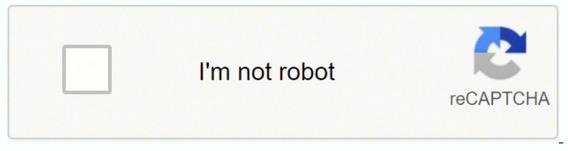

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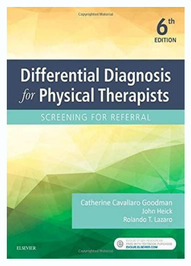

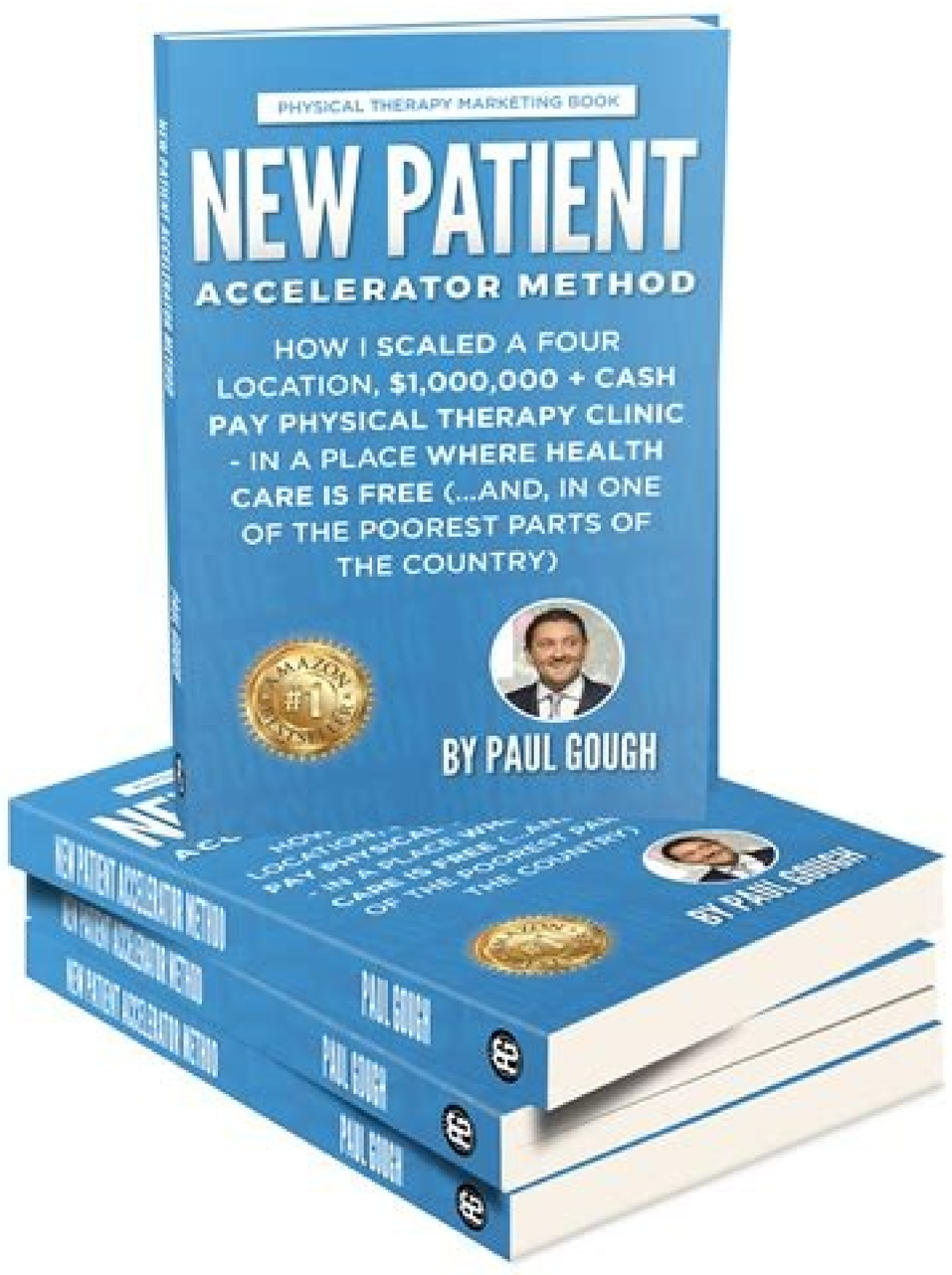

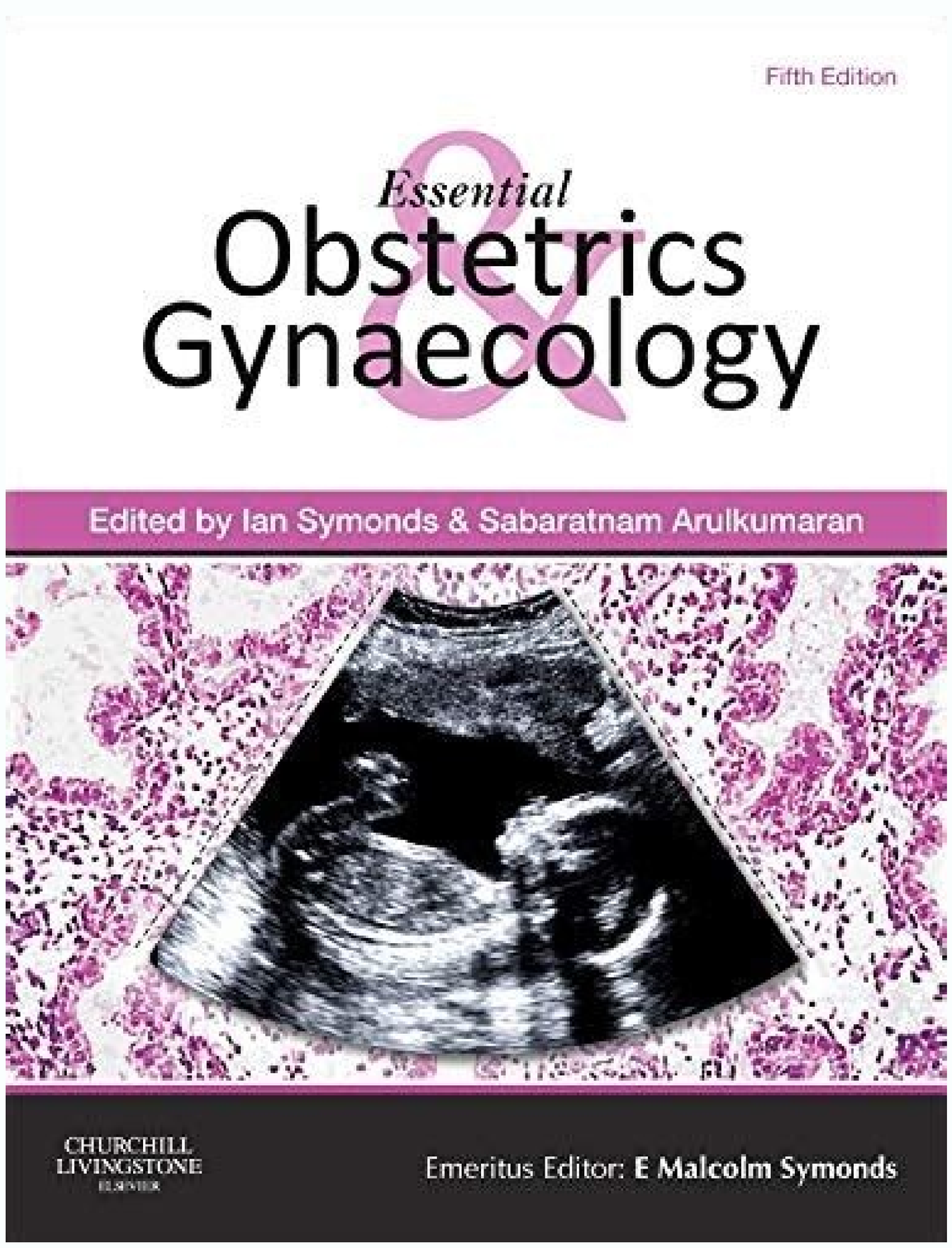

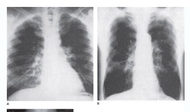

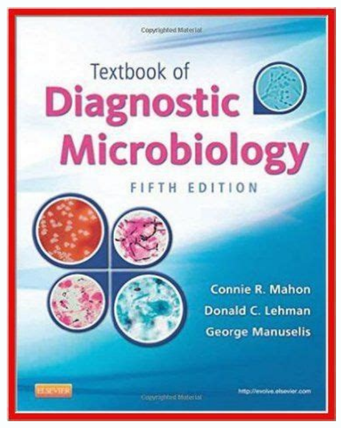

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Malmberg K, Yusuf S, Gerstein H.C, et al. Cardiac Rehabilitation: Clinical Practice Guideline, Number 17. Coons J.C, Seidl E. The symptoms of obstructive pulmonary disease are similar to restrictive disease in that many individuals complain of dyspnea or shortness of breath. Robinson K, Arheart K, Refsum H, et al. 2000;80(9):896–903. Cardiopul Phys Ther J. Thus they can be used interchangeably and the pharmacist is allowed to dispense the generic drug version even if the physician did prescribe the brand name drug (unless specifically prohibited by the physician). States in the second highest mortality rate category were predominantly coastal states. Frequency Usually in the acute care patient population, multiple short sessions of exercise are repeated two or three times per day as tolerated and should be performed six or seven times per week.78 Modes of Exercise Mode refers to the method of exercise or technique that is to be used for training. Stomach and intestinal abnormalities are not uncommon in these patients, who frequently receive many medications with profound side effects.104 In addition, the interrelated disease processes occurring in other organs because of CMD and CHF frequently produce anorexia, which leads ultimately to malnutrition. Further interventions should be withheld until cerebral compliance improves. In the screened population, 92 (26.5%) individuals were identified via ABI and questionnaire to have PAD.49 These individuals had no prior indication of their illness. More recently, a group of direct thrombin and factor Xa inhibitors—dabigatran, rivaroxaban, and apixaban—has been introduced. 1985;64:371–387. When air can move freely through the chest wall, into and out of the pleural space, the patient is unable to maintain a negative pleural space pressure. The difference between ischemia and infarction is covered in detail in Chapter 3. Prox1 is a master control gene in the program specifying lymphatic endothelial cell fate. 1992;327(10):669–677. Because of the reflex nature of the feedback “loop” of the autonomic nervous system, the effects of these agents must be monitored closely. Portable equipment utilizing the anteroposterior (AP) orientation is used to take chest films of patients who are too sick or unstable to be transported to the radiology department for a standard PA film. By fine manipulation of the degree of vasodilation, vasoconstriction, or cardiac inotropy, an adequate mean arterial blood pressure can be established with drug therapy. Lung Volumes Restrictive lung dysfunction eventually causes all the lung volumes and capacities to become decreased. For example, a patient who requires supplemental oxygen may be breathing through the mouth and therefore not inhaling the oxygen appropriately. This combination is consistent with high probability of pulmonary embolism. I will click it each time you turn around at this starting line. 231. The normal FEF25–75 is approximately 4 L/sec (240 L/min). Ross R, Glomset J.A. The pathogenesis of atherosclerosis (second of two parts). Some patients with respiratory distress are given corticosteroids to speed up this process.8,25 Penicillamine This drug is used to treat Wilson disease, cystinuria, primary biliary cirrhosis, scleroderma, and severe RA in patients who have failed to respond to conventional therapy.30 However, it can cause bronchiolitis obliterans, which contributes to both obstructive and restrictive lung dysfunction, Goodpasture’s syndrome, or penicillamineinduced SLE. 59. 1999;17:255–281. 2014. (From Walsh D, Caraceni AT, Fainsinger R, et al: Palliative Medicine, Philadelphia, 2008, Saunders.) In any systematic approach to the interpretation of ABGs, it is advantageous to focus upon three principal categories: the adequacy of alveolar ventilation, the acid–base balance, and the oxygenation status. Initial reports of human lung transplantation using donors after cardiac death show comparable outcomes to more traditional donors, and this practice is increasing.114 There is a trend to offer heart transplantation to higher-risk patients, both in terms of advanced age and increased comorbidities, but outcomes continue to improve despite this trend.28 The median age of heart transplant recipients has increased from 40 years in 1982 to 53 years of age in 1996, and recipients who are 70 years of age or older increased from 0.2% to 1.3% in this same period and now comprise 1.3% of overall heart transplants. This could then be followed by fibrotic changes.16 In a study of more than 31,000 patients with diabetes mellitus, pulmonary fibrosis was found in 0.8% of the diabetic population, which is a moderately greater incidence than that reported for the general population.35 Juvenile diabetics have shown a decrease in elastic recoil of the lungs and in lung compliance, causing a decrease in TLC.33,35 These abnormalities in ventilatory mechanics are thought to be due to changes in the elastin and collagen within the lung. Early progressive mobilization of left ventricular assist device patients is safe and optimizes recovery prior to cardiac transplant. Altered resting and exercise respiratory physiology in obesity. As this improves the patient’s use of the diaphragm, the therapist’s hand can be removed. 2004;42:I49–I61. FIGURE 16-1 The elements of patient management leading to optimal outcomes. The wean attempt will be terminated with any of the following signs of respiratory distress57,51,58: ■ Respiratory rate greater than 35 breaths per minute ■ Appearance of paradoxical breathing pattern, use of accessory muscles of respiration, or dyspnea ■ Desaturation with SaO2 less than 90%, any decrease of PaO2, or increase in PaCO2 of 5 mm Hg as monitored by ABG values, especially in the presence of acidosis with a pH less than 7.30 ■ Change in heart rate greater than 20 beats per minute, a change in blood pressure more than 20 mm Hg, angina, cyanosis, or cardiac arrhythmias ■ Change in level of consciousness Methods of Weaning Common methods of weaning currently utilized include intermittent mandatory ventilation (IMV), timed spontaneous breathing periods using a T-piece, and pressure support ventilation (PSV). Fonarow G.C. A review of evidence-based beta-blockers in special populations with heart failure. From the physical therapist’s perspective, a mechanical ventilator is an assistive device capable of performing a wide range of support for the act of breathing. 2007;4:548–559. Overt heart disease occurs in less than 25% of patients but is found in up to 80% at autopsy and results from either primary involvement of the heart or secondary involvement by SSc affecting the kidneys or lungs.229 Myocardial fibrosis (resulting from vasospasm and small vessel disease producing ischemia/reperfusion damage, as well as occlusive arterial disease) leads to cardiomyopathy.235 Other cardiac manifestations of SSc include myocarditis, pericarditis, and occasionally conduction disturbances and arrhythmias and valvular abnormalities. J Gerontol Nurs. Validity of a quality of well-being scale as an outcome measure in chronic obstructive pulmonary disease. To quote Limongelli et al: “Adult and pediatric cardiologists should be aware that skeletal muscle weakness may indicate a primary neuromuscular disorder…, a mitochondrial disease…a [glycogen] storage disorder… or metabolic disorder. A pulse oximeter (Fig. Clinical manifestations of heart failure. (Courtesy of Zoll Lifecor Corporation, Pittsburgh, PA. The safety of mobilization and its effect on hemodynamic and respiratory status of intensive care patients. Oxygen transport: The basis for cardiopulmonary physical therapy. Collins S.M, Cahalin L.P. Acute care physical therapy in patients with pacemakers. Before the use of cyclosporine (Sandimmune), the first CI to be used for patients undergoing heart transplantation, the 1-year survival rates were, at best, 65%.86 Cyclosporine use, either alone or in combination with prednisone, has resulted in a lower incidence of rejection and infection in this population.87 This agent appears to act at an early stage in stem cell differentiation to block the activation of T cells, which are significantly involved in rejection reactions. In such patients, skeletal muscle weakness usually precedes cardiomyopathies and dominates the clinical picture. 1991;6:686–694. Pulmonary involvement occurs in 20% to 85% of patients, according to the most dominant clinical pattern, and most often consists of interstitial lung disease and pulmonary fibrosis, pleural effusion, and pulmonary HTN, which is a major cause of morbidity and mortality.228 The most common cardiac manifestations are pericarditis and mitral valve prolapse. Clinical and surgical significance. The neck is the 1-inch long portion of the rib extending laterally from the head; it provides attachment for the anterior costotransverse ligament along its cranial border. While mechanically supported on a ventilator, the diaphragm can lose 5% of its strength per day.40 When the patient begins the weaning process, the inspiratory muscles will gain endurance while performing inhalations without the assistance of the ventilator. However, if the patient complains of dizziness with an increase in activity and a blood pressure drop is noted, this patient is defined as having exertional hypotension. In addition, the alveolar surfactant decreases over a period of approximately 24 hours, which results in alveolar collapse and regional atelectasis. 1997;77(8):1764–1766. Normal nonsmoking individuals have a progressive loss of FEV1 but never become symptomatic with airway obstruction. Ventilation–perfusion matching is markedly impaired. Innervation Although the SA node and conduction pathway have an intrinsic rate of depolarization causing contraction of the myocardium, the autonomic nervous system influences the rate of impulse generation, contraction, relaxation, and strength of contraction.6,17 Thus autonomic neural transmission creates changes in the heart rate and contractility to allow adjustments in cardiac output to meet metabolic demands. EMBO J. Corcoran Memorial Lecture. These coal macules are often located at the division of respiratory bronchioles and are often associated with focal emphysema.35 Lymph nodes are enlarged and homogeneously pigmented and are firm but not fibrotic. 1986;1:1229–1232. Heart rate is again recorded at the end of the final 3 minutes. Natl Vital Stat Rep. It presents later in life and is slower in progression, so that 50% of patients survive to age 40 and some have a near-normal life expectancy. St. Louis: Mosby; 1998. REF. Tubes may be connected to a small one-way valve (Heimlich valve) that allows air or fluid to escape from the pleural space while preventing reentry.32 Fig. This is especially true when treating elderly women (mean 85 years old) with systolic heart failure.67,68 Another problem in the elderly is the presence of noncardiac diseases, as well as the use of multiple drugs for all conditions increasing the risk of unwanted drug interactions. The prevalence of depression and anxiety were shown to be higher in patients with more severe COPD and in those requiring supplemental oxygen.9 Some estimates suggest that individuals with COPD are two and a half times more likely to have anxiety and depression than are healthy persons.10 Cognitive impairment is also prevalent in patients with COPD and can be complicated by chronic hypoxemia.11–13 Cognitive impairment worsens as the disease progresses.14–17 These impairments include recent memory loss, construction, visual processing, number sequencing, attention, language and orientation, cognition flexibility, and shifting capacity. Because most patients who undergo dobutamine stress testing have bronchospastic lung disease, β-blockers should be used with caution. Ischemic Heart Disease Antiischemic Drugs Dramatic changes took place during the latter part of the twentieth century in the pharmacologic management of ischemic heart disease. 1986;6:299–316. Prothrombin time and partial thromboplastin time measure the coagulation of the blood. 1990;81(1 Suppl):II47–II58. In: Kronenberg HM, Melmed S, Polonsky KS, Larsen P Textbook of Endocrinology. 1997;15:513–515. Coronary heart disease: Epidemiology of smoking and intervention studies of smoking. Neas L.M, Schwatrz J. A quantitative arteriographic analysis. Mechanical ventilator pressures can also cause air leaks, tension pneumothorax, and extensive pulmonary interstitial emphysema. 1991;2:462–473. If a patient reports chest pain during the patient interview and can point to the exact area of pain, then palpation should be done to assess whether this pain is of musculoskeletal origin. The Kidney and Body Fluids in Health and Disease. In longitudinal studies, patients who participated in exercise at age 36 and 43 had the lowest rate of memory decline at age 53.157 Most evidence supports that aerobic exercise benefits cognitive function. New York: McGrawHill; 1983. Mol Cell Endocrinol. Further, MRI has similar diagnostic accuracy as PET imaging and is similarly used as a noninvasive test to assess regional blood flow problems, but it is more widely available and often less expensive.75 Nuclear magnetic resonance can produce high-resolution tomographic pictures of the heart without using any radiation. Table 5-10 Pneumonia transmission and treatment AIDS, acquired immunodeficiency syndrome; ARDS, adult respiratory distress syndrome; COPD, chronic obstructive pulmonary disease. Linnebur S.A. What’s new about old drugs: implications for the care of older adults. The cardiac plexus receives its parasympathetic input from the right and left vagus nerves.17 Subsequently, nerves branch off the plexus, follow the coronary vessels, and innervate the SA node and other components of the conduction system. 1998;31:15–20. Research now is revealing that it likely is due to a fibrotic response driven by abnormally activated alveolar epithelial cells.16 The most important environmental risk factors are cigarette smoking and exposure to metal and wood dust.16 Other potential risk factors include microbial agents and gastroesophageal reflux.17 Genetic transmission occurs in about 0.5% to 3.7% of cases.16 Pathophysiology The pathogenesis remains largely unknown. These different pulmonary disorders cause acute or chronic RLD with decreased lung compliance, increased ventilation–perfusion mismatching, decreased DLCO, hypoxemia, and hypercapnia. Reliability Reliability is a measure of the repeatability of a measure through evaluation of its test– retest capability and its internal consistency. In the lung, this would include the capillary endothelial cells, the type I alveolar epithelial cells, and the type II pneumocytes. 2000;8(6):463–465. Consequently, anesthetists and anesthesiologists usually opt for lighter general anesthesia in conjunction with muscle-paralyzing agents to produce the desired degree of immobilization. 2007;120:S12–S18. It is important to note that adult females tend to demonstrate a slower rate of rise in the systolic pressure during exertion in contrast to adult males. ■ Systolic dysfunction refers to an impairment of ventricular contraction, resulting in decrease in stroke volume and decrease in ejection fraction. Upper Saddle River: Prentice Hall; 2002 2002. 1975;26:113–128. Fam Pract. Hoffman L.A. Novel strategies for delivering oxygen: reservoir cannula, demand flow, and transtracheal oxygen administration. The pericardial friction rub sounds like a “creak” with each beat and has also been described as a “leathery” sound, as if two pieces of leather were being rubbed together.24 Palpation Palpation is an assessment technique employed to refine the information previously gathered from the chart review, inspection, and auscultation. The majority of patients treated with hemodialysis show a decrease in arterial oxygen concentration (PaO2) during treatment, which results from hypoventilation induced by loss of CO2 or metabolic alkalosis, depending on the type of dialysate used.207 Other forms of treatment are also associated with pulmonary abnormalities. Eldridge J.E, Hossack K.F. Patterns of oxygen consumption during exercise testing in peripheral vascular disease. 2003;75(1):314–321. 1982;113:261–266. Respiratory muscle function and exercise capacity in multiple sclerosis. Philadelphia: Lippincott Williams & Wilkins; 2000. Appl Physiol Nutr Metab. If the patient is lying on the left side, the therapist slides the left hand to the patient’s shoulder and the right hand to the patient’s right gluteal fossa at the beginning of expiration. A hypertensive response to low-level exercise (over 160/90 mm Hg) in the patient who is at least 3 days post–myocardial infarction may be indicative of cardiac ischemia.79 There should be an increase of 8 to 12 mm Hg for each metabolic equivalent of energy expenditure (MET). Fig. As cuff pressure is diminished, the sounds increase in intensity and then rather suddenly become muffled at the level of diastolic pressure where the arteries remain open throughout the entire pulse wave. Cannon C, Braunwald E. There is therefore excess fluid in the pleural space, causing a bilateral pleural effusion. Evaluation of a brief aerobic exercise intervention for high anxiety sensitivity. 6-2 are present only in severe obstructive lung disease; therefore a CXR is of limited value in diagnosing obstructive lung disease. To maintain oxygenation, supplemental oxygen is provided. 1997;5:153–157. The lower portion of Fig. 2014 2047487314564729, 2016 Jan, 23(1):75–85. Diffusing capacity is therefore reduced, and physiologic dead space is increased.11 The static elastic recoil of the alveolar tissue decreases, which means that alveolar compliance is increased and the lungs do not empty well. Centers for Disease Control and Prevention (CDC). Psychological impairments also play a significant role in activity tolerance, exercise capacity, and individuals’ ability to perform activities of daily living. The antihypertensive effect can be increased by a number of herbal preparations, such as mistletoe, kelp, black cohosh, and dandelions. Effective drug management is complex and multidimensional; it is strongly influenced by metabolic processes—the functioning of the liver, kidneys, lungs, heart, and circulatory systems. 1972;45(Suppl 1):147–153. The scalenes, trapezius, and intercostals work harder than normal when their contribution to normal resting or exercise breathing is increased. Postoperative pulmonary embolism is usually treated with low-dose heparin. Oxygen delivery systems are discussed in Chapter 13. Respir Care. This discussion will serve only as a brief review of key concepts influential in the drug management of heart failure. Numerous cardiac conditions, including cell hypoxia, ischemia, scarred tissue, and medications, can alter these parameters and can cause some cardiac cells that normally have fast action potentials to become faster or much slower, and slow action potentials to respond faster or slower than normal. Res Nurs Health. Auscultation of the heart is performed in a systematic fashion using both the bell and diaphragm of the stethoscope at the indicated sites. During the activity evaluation, the patient’s heart rate and rhythm (via ECG telemetry if possible), blood pressure, and symptoms should be monitored with all activities (and O2 saturation, if applicable). Maron B.J, Fananapazir L. When these breaks are double stranded, the cell cannot correctly repair the damage, and so the integrity of the chromosome is disrupted.30 Chromosomal aberrations do not affect the survival or function of the cell until it tries to replicate itself. 1977;296:898–903. A temperature probe can also be found in the nose or connected to the Foley catheter. 1988;9(Suppl H):49–53. ■ Spinal cord injury can also produce CMD because of cervical spinal cord transection, which causes an imbalance between sympathetic and parasympathetic control of the cardiovascular system. Clin Invest Med. Transplant Proc. Philadelphia: Lea & Febiger; 1993. Pulmonary diagnostic tests and procedures Chest Imaging Bronchoscopy Pulmonary Function Testing Blood Gas Analysis Oximetry Cytologic and Hematologic Tests Summary Section 4. Computed tomography scan and MRI may be indicated if there is suspicion of respiratory failure. She plans to return to extended care at the retirement home until she is able to take care of herself. A score above 6 is a high probability, 2 to 6 is a moderate probability, and below 2 is low.56 Table 5-18 Clinical manifestation of pulmonary emboli ECG, electrocardiograph; PE, pulmonary emboli; RR, respiratory rate. Another way of expressing airflow limitation is to measure the amount of air that can be exhaled in 1 second as a percentage of the total amount of air that can be forcefully exhaled, or the FEV1/FVC ratio × 100%. 1959;169:1286–1296. Hunt, I am Erica, from Physical Therapy. Curr Probl Dermatol. ■ Phase 2 is the plateau phase affected by calcium and potassium movement across the membrane. Multiple Risk Factor Intervention Trial Research Group. Differential diagnosis includes hysteria, stroke in the brainstem, acute neuropathies, and porphyria.54 Clinical Manifestation The clinical manifestation of Guillain–Barré syndrome can be found in Table 5-23. Typical immunosuppression regimens combine drugs specific to the type of rejection and phase of recovery (perioperative, also known as the induction period, and maintenance periods). FIGURE 5-23 Paradoxical breathing. Cardiac catheterizations are performed to visualize the cardiac dysfunction and to assist in the decision-making process regarding medical versus surgical management. ■ The physical therapist assesses the patient’s cardiac and pulmonary system limitations, as well as musculoskeletal condition, exercise capacity, ventilatory function, and mucociliary clearance. Ejection fraction, peak exercise oxygen consumption, cardiothoracic ratio, ventricular arrhythmias, and plasma norepinephrine as determinants of prognosis in heart failure. 116. CBC: RBC 4.0 million/μL, WBC 5000, WBC differential—neutrophils 60%, lymphocytes 30%, monocytes 5%, eosinophils 1%, basophils 0.50%; hematocrit 30%, hemoglobin 10 g/100mL, platelets 300K/μL. Cholesterol is a naturally occurring fatlike substance that is found within various tissues of the body: cell membranes, hormones, and plasma. 23. The epithelium of the terminal and respiratory bronchioles is single layered and more cuboidal in shape, and many of the cells are nonciliated. In: Payton O.D, ed. 1983;106(2):316. Adult Treatment Panel III. 1999;159:1257–1266. Scoliosis also rotates the lungs as the scoliotic curve progresses throughout life. An individual may or may not have had symptoms of classic angina before experiencing the intense and constant pain of preinfarction angina. 2007;115(15):e407. Stewart A, Hays R, Ware J.J. The MOS short-form general health survey. Furthermore, albumin or mannitol may be used to increase osmotic pressure to combat the increased hydrostatic forces. The right atrium receives deoxygenated blood from three major vessels. American Physical Therapy Association. FIGURE 8-7 Worksheet for interpretation of exercise test results. Some drugs called prodrugs are pharmacologically inactive and are only activated in the body by these reactions. SpO2 on 2 L/min O2 per nasal cannula—94% at rest. Bowden M.G, Balasubramanian C.K, Behrman A.L, Kautz S.A. Validation of a speed-based classification system using quantitative measures of walking performance post-stroke neurorehabil neural repair. 1990;81:491–497. However, not all patients are appropriate candidates for low-level exercise testing. 2009;52:17–30. What examination procedures can be performed to help determine the urgency of this matter? If the needle is placed too low on the chest, the diaphragm or organs below the diaphragm can be punctured. These medications work by blocking proteins needed for clot formation, which in turn slows and/or prevents this process. Guyton A.C. The relationship of cardiac output and arterial pressure control. ■ Aerobic and resistance exercise are important interventions for all individuals who are obese as a means of increasing energy expenditure, improving cardiorespiratory fitness, ameliorating CV risk factors, protecting against loss of lean body mass during caloric restriction, and increasing muscular efficiency, even if no weight loss is achieved. 16-19). 1991;16:296–301. Pharmacol Ther. Minneapolis: University of Minnesota; 1975. Weight loss, exercise, or both and physical function in obese older adults. Magee C.L. Physical therapy for the child with asthma. 1998;92:S25–S32. Examining Chest Radiographs Although there is no single “best” method for examining chest radiographs, a systematic approach should be used. Hagberg J.M, Montain S.J, Martin W.H, Ehsani A.A. Effect of exercise training in 60- to 69-year-old persons with essential hypertension. 2005;6:225–240. Major G.C, Chaput J.-P, Ledoux M, et al. Normal adult respiratory rates during quiet breathing are between 12 and 18 breaths per minute. Pericardial Friction Rub An abnormal sound associated with each beat of the heart is known as a pericardial friction rub. MRC/BHF Heart Protection Study of cholesterol lowering with simvastatin in 20,536 high-risk individuals: A randomised placebo-controlled trial. Individuals undergoing this procedure need to know that this is not 100% reliable for all populations (those at risk versus those not at risk for CAD). 1992;267(6):4143–4151. Normocytic anemia (hypochromic) is found in chronic infections, lead poisoning, chronic renal disease, and malignancies, whereas normochromic anemia is found in hemorrhage, hemolytic anemia, bone marrow hypoplasia, and splenomegaly. AACVPR Outpatient Cardiac Rehabilitation Data Registry. Health professionals responsible for monitoring the exercise response of patients on antiarrhythmic agents should understand the basis of arrhythmia production and suppression. The name relates to its presentation by twisting around the isoelectric line. The utility of the FEV1 measurement is exemplified by the simple relationship between it and the associated degree of obstruction: ■ Little or no obstruction: FEV1 greater than 2.0 L to normal. The belief is that the inspiratory component of vesicular sounds is produced regionally within each lung and possibly within each lobe.15 The expiratory component is believed to be produced in the larger airways. This test is performed with the patient standing. Thygesen K, Alpert J, White H. The preferred method of predicting functional capacity is via the maximal workload performed on the treadmill test. The presence of a chest tube is not a contraindication to mobilization. Lambers S, Van Laethem C, Van Acker K, et al. Patient able to ambulate 300 ft and maintain SpO2 levels above 92% on room air. This device is implanted in patients with end-stage heart failure as: ■ A bridge to recovery until the clinical condition improves ■ A bridge to transplantation while waiting for a donor heart ■ A destination therapy for patients who are not eligible for a cardiac transplantation. Moschen A.R, Kaser A, Enrich B, et al. 1997;156:133–139. Measurement of PFTs is done via spirometry. Problems occur if respiratory muscle weakness develops and the patient develops hypoxemia and low ventilation or weakness of swallowing muscles, making him or her at increased risk of aspiration pneumonia. Although the body tries to preserve the tidal volume (TV) in RLD, the compliance gradually decreases and the work of breathing increases; thus the TV decreases. 2009;9(2):333–342. Lymphocytes, mononuclear cells that circulate in the blood and lymph, interact with foreign substances to protect the body from invasion. The normal value for serum glucose is 80 to 110 mg/100 mL of blood, measured in the fasting state. Lipoproteins of human peripheral lymph. The use of identifying specific genetic mutations, such as in cystic fibrosis, and targeting the action of specific cell receptors to achieve desired effects is a continued focus in the development of new medications to address pulmonary disease. Lung Contusion Treatment is supportive and preventive. ■ Diabetes mellitus, general nonblack population: thiazide-type diuretics, ACE inhibitors, ARBs, calcium-channel blockers are recommended. The patient may be log-rolled for turning in bed. 1997;26:15–19. In this technique, the therapist places both hands on the lateral aspects of the rib cage and gently applies pressure against the ribs during inspiration. They may be useful in the treatment of supraventricular tachycardia (SVT), with classes 1C (and III) being the most effective for pharmacologic cardioversion of atrial fibrillation.40,41 The ECG of a patient on a class 1 antiarrhythmic drug may exhibit a prolongation of the QRS duration, with a normal or prolonged PR interval. Give five to ten breaths via manual resuscitator bag. Therefore it is important to use a combination of disease-specific and generic outcome measures and tools to present a complete picture of the individual’s status and progress. Clin Cancer Res. 2013;1(5):382–388 Epub 2013 Sep 11. An increase in venous capacitance results in a decrease in preload and therefore in LV end-diastolic pressure and decreases myocardial oxygen demand; an increase in arterial resistance decreases afterload and thereby decreases myocardial oxygen demand. A cardiac catheterization revealed occluded grafts to the right coronary artery and left anterior diagonal artery and high-grade occlusion of the circumflex artery, inferior hypokinesis, and depressed EF (approximately 30%). 4-22). 1987;135:363. 1996;25:1172–1181. Upper Saddle River: Prentice Hall; 2008. Silber T.J. Ipecac syrup abuse, morbidity, and mortality: isn’t it time to repeal its over-the-counter status? The group depends on the clinical presentation. Safety in testing has been demonstrated in all populations, including those patients with diabetes, as long as similar pretest and monitoring procedures are followed as in exercise testing.158 In addition, pharmacologic stress testing has been shown to be safe in patients who have undergone thrombolysis following acute MI as soon as 2 to 5 days after initiation of thrombolysis.157,159 The sensitivity of dipyridamole SPECT imaging, 89% (95% CI = 84% to 93%), was higher than that of dipyridamole echocardiography, but the specificity of dipyridamole SPECT imaging, 65% (95% CI = 54% to 74%), was lower than that of dipyridamole echocardiography. Although heroin is an excellent analgesic fulfilling the biological definition, it is not allowed today to be medically used because the FDA does not allow its use. Alternatively, early mobilization has been shown to be as effective as deep breathing exercises after gallbladder and cardiac bypass surgery.46–48 FIGURE 17-9 Patient using an incentive spirometer. Environmental/Occupational Causes Coal Workers’ Pneumoconiosis Coal workers’ pneumoconiosis (CWP), an interstitial lung disease, is defined as the accumulation of coal dust in the lungs and the subsequent reaction by the surrounding tissue. 2014;67(6):681–688 Date of Electronic Publication: 2014 Feb 17. The latter three were known as nosocomial.1 The World Health Organization estimates that lower respiratory tract infection is the most common infectious cause of death in the world (the third most common cause overall), with almost 3.5 million deaths yearly.2 Together, pneumonia and influenza constitute the ninth leading cause of death in the United States, resulting in 50,000 estimated deaths in 2010.40 Etiology Community-acquired pneumonias can be divided into two types: acute and chronic. Age-related c hanges Aging appears to dec rease c ardiac output by altered c ontrac tion and relaxation of c ardiac musc le. 1993;12:549–562. Circulatory studies on healthy old men. 1985;86(5):637–651. The effect of physical training on walking tolerance and venous lactate concentration. This information is accessible at . Westerterp-Plantenga M.S, Nieuwenhuizen A, Tomé D, et al. 2008;34:2–11. 260. High-density lipoprotein (HDL) is secreted by both liver and intestines. There is variance among image quality with the use of established low-dose protocols. Values for FVC, FEV1, peak flow, and so on should be the same as those obtained by conventional spirometric methods. Assessment found no functional limitations in any extremity concerning range of motion or manual muscle testing. The seriousness of the dysfunction may also be inferred from the magnitude of deviation of the values from normal. Approximately 20% of individuals older than 50 years of age who begin renal dialysis have atherosclerotic RAS as the cause of their renal failure. These vessels have no valves; instead, pectinate muscles extend from the atria into the pulmonary veins and exert a sphincterlike action to prevent backflow of blood during contraction of the atria. Prevalence of overweight, obesity and extreme obesity among adults: United States, trends 1976–1980 through 2005–2006. ST-segment elevation myocardial infarction: management. Hemodynamic invasive monitoring of blood pressure requires a pressure transducer, pressure transmission (connective) tubing, and a pressure monitor or recorder. Pulmonary function tests can measure static and dynamic properties of the chest and lungs as well as gas exchange. The SAPALDIA Team. In patients with emphysema, the chronicity of the disease leads to progressive destruction of the elastic recoil, making the compliance high.13 A reduced inward pull from low recoil allows small changes in transmural pressure to cause large changes in lung volumes and resultant hyperinflation of the lung. 108. In that year the National Institutes of Health Consensus Conference concluded what many practitioners had believed for years: elevated blood cholesterol levels, especially low-density lipoprotein (LDL), were associated with premature coronary heart disease (CHD) and, most important for clinical practice, lowering the LDL levels decreased the risk of developing CHD. A comparison of warfarin and aspirin for the prevention of recurrent ischemic stroke. At TLC, the force of the inspiratory muscles is balanced by the inward elastic recoil of the lung. (From Chee SP: Positioning patients with severe kyphosis during cataract surgery, J Cataract Refractive Surg, 36(2):366–67, 2010.) BO X 17- 3 C ont ra indica t ions or pre ca ut ions for a dva ncing funct iona l m obilit y • Untreated deep vein thrombosis • Unstable vital signs • Patient not able to follow commands, fully sedated • High ventilatory support (for removing the patient from the ventilator for mobility) • Contraindication: PEEP or CPAP > 10 cm H2O • Precautions: PEEP or CPAP > 5 cm H2O PAP > 50 cm H2O minute ventilation > 15 L/min • Other orthopedic, vascular, or neurologic injury that requires alternative bed activities Positioning for Dyspnea Relief Dyspnea is defined as the sensation of difficult or labored breathing.23 The patient may experience dyspnea at rest or after a period of activity. The pump can be driven by air (pneumatic) or with a battery. Barbato M. 1987;83:43. Cahalin L.P, Certo C, LaFiandra M, et al. 2007;297(22):2502–2514. In addition, as incisions heal, they can bind to the underlying tissue and further limit chest wall expansion. Positron emission tomography (PET) scans or CT scans can show smaller lesions and presence of metastatic lesions. 1988;78(Suppl 11):624. 306. Classically, any discomfort, such as chest pain, tightness or pressure, shortness of breath, palpitations, indigestion, and burning, should be considered a cardiac symptom unless cardiac dysfunction has been ruled out. 2006;77(Suppl 1):34–40. Moe G.W, Canepa-Anson R, Howard R.J, et al. Plasmapheresis to remove the immunoglobulin G (IgG) antibody is sometimes used. Lymphedema microsurgical preventive healing approach: A new technique for primary prevention of arm lymphedema after mastectomy. FIGURE 2-6 Two pairs of unequally filled alveoli arranged in parallel illustrate the effect of a surfaceactive agent. Bilateral depressions are seen laterally to the cartilage of the costochondral junction, which is bilaterally hypertrophic; the sternum projects anteriorly. ↑ Elevated alkaline phosphatase 12. Littleton S.W, Mokhlesi B. However, atropine is readily absorbed into the systemic circulation and has been frequently associated with a number of adverse reactions. All types can cause a restrictive impairment within the lung. The physician then interprets the results and plans the treatment accordingly. A cardiac index of less than 2.2 L/min/m2 is considered diagnostic of cardiogenic shock.17 Mixed Venous Oxygen Saturation The supply of oxygen to the tissues depends on CO, Hb level, and SpO2. Oiknine R, Bernbaum M, Mooradian A.D. A critical appraisal of the role of insulin analogues in the management of diabetes mellitus. ■ Eating disorders are associated with numerous medical complications. This pseudostratified olfactory epithelium is composed of ciliated receptor cells, nonciliated sustentacular cells, and basal cells that help to provide a sense of smell.8 Sniffing increases the volume of inspired air entering the olfactory region, allowing the individual to smell something specific.4 The respiratory region is lined with a mixture of columnar or pseudostratified ciliated epithelial cells, goblet cells, nonciliated columnar cells with microvilli, and basal cells. When an irregular fetal heart rate is detected, transplacental steroids may be administered. The ability of the infant or child to respond to adequate concentrations of a cardiac drug is influenced by structural concerns that are unique to the developing organism.74,75 Although not well studied in humans, fetal and newborn puppies and lambs exhibit (1) stiffer, less compliant ventricles; (2) smaller myocardial cells (adjusted for weight and size); and (3) a higher proportion of noncontractile to contractile tissue (e.g., mitochondria to myofilaments) compared with the adult. 69. The process of muscular contraction requires the availability of actin, myosin, troponin, tropomyosin, and calcium. H. 96. In addition, less symptomatic hypotension and bradycardia occur. Fonder M.A, Loveless J.W, Lazarus G.S. Lipedema, a frequently unrecognized problem. Philadelphia: Elsevier; 2003. In insulindependent diabetics, hypoglycemia may occur during or immediately after the exercise session or hours after the session has ended as the muscles are replenishing their energy stores. Pearlman D.S. Pathophysiology of the inflammatory response. 137. Kigin C.M. Chest physical therapy for the postoperative or traumatic injury patient. 2014;64(1):6. Drug holders with the day of the week written on each compartment may improve compliance with medications. S Afr Med J. The normal diffusing capacity of carbon monoxide is approximately 25 to 30 mL/min/mm Hg. Although there may be many causes for an abnormal DLCO test, they usually can be attributed to three key factors: (1) decreased quantity of hemoglobin per unit volume of blood; (2) increased “thickness” of the alveolar–capillary membrane; and (3) decreased functional surface area available for diffusion. The TandemHeart pVAD is a continuous-flow centrifugal assist device placed extracorporeally. ■ Treatments for obesity include caloric restriction and other diet modifications, increased physical activity, behavioral modification, pharmacotherapy, and bariatric surgery, depending on the degree of obesity. 1-1). 1991;36(2):229. Conceptual Framework and Item Selection. In patients with chronic obstructive pulmonary disease (COPD), there is compromised ability to expire. Published online November 12, 2013. The exercise prescription of patients with CHF can be progressed when (1) the cardiopulmonary response to exercise is adaptive (see Table 4-15) and (2) workloads that previously produced moderate dyspnea (e.g., Borg rating of 3/10) produce mild dyspnea (e.g., Borg rating of 2/10 or less). Regensteiner J.G, Steiner S.F, Panzer R.J, et al. Two sets of laryngeal muscles (internal and external) play important roles in swallowing, ventilation, and vocalization. Also, a pause occurs between the inspiratory and expiratory components. Extending the benefits of early mobility to critically ill patients undergoing continuous renal replacement therapy: the Michigan experience. Biopsy studies indicate that skeletal muscles frequently have abnormal structure and function, referred to as uremic myopathy. 2001;121:879. The drop in pressure allows for a filling of the veins, and the changing pressure within the abdomen and thorax cause a milking effect to help return blood back to the heart. 2005;16:17–23. Addressing the patient’s cardiopulmonary impairments can result in improved oxygen transport, which is critical for the patient to progress toward functional goals. In simplified form, it involves the activation of blood proteins (including clotting factors, prothrombin, fibrinogen), platelets, calcium, and lipids. Anything that increases airway resistance, increases flow rates, or decreases lung or chest wall compliance increases the work of breathing. B, During expiration, the increase in pleural pressure produces an outward displacement of the flail segment. A randomized, prospective study of a role for adjunctive intermittent pneumatic compression. Ornish D, Scherwitz L.W, Billings J.H, et al. ∗ Paco2 is inversely proportional to VA. ■ Lymph consists of proteins, water, fatty acids, and cellular components (including bacteria and cellular debris). Aerobic exercise as an adjunct therapy for improving cognitive function in heart failure. Managing the diabetic patient. The Sickness Impact Profile: Development and final revision of a health status measure. Accelerated atherosclerosis is related to numerous CV risk factors commonly seen in patients with CKD: DM and insulin resistance, HTN, dyslipidemia, and obesity. As understanding of atherosclerosis increased, the impact of inflammation, lipid metabolism, and cellular physiology on the development of atherosclerosis led the way to the development of new drugs with improved and earlier drug management. National Institute for Health and Care Excellence, . Incidence, natural history and cardiovascular events in symptomatic and asymptomatic peripheral arterial disease in the general population. Kouidi E. Clinical Manifestation The clinical manifestation of pneumonia can be found in Table 5-11. Exerc ise with LVADs Progressive inc rease in exerc ise; should demonstrate normal responses. 14-7). Therefore the treatment of choice for ESRD, particularly in younger patients, is kidney transplantation. The local pulmonary microvasculature is damaged, causing red blood cells and plasma to move into the alveoli.32 This immediately decreases the compliance of the lung, changes the distribution of inspired gases, and increases ventilation–perfusion mismatching. Proteoglycans, lipoproteins, and atherosclerosis. 2009;36:271– 285. 9-50, A). Again, extent of movement and symmetry of movement should be documented (see Fig. Tiep B.L, Burns M, Kao D, et al. Gen Hosp Psychiatry. 2014;311(8):806–814. Heart excision and replacement. Fifty percent of patients who undergo a thymectomy have stable and long-lasting complete resolution of symptoms.60 Diagnostic Tests History and clinical manifestations are primarily used for diagnosis. When it is given parenterally, it has a rapid onset of action and is effective in the treatment of severe HF, with or without cardiogenic shock. There is usually edema of the laryngeal and trache

during constant-load treadmill exercise achieved during exercise testing have been reported.269–277 A recent Cochrane Review found patients healthy enough to participate in exercise programs can improve the time and distance of walking, with results lasting for approximately 2 years.278 Studies even have concluded that greater symptomatic relief and functional improvement in patients with mild to moderate claudication not requiring immediate therapeutic interventions is achieved through supervised exercise therapy rather than PTCA.270,279 Some studies have demonstrated the benefit of exercise for patients with rest pain.280 Several mechanisms have been postulated to account for these improvements: increased walking efficiency, increased peripheral blood flow through changes in the collateral circulation, reduced blood viscosity, regression of atherosclerotic disease, raising of the pain threshold, and improvements in skeletal muscle metabolism. E, Cystic changes (arrows) within the bones of the fingers of a patient with sarcoidosis. Because the chart review and medical history should provide you with objective information about the biologic and physiologic health of your patient, this information should also be considered an outcome measure (as consistent with the AACVPR matrix) and should be monitored and reassessed at points along the continuum of care. Other common drug receptors are located on various enzymes and on nucleic acids. Atherogenic Dyslipidemia, A Pocket Guide. Top Stroke Rehabil. There may be cardiac gallop sounds, cardiac enlargement, and ECG abnormalities. Chicago: Loyola University Chicago; 2006. (From Snopek AM: Fundamentals of Special Radiographic Procedures, ed 5, St. Louis, 2007, Saunders.) Regurgitation, or insufficiency of the mitral valve, causes blood to accumulate in the left atrium and elevate left atrial pressures. Pulmonary function in Parkinson’s disease. Evaluation of energy metabolism in skeletal muscle of patients with heart failure with gated phosphorus-31 nuclear magnetic resonance. Usually, the aerosolized drug is inhaled through a tubelike mouthpiece, similar to that of an inhaler. Percussion usually proceeds in a cephalocaudal direction and back and forth between the left and right sides, anteriorly and posteriorly. The actions of the inspiratory muscles expand the dimensions of the thoracic cavity and concomitantly reduce the pressure in the lungs (intrathoracic pressure) below the air pressure outside the body. Responsiveness and sensitivity to change of SLE disease activity measures. Dornase alfa (Pulmozyme) is a highly purified solution of recombinant human deoxyribonuclease I (rhDNase). It has now been well established through numerous studies that the primary causative factor is tobacco use. Many vasodilators can be administered either orally or intravenously; the latter is the route of choice for rapid treatment of malignant systemic hypertension. Weitzenblum E, Kessler R, Oswald M, Fraisse P. Slater J.W, Zechnich A.D, Haxby D.G. Second-generation antihistamines: A comparative review. A family member may be recruited as a coach or a partner to help keep the patient motivated to complete the exercise program, or a more structured program such as cardiac or pulmonary rehabilitation programs (see Chapters 18 and 19) can be utilized to promote adherence. Short-acting β2-adrenergic agonists (SABAs) work quickly (generally within 3 to 5 minutes), but last for relatively short periods (4 to 6 hours). Genetic background, environmental factors, habits (e.g., smoking), race, age, and gender have been shown to influence drug response and therefore will influence drug choice. Fick A.W, Holloway V. Arrhythmias are the leading cause of death.313 Anorexia Nervosa Anorexia nervosa is characterized behaviorally by severe self-induced weight loss (at least 15% below ideal body weight) through extreme restriction of food intake and sometimes ritualized exercise and purging. Wenger N.K, Abelmann W.H, Roberts W.C. Cardiomyopathy and specific heart muscle disease. Later, hypersecretion progresses to smaller airways, where airway obstruction begins as chronic bronchitis. Each lung lies freely within its corresponding pleural cavity, except where it is attached to the heart and trachea by the root and pulmonary ligament. It must be noted that the identification of a murmur would warrant the need for additional testing, including echocardiography, to accurately diagnose pathology within a particular valve. This forceful airstream is designed to carry any materials in its path up and out through the trachea to the mouth for expectoration. Oradell: Medical Economics Company; 1985. Frost P.H, Davis B.R, Burlando A.J, et al. Organ Procurement and Transplantation Network. This is where the role of β blockers plays a major part in treatment of CHF. Accessed June 2009. Cochrane Database Syst Rev. Specific medical treatment (specific antibiotic) is based on identification of the microbe, although broad-spectrum medications may be initiated before identification has been made. 1993;42:576–579. Irritant receptors: These receptors are found within the epithelial layer of the conducting airways and respond to various noxious gases, particulate matter, and irritants, causing them to initiate a cough reflex. These signs and symptoms should make a physical therapist suspicious of a lower extremity DVT, but additional screening should be performed. Palpation—no fremitus, pacer battery palpated under L clavicle, expansion is symmetric. A hollow screw is positioned through the skull into the subarachnoid space. Chin J.E, Hatfield C.A, Winterrowd G.E, et al. Recurrence of Guillain–Barré syndrome in the same patient is possible; in fact, patients with this syndrome are at slightly higher risk than the general public. a 1 IU is the amount of enzyme that will catalyze the formation of 1 μmol of substrate per minute under the conditions of the test. B, Conquering a hill on a hiking trip 7 months after lung transplant. The patient completed 2 minutes 25 seconds of the modified Bruce protocol (attaining a maximal heart rate of 104 bpm, 67% of the age-predicted maximal heart rate), which was terminated because of leg fatigue. Therefore early aggressive therapy encompassing plasmapheresis, drugs, ventilator support, acute hemodialysis, treatment of infection, and careful avoidance of cardiogenic edema has been used to increase survival rates to 70% to 80%.10 Table 5-33 Clinical manifestation of Goodpasture’s syndrome ECG, electrocardiograph; Paco2, arterial partial pressure of CO2; PaO2, arterial partial pressure of O2. Bulbar muscle weakness with dysfunction of the pharyngeal and laryngeal muscles, which is common in such diseases as ALS, myasthenia gravis, and multiple sclerosis (MS), increases the risk of recurrent aspiration and resultant pneumonia and interferes with cough effectiveness (due to poor glottic closure). Rosenthal D.S, Braunwald E. FIGURE 16-10 A, A normal anteroposterior (AP) diameter. J Mol Cell Cardiol. Studies have shown that the heart rate, blood pressure, and ECG responses with ambulation during the activities evaluation strongly correlate with the responses that occur with the patient’s daily monitored ambulation program.26 Clinical tip Activity evaluation is a key assessment of the patient’s ability to perform ADLs. This assessment should include an evaluation of what the patient was doing before hospital admission, as well as the patient’s goal on discharge. Furie K.L, Kasner S.E, Adams R.J, et al. Numerous cardiac pathologies, including CAD, HF, cardiomyopathy, and congenital heart disease, can be responsible for the production of arrhythmias. 5-29). High plasma levels of high-density lipoprotein cholesterol (HDL-C) are inversely related to the risk of CAD. Treatment, including cardiopulmonary conditioning, may be initiated when the patient is hemodynamically stable in the ICU. Appel S.J, Wadas T.M, Rosenthal R.S, et al. Neuromuscular Causes Spinal Cord Injury Spinal cord injury (SCI) is damage to or interruption of the neurologic pathways contained within the spinal cord.53,57 Etiology An SCI can result from an acute traumatic event, often a motor vehicle accident or a diving accident, or from a pathologic process that invades the spinal cord and damages it or in some way interrupts the neurologic transmissions. Low-dose doxapram for treatment of apnoea following early weaning in very low birthweight infants: A randomized, doubleblind study. As soon as the drug effects have worn off, the transient RLD also disappears.2,66 Illicit Drugs Cocaine It is estimated that there are more than 5 million regular cocaine users in the United States.30 Cocaine became affordable and very popular in the 1980s with the introduction of the alkaloidal form of cocaine hydrochloride, known as free-base or crack. There are six types of “chest pain” that make the differential diagnosis of angina difficult, however. Deaths: Final data for 2010. The most common pattern of lipid abnormalities in type 2 diabetes patients is elevated triglycerides and decreased LDL levels.31 However, type 2 diabetes patients have a preponderance of smaller, denser LDL particles, although their LDL cholesterol concentration is usually not significantly different from that of individuals without diabetes. Clinical tip Specific strategies may be discussed to help the patient realistically fit the exercise routine into a personal schedule. These can be adopted from the AHA’s guidelines for advanced cardiac life support.126 Safety is a major consideration in exercise testing, and among the most important determinants of safety are the knowledge and experience of the examiner conducting the test. Singh S, Morgan M, Scott S, et al. 1968;48:577. Until the time that scientific and clinical outcomes demonstrate the efficacy of such programs, primary prevention probably will not be reimbursed under health care plans. The changes in the ventilatory mechanics and within the lung parenchyma combine to increase the risk of pulmonary infection or pneumonia in patients with diaphragmatic dysfunction.9,32,35 Diagnostic Tests The diaphragm can be evaluated in multiple ways. Brochier M.L, Arwidson P. In the acute care setting, this technique can help the patient control his or her respiratory rate and associated feelings of dyspnea.26 Inspiratory Hold Technique An inspiratory hold technique involves prolonged holding of the breath at maximum inspiration. Abuin G, Nieponice A. Dietary Changes and Nutritional Supplementation Because of the associated dietary and nutritional deficiencies, supplementation of vitamins, minerals, and amino acids is often provided to persons with CHF. Garber A.J. Combined pharmacologic/nonpharmacologic intervention in individuals at high risk of developing type 2 diabetes. Cooper J. The larynx, or voice box, is a complex structure made up of several cartilages and forms a connection between the pharynx and the trachea. Table 22-6 provides the speed and number of shuttles per level of test. Burkhart Jr. J.E, Stoller J.K. Oxygen and aerosolized drug delivery: Matching the device to the patient. Patients with marked CHF often assume a sitting position to sleep and are sometimes found sleeping in a recliner instead of a bed.5 Orthopnea The term orthopnea describes the development of dyspnea in the recumbent position.5 Sleeping with two or more pillows elevates the upper body to a more upright position and enables gravity to draw excess fluid from the lungs to the more distal parts of the body. Kendall F.P, McCreary E.P, Provance P.G, et al. Exercise and heart transplantation: A review. Pulsus Alternans Pulsus alternans (mechanical alteration of the femoral or radial pulse characterized by a regular rhythm and alternating strong and weak pulses) can frequently identify severely depressed myocardial function and CHF in general. Other signs include a decrease in chest wall expansion and possible cyanosis or clubbing (see Table 5-1). There are two primary classification systems for HF: the American College of Cardiology Foundation/American Heart Association (ACCF/AHA) identifies four stages, Stages A through D, which stratifies according to risk factors for the development of HF and cardiac structural change.18 The New York Heart Association (NYHA) system identifies four classes, Class 1 through 4, and stratifies according to functional status.19 The use of both classification systems helps to broaden the understanding of the pathophysiology and the functional impairment of HF. Ferrell R.E, Baty C.J, Kimak M.A, et al. 1989;8:15–18. 1999;290(1):188–195. ■ Pressure-regulated volume control (PRVC): Combines volume control and pressure control. Ultrastructural and electrophysiologic changes of experimental acute cardiac lymphostasis. Proc Am Thorac Soc. Clinical tip After surgery, particularly after coronary artery bypass graft surgery, patients will demonstrate decreased hematocrit and hemoglobin values (and usually normocytic and normochromic MCV) and may be more symptomatic with activity because of low oxygen-carrying capacity. 1999;2:229–236. Serous cells are much less numerous than mucous cells and are confined predominantly to the extrapulmonary bronchi. Pericarditis Pericarditis is an inflammation of the pericardial sac that surrounds the heart and may actually result in a restriction of cardiac output. The pathological implications of protein glycation. 80. An electrode array, inserted into a nasogastric tube and placed in the lower esophagus, is able to sense the diaphragmatic activity. There is a short costal groove on its internal surface posteriorly. Does the patient population or material to be covered lend itself to a group teaching and learning situation? A sudden increase in enlargement can also predict the possibility of aneurysm rupture, especially for AAAs 5.5 cm or greater in diameter (Fig. By mouth (oral, or PO) is also known as enteral, indicating that the drug enters the gastrointestinal (GI) system before it enters the circulation. Milrinone (Primacor) has a mechanism of action similar to that of amrinone/inamrinone and is used primarily for the short-term management of acute heart failure. Monitoring clinical changes in patients with heart failure: A comparison of methods. Dela Cruz C.S, Matthay R.A. Role of obesity in cardiomyopathy and pulmonary hypertension. 1995;91(6):1725–1731. Oxidation of FFA by the liver produces ketones; ketones are used as an energy source in the absence of sufficient glucose. 2004;351:1296–1305. This right-sided heart failure is due to hypoxemia, fibrosis, and compression of the pulmonary capillaries, which leads to pulmonary hypertension. dynamic, 516–518, 516f–517f, 517b cough and cough production, 518, 518t exercise responses, abnormal, 534, 534f, 535t exercise responses, normal, 532–533, 533t extremities appearance, 518–519, 519f facial characteristics, 514–515 general appearance, 513–514, 514f heart auscultation, 522–524, 522b, 523f–524f, 523t heart rate measurements, 530–531, 530f, 530t, 530b–531b heart rhythm, 531 inspection, 513–519 lung auscultation, 519–522, 519f, 520t lung sounds, 520–522 mediate percussion, 529f, 528–529, 528f–529f neck evaluations, 515–516, 516f oxygen saturation evaluations, 532, 533f palpation, 524–528, 525f–527f phonation, 518 respiratory rates, 517t resources for, 538 systems reviews, 510t, 512 Excursions, blood glucose, 237t Exercise abnormal responses, 549, 549b for acute cardiopulmonary conditions, 557–560 See also Acute cardiopulmonary condition interventions components of, 558–559 duration of, 559 endurance vs. A thorough evaluation of pulmonary function involves several tests that measure lung volumes and capacities, gas flow rates, gas diffusion, and gas distribution. The left lung has no middle lobe, which is a major distinguishing feature in the general architecture of the lungs. Zsoter T. Hypertension Although surveys vary, an estimated 25% of adult Americans have hypertension when defined as blood pressure numbers above 140/90 mm Hg. Another 25% of the population is considered to have prehypertension, defined as a systolic blood pressure of 120 to 139 mm Hg or a diastolic blood pressure of 80 to 89 mm Hg.43 Of those who obtain medical treatment, most are prescribed diet or exercise or drug therapy, or a combination of these. The piezoelectric pressure transducer is similar to a strain gauge in principle; the piezoelectric crystal creates a change in voltage when it is strained. An autopsy study of 76 obese subjects. 1986;58:518–524. submaximal, 279, 281b pharmacologic, 288–289, 289b adenosine, 288–289 contraindications for, 289b dipyridamole, 288–289 ergovine stimulation, 289 Stretch receptors, 26 See also Receptors Strokes (cerebrovascular accidents), 62 Stroke volume regulation, 37–38 afterload, 38, 39f contractility, 38 definition of, 37 preload, 37, 37f Subatmospheric pressure, 27 See also Pressure Submaximal stress testing, 279, 281b See also Stress testing Subsegmental bronchi, 13–14, 14f See also Bronchi Suctioning, airway, 546–547, 548f See also Airways Sudden cardiac death, 50, 50b Supplementation, 104, 205 Surface-active agents, 28–29 Surfactants, 28–29, 627 Surgical interventions cardiac and thoracic, 364–385 life support, 419–444 monitoring measures, 419–444 organ transplantation, heart vs. Adenylate cyclase is an effector enzyme activated by a receptor agonist, thus enhancing cAMP synthesis. Echocardiography can quantify volumes of the left ventricle, estimate stroke volume and therefore ejection fraction, and analyze motion of the valves and the heart muscle. 1-19). A statement for healthcare professionals from the American Heart Association Task Force on Risk Reduction. Haahtela T. These structures together are termed the acinus and participate in gas exchange. 16-24). www.unos.org. Use of these drugs is limited to acute interventions in a critical care setting because prolonged use of beta stimulators may lead to receptor desensitization and decreased inotropy. Sciaky A. 1996;16:183–192. If physical therapists reserve airway suctioning for those secretions that the patient is unable to clear from the airway independently or with assists, rehabilitation of cough effectiveness can be initiated before extubation. Table 8-2 provides the laboratory studies and the normative values. Effect of functional health-related quality of life on long-term survival after cardiac surgery. Most patients are required to attend an outpatient pulmonary rehabilitation program after discharge to continue to improve their strength and endurance. Diffuse scleroderma is more widespread and has more rapid and symmetric skin thickening. What fits whom? The clinical picture includes dyspnea, pulmonary hypertension, and restrictive lung impairment with a decreased DLCO. A plan of care is developed based on the prognosis, which includes anticipated goals and expected outcomes. They decrease myocardial oxygen demand by decreasing arterial blood pressure and may increase supply by facilitating vascular smooth muscle relaxation. Wilkins R.L. Clinical Assessment in Respiratory Care. Am J Med. 1011 is a bronchogram demonstrating bronchiectasis of the left lower lobe bronchi. Most institutions use a triple-drug immunosuppressive drug regimen for their firstyear survivors of heart transplantation. Decrease in systolic blood pressure during physical exertion in stress tests. 2014;28(10):906–910. L. 1996;144:325–334. Disadvantages include twice-daily dosing, increased costs, and lack of current antidote.16 Calcium-Channel Blockers There are two sources of calcium within the body: ■ Intracellular calcium, stored within the sarcoplasmic reticulum ■ Extracellular calcium, stored within the plasma Different tissue types have an affinity for the different sources of calcium. Clinical tip In acutely ill patients with limited ability to follow instruction (i.e., “take a deep breath”), vibration may help facilitate deep breathing and huffing. Transesophageal echocardiography (TEE) has solved these problems and allows an improved view of the heart and mediastinum (Fig. 1994;89:1144. Clinics Chest Med. Table 10-4 Common types of lung disease and PFT patterns27,34 Type Medical diagnoses Obstruc tive disorders Emphysema, c hronic obstruc tive bronc hitis P FT pattern 10 mm Hg below the resting level with exerc ise DBP >110 mm Hg DBP inc reases >15 mm Hg above the resting level with exerc ise ECG abnormalities that impair perfusion ECG abnormalities that worsen and impair perfusion RPE >13/20 or 4/10 (somewhat hard) RPE that inc reases to ≥15/20 or 5/10 (hard) with exerc ise Guidelines for use at rest and with exercise Dyspnea index >15 Exc essive fatigue Vertigo Claudic ation Mental c onfusion or dizziness bpm, beats per minute; DBP, diastolic blood pressure; HR, heart rate; RPE, rating of perceived exertion; SBP, systolic blood pressure. The events leading to ventilatory failure can occur relatively rapidly in patients who are acutely ill, or over a period of days or weeks in patients with chronic lung disease, as they decompensate (i.e., become unable to meet the demands for the increased minute ventilation needed to maintain adequate gas exchange). Weakness of a muscle is the inability to generate force against resistance. Physical Therapy for Children. Overall Etiology, Pathology, and Pathophysiology of COPD Chronic obstructive pulmonary disease has two primary causes: inhalation factors and genetics. McCarthy P.M. HeartMate implantable left ventricular assist device: Bridge to transplantation and future applications. 1994;3:69–80. The Cardiac Transplant Research Database Group. Philadelphia: Saunders; 1970. As lymph flow continues, edema increases in the vascular system and interstitium, increasing the pulmonary capillary wedge pressure and eventually flooding the alveoli known as pulmonary edema, which significantly compromises gas exchange, producing severe hypoxemia and hypercapnia.71 In addition, severe alveolar flooding can produce the following: (1) filling of the large airways with blood-tinged foam, which can be expectorated; (2) reductions in most lung volumes (e.g., vital capacity); (3) a right-to-left intrapulmonary shunt; and (4) hypercapnia with acute respiratory acidosis.71 Perhaps the most important principle regarding pulmonary edema is that of maintaining pulmonary capillary pressures at the lowest possible levels.71 Pulmonary edema can be decreased by more than 50% when pulmonary capillary wedge pressures are decreased from 12 to 6 mm Hg. The effect of repeated bouts of pulmonary edema (which is common in CHF) upon pulmonary function appears to be profound. 1976;295:420–425. These fibers extend from the apex of each ventricle and penetrate the heart wall to the outer myocardium. Fillmore S.J, Giumaraes A.C, Scheidt A.C, et al. Apparently small LDL particles can be moved into the vessel wall 50% faster than the large LDL particles. Family history as a risk factor of coronary heart disease in patients under 60 years of age. BO X 22- 8 Ot he r out com e s t ha t ca n be m e a sure d in ca rdiopulm ona ry pa t ie nt s Activity testing 1. Clinical tip Patients with rigid chest walls or the diagnosis of diffuse pulmonary fibrosis usually demonstrate a complete lack of lateral costal expansion. Smith C.E. Nurse’s increasing responsibility for patient education. Accessed June 13, 2014. De Deyne C, Struys M, Decruyenaere J, et al. βBlockers are an example of a drug whose long-term use should not be terminated abruptly but slowly discontinued. When the symptoms or complications of CKD become unacceptable, renal replacement therapy (RRT) is indicated and is most commonly accomplished using hemodialysis or peritoneal dialysis. Morris D.C. Cocaine heart disease. 2011;66(5):425–429. Prone positioning has been shown to assist in mobilizing secretions and allowing greater volumes of ventilation and increased PaO2 for the patient with acute respiratory distress syndrome (ARDS).21 This procedure requires the use of three people. Percussion is performed with the middle finger of one hand placed flat on the chest wall along the intercostal space between two ribs (usually the nondominant hand), while all other fingers are lifted off the chest wall. Productive coughs with purulent sputum and hemoptysis can develop in 50% to 75% of patients.30 However, most patients (90%) begin with a nonproductive cough.30 The chest radiograph may show lobar consolidation or unilateral or bilateral bronchopneumonia; rounded densities with cavitation may also be seen. New Horiz. 2006;91:881–884. Once the jar is opened, the tablets begin to lose their potency. 4. Eschbach J.W, Adamson J.W. Anemia of end-stage renal disease (ESRD). Controlling responses to this autoimmune disease have improved mortality rates, which now exceed 5%. • Always discuss with doctor or nurse before disconnecting suction. Cardiac rehabilitation physical therapy, including progressive ambulation and strength training, may proceed within established acceptable guidelines. Another potent vasopressor, vasopressin, is used to manage hypotension associated with refractory shock. Breathing control: The patient performs diaphragmatic breathing at normal tidal volume for 5 to 10 seconds. If diastolic blood pressure increases more than 10 mm Hg, activity should be modified.42 Ankle–Brachial Index The ankle–brachial index (ABI) is a noninvasive, easy, and economical objective outcome measure that can be used to examine perfusion of the lower extremities in individuals who are at high risk of cardiovascular or peripheral arterial disease (PAD). β-Adrenergic antagonists therefore block catecholamines from binding and limiting their effects. 1991;9:27–38. COPD and the present pulmonary condition (e.g., infiltrates in bases, retained secretions), as well as the orthostatic hypotension, will affect her activity progression. Hypertension is almost invariably present, as it is both a cause and a consequence of renal disease and greatly aggravates renal dysfunction in CKD, particularly in blacks. Although primate-tohuman xenotransplantation has been attempted, study of the use of porcine donor organs has increased due to the large number of pigs available and their appropriate size and low cost.166 Hyperacute rejections are a barrier to clinical xenotransplantation, occurring almost invariably when donor and recipient are of phylogenetically different species.166 Lin and Platt166 outlined new strategies for interfering with antibody–antigen interaction and the development of animals more genetically suited for transplantation, averting the occurrence of hyperacute rejection; this still leaves the recipient susceptible to more chronic forms of rejection. Cahalin L.P, Cannan J, Prevost S, et al. What would you monitor during exercise in this phase of care, including inpatient and outpatient plans of care? Therefore shortness of breath in these patient groups should be assessed in great detail to rule out that the shortness of breath is not an angina equivalent. Nitric oxide inhalation during exercise in chronic obstructive pulmonary disease. Although the physical therapist may not actually perform the stress test, obtaining the interpretation of the results provides valuable data for developing an exercise prescription. To appreciate the impact and complexity of drug management, a few supportive concepts should be introduced. Heart transplantation. The Kyoto and Shiga Myocardial Infarction (KYSMI) Study Group. 2004;24:68– 79. Veyssier Belot C. The decreased ventilation in the bases of the lungs results in early small airway closure and increased ventilation–perfusion mismatching. ■ Crush injuries and penetrating wounds to the thorax can cause significant RLD but are almost always reversible with corrective interventions. 6. The heart rate should be recorded with all activity, but the important factor is the heart rate response to activity. Nature. 2008;206:1038–1042 discussion 1042– 1044. This surface tension acts to collapse the alveolus and increase the pressure of air within the alveolus. 2014 Jun 1;17(3):E141–E145. With proper use, a spacer can make an inhaler somewhat more effective in delivering medicine. Mosca L, Banka C.L, Benjamin E.J, et al. A more sensitive CRP test, called a highly sensitive C-reactive protein (hs-CRP) assay, is available to determine heart disease risk. Current guidelines indicate that β-blocker therapy should be initiated and continued for 3 years in all patients with normal LV function after suffering an MI or ACS. Blood pressure can be measured directly by means of indwelling arterial catheterization using a catheter inserted into an artery (as done in laboratory or critical care situations) or indirectly using a sphygmomanometer. Morphine sulfate, included in this last group, is the drug of choice for management of myocardial ischemic pain. Immune reactants and complexlike deposits have also been identified in renal biopsies of patients with Wegener ’s granulomatosis. Early detection and awareness of lipid abnormalities has improved over the past quarter century because of advances within the scientific community and heightened consumer knowledge. This results in a patchy flaccid paralysis or paresis of the lower motor neuron type. Treatment No curative treatment exists, but comprehensive management strategies help to improve quality of life and slow deterioration. When elderly patients feel good, they may choose to discontinue taking the drug, or the side effects themselves may discourage patients from taking the drug. In the case of tolerance, the dosage may need to be increased, the drug replaced, or an additional drug prescribed to supplement the initial drug. This section describes the neural mechanisms that regulate ventilation. Clinical tip Vascular markings that are increased on a chest radiograph are indicative of early left ventricular failure. Its pulmonary component is characterized by airflow limitation that is not fully reversible. The metabolic syndrome—from insulin resistance to obesity and diabetes. 2001;101(10):26–32. Exercise testing to evaluate patients with pulmonary vascular disease. Squamous cell carcinoma often arises in the segmental or subsegmental bronchi, but can also cause a hilar tumor. 2012;42(2):56–65 Date of Electronic Publication: 2012 Feb 01. Sutton P.P, Lopez-Vidriero M.T, Pavia D, et al. Types of venous insufficiency range from mild forms of spider veins (telangiectasias) and varicose veins to chronic venous insufficiency. In addition to the biologic, functional, and physiologic data collected at initial evaluation, health-related quality of life (HRQL) must also be considered as data that are essential to gather during the initial evaluation and the reevaluation of the patient. Vibration Vibration is an airway clearance technique that can be performed manually or with a mechanical device (see Table 17-3). Turner D.A, Cheifetz I.M, Rehder K.J, et al. Diabetes mellitus, hypertension, and cardiovascular disease: Which role for oxidative stress? On the left side, there are typically four curves of importance. 1997;17:2897–2903. Harmonizing the metabolic syndrome. 93. 1993;21:861–866. It increases tidal volume and respiratory rate and is one of the most widely accepted analeptics. In addition, after lung transplant the regenerative capacity is diminished due to microvascular insufficiencies in the small airways from interrupted blood supply during the surgery and increased susceptibility to alloimmune immunologic insults.63 Early in OB there is mononuclear cell infiltration, epithelial damage, and ulceration. One such tool is the Mayo Clinic’s Heart Disease Risk calculator (, which assesses a person’s 30year risk of developing CVD. The structure of the surfactant molecule is such that it presents a nonpolar end of fatty acids (two palmitate residues) that is insoluble in water, and a smaller, polar end (a phosphatidylcholine group) that dissolves readily in water. The parasympathetic postganglionic fibers from thoracic sympathetic ganglia innervate essentially the same structures. 1996;3:148–153. 9. It moves inward during inspiration, drawn by the increase in the negative pleural space pressure. It is beneficial in patients in the critical care setting to help stabilize them without the adverse effects of hypotension that can occur with hemodialysis. Resorptive atelectasis can be divided into two groups depending on whether bronchial obstruction involves a large airway such as segmental, lobar, or main bronchus or smaller peripheral bronchi or bronchioles.50 (2) Passive atelectasis refers to loss of volume in the lung and is caused by simple pneumothorax or diaphragmatic dysfunction. SECT ION 5 Pharmacology OUT LINE 14. Lochner A, Hewlett R.H, O’Kennedy A, et al. What concerns would you have about the patient? 13-20). Risks and benefits of estrogen plus progestin in healthy postmenopausal women: principal results from the Women’s Health Initiative randomized controlled trial. Other sites that are critically important for achieving cardiovascular stability are the CNS for management of hypertension and the blood cells for their role in clotting and lysis. Practitioners and researchers must always rely on their own experience and knowledge in evaluating and using any information, methods, compounds, or experiments described herein. Philadelphia: Mosby; 2002. 1992;152:56–64. The tool provides quality-of-life information in terms of fatigue, emotion, mastery, and dyspnea. Limitations of the laboratory monitoring of heparin therapy. The ECG changes in pericarditis are caused by the superficial myocarditis that accompanies it. The group of drugs that most significantly inhibits PDE is the methylxanthines.2,5,22 Methylxanthines may also facilitate bronchodilation through prostaglandin inhibition, adenosine receptor blockade, enhancement of endogenous catecholamine levels, inhibition of cGMP, and enhancement of the translocation of intracellular calcium.2,5,22 Methylxanthines may also stimulate the central nervous system and skeletal muscle, therefore improving diaphragmatic contractility and decreasing diaphragmatic fatigue in patients with chronic lung disease. Jenkins S, Soutar S.A, Loukota J.M, et al. Table 14-13 Combination antihypertensive agents Drug group Diuretic and Diuretic Drug combination Amiloride–hydroc hlorothiazide S pironolac tone–hydroc hlorothiazide Triamterene–hydroc hlorothiazide ACE inhibitors and diuretic s Benazepril–hydroc hlorothiazide Captopril–hydroc hlorothiazide Enalapril–hydroc hlorothiazide Fosinopril–hydroc hlorothiazide Lisinopril–hydroc hlorothiazide Moexipril–hydroc hlorothiazide Quinapril–hydroc hlorothiazide ARBs and diuretic s Candesartan–hydroc hlorothiazide Eprosartan–hydroc hlorothiazide Irbesartan–hydroc hlorothiazide Losartan–hydroc hlorothiazide Olmesartan medoxomil–hydroc hlorothiazide Telmisartan–hydroc hlorothiazide Valsartan–hydroc hlorothiazide β-Bloc kers and diuretic s Atenolol–c hlorthalidone Bisoprolol–hydroc hlorothiazide Metoprolol–hydroc hlorothiazide Nadolol–bendroflumethiazide Propranolol LA–hydroc hlorothiazide Timolol–hydroc hlorothiazide Centrally ac ting drug and diuretic s Methyldopa–hydroc hlorothiazide Reserpine–c hlorthalidone Reserpine–c hlorothiazide Reserpine–hydroc hlorothiazide ACE inhibitors and c alc ium-c hannel bloc kers Amlodipine–benazepril hydroc hloride Enalapril–felodipine Trandolapril–verapamil α-Bloc kers and β-bloc kers Carvedilol Labetalol Trade name Moduretic Aldac tazide Dyazide, Maxzide Lotensin HCT Capozide Vaseretic Monopril/HCT Prinzide, Zestoretic Uniretic Ac c uretic Atac and HCT Teveten HCT Avalide Hyzaar Benic ar HCT Mic ardis HCT Diovan HCT Tenoretic Ziac Lopressor HCT Corzide Inderide LA Timolide Aldoril Regroton Diupres Hydropres Lotrel Lexxel Tarka Coreg Normodyne, Trandale Adapted from Chobanian AV, Bakris GL, Black HR, et al: Seventh report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure, Hypertension 42:1206–1252, 2003. Quadrelli S.A, Roncoroni A.J, Porcel G. Hunt S.A, Abraham W.T, Chin M.H, et al. 241. Table 8-5 Total cholesterol to high-density lipoprotein (HDL) ratio as a predictor of heart disease From Gordon T, Castelli WP, Hjortland MC, et al: Diabetes, blood lipids, and the role of obesity in coronary heart disease risk for women, Ann Intern Med 87:393, 1977. (Redrawn from Page C, Curtis MJ, Sutter MC, et al, editors: Integrated Pharmacology, ed 2, Philadelphia, 2002, Mosby.) Physiology A number of physiologic factors combine to establish and maintain normotension in the cardiovascular system. B, At the end of a normal inspiration. Clinical Manifestation The clinical manifestation of pulmonary edema can be found in Table 5-17 and Fig. Angiology. 5-11).37 Clinical Manifestation The clinical manifestation of silicosis can be found in Table 5-8. In: Paz J, West M, eds. Details of the ECG and rhythm disturbances are discussed in Chapter 9. For example, a modified position to treat the lateral segment of the right lower lobe would be the left side-lying position with the bed flat rather than in the Trendelenburg position. Bronchovesicular breath sounds are a softer version of bronchial sounds but differ only in that they are continuous between inspiration and expiration. 1996;8:512–519. Adkins H.V. Improvement of breathing ability in children with respiratory muscle paralysis. 212. New onset of symptoms such as peripheral edema and persistent cough should be thoroughly investigated before deciding that they are primarily due to the use of calcium-channel blockers. I also especially rely on the support and inspiration of some very dear friends/colleagues including Dianne Jewell, Andrew Ries, Claire Rice, and Joanne Watchie. 1971;63:102–145. Today, the majority, if not all, of the evaluation is performed on an outpatient basis and only takes 2 to 3 days. Berne R.M, Levy M.N. Cardiovascular Physiology. Glob J Health Sci 14. FIGURE 16-14 One method of auscultating the chest. Home-based exercise improves functional performance and quality of life in woman with diastolic heart failure. Chemotherapy is the treatment of choice for small cell lung carcinoma.32 Due to the early spread of small cell carcinoma, surgery has little to offer patients with this type of cancer. Table 16-14 Pediatric low-normal systolic pressure values Age Low normal (mm Hg) Infant (birth to 1 year) >60 a Toddler (1 to 3 years) >70 a Presc hooler (3 to 6 years) >75 Elementary sc hool age (6 to 12 years) >80 Adolesc ent (12 to 18 year) >90 a Infants and children age 3 years or younger: substitute strong central pulse for blood pressure reading from NY State Dept of Health. (From Hillegass E, Fick A, Pawlik A, et al: Supplemental oxygen utilization during physical therapy interventions, Cardiopulmonary Phys Ther J 25(2):38–49, 2014.) Abbreviation: O2, supplemental oxygen 1 Correct use of oxygen monitoring requires individual to palpate pulse and compare to reading of pulse rate on pulse oximetry 2 Order example: “Titrate oxygen to maintain SpO2 ≥ % 3 Oxygen delivery system needs to be changed to maintain or improve oxygenation Clinical tip Digital and invasive blood pressure monitoring provides measurements of systolic and diastolic blood pressures and mean arterial pressures. 2004;36:775–781. Reichl D. Research with the Locus of Control Construct. Finally, digitalis may be used to control the ventricular response rate to atrial flutter or fibrillation. Kalra M, Gloviczki P, Bower T.C, et al. Cohen M, Fuster V. The therapist then slows the audible breathing pattern and the facilitation of shoulder movement to encourage an increased tidal volume and decreased respiratory rate. During this time, the physical therapist instructed MA in the use of a positive expiratory pressure device for airway clearance, reviewed exercises for chest mobility, and increased supplemental oxygen use to continuous, as his resting SpO2 percentage was in the low 80s. New York: Elsevier Health Sciences; 2014:33. By binding to the enzyme, digitalis inhibits the active transport of sodium and potassium, thereby increasing intracellular sodium. BMC Geriatr. The enzyme plasmin breaks up the network of fibrin strands and degrades the thrombus into fibrin fragments C. Kvernmo H.D, Osterud B. The last 6-minute walk before transplantation was 1762 feet with 8 L of O2 required to maintain SpO2 at 90% or more, with a heart rate of 132 to 162 beats per minute and an RPE of 18/20. Calcium-channel blockers block the entrance of calcium into the cell from the extracellular stores. Intricacies of fat. Pavlovic M. Yankaskas J.R, Mallory G.B. Lung Transplantation in Cystic Fibrosis: Conference Consensus Statement. The right root lies behind the superior vena cava and a portion of the right atrium, below the end of the azygos vein; the left root lies below the arch of the aorta and in front of the descending thoracic aorta. Vital signs are monitored continuously during patient positioning. Lungs The lungs are located on either side of the thoracic cavity, separated by the mediastinum. The cilia projecting from their luminal surfaces are intimately involved in the removal of inhaled particulate matter from the airways via the “mucociliary escalator ” mechanism. 2010;139:e137–e139. Incretin-based therapies. Skeletal muscle carnitine deficiency has been observed in a small population of patients with hypertrophic cardiomyopathy and has been linked with genetic causes.91 When carnitine was replenished, cardiac symptoms and echocardiographic parameters apparently improved.106 In addition, substantial literature supports the supplementation of coenzyme Q10 in persons with CHF deficient in this apparently important biochemical component, which appears to have a role in the essential function of mitochondria, antioxidation of heart muscle, and cardiostimulation.107–111 Individuals with CHF and renal dysfunction may also demonstrate: ■ Decreased production of erythropoietin (a hormone synthesized in the kidney that is an important precursor of red blood cell production in bone marrow), causing anemia and possibly less free fatty acid oxidation112,113 ■ Potential for decreased calcium absorption from the gastrointestinal tract,114 as well as the development of hyperparathyroidism115 ■ Impaired gluconeogenesis and lipid metabolism, as well as degradation of several peptides, proteins, and peptide hormones, including insulin, glucagon, growth hormone, and parathyroid hormone.116 Individuals with CHF may benefit from enteral or parenteral products to improve nutrition and the biochemical profile. Giannuzzi P, Temporelli P.L, Corra U, et al. 1990;11(Suppl E):230–236. Prinzmetal M, Ekemecki A, Kennamer R, et al. Packe G.E, Freeman W, Cayton R.M. Effects of exercise on gas exchange in patients recovering from acute severe asthma. Table 14-14 Blood cholesterol guidelines Medical management Statin benefit groups High Clinic al AS CVD a and ≤75 y/o intensity b LDL-c holesterol ≥ 190 mg/dL DM age 45–70 y/o a nd LDL-c holesterol ≤190 mg/dL a nd estimated 10-year AS CVD risk ≥7.5% Moder

immunosuppressive agents may have a positive impact in reducing CAV, in part by reducing the associated hypertension and hyperlipidemia. Heart Rhythm Heart rhythm can be palpated to assess regularity during exercise, but the interpretation of any specific rhythm disturbance cannot be made without ECG monitoring. Pickworth K.K. Long-term dobutamine therapy for refractory congestive heart failure. Health-related quality of life can also assist the therapist in choosing the most appropriate treatment interventions, modifying those treatment interventions, and measuring the results as a reflection of quality of care. Clinical tip A high SvO2 indicates inadequate tissue perfusion despite a high CO, signaling a poor demand status. Intermittent testing intersperses progressive workloads with short rest periods to give the subject time to recover and decrease the effect of peripheral fatigue. Sleep. 2000;342:1855–1865. Strauer B.E. Left ventricular wall stress and hypertrophy. 1996;5:186–191. Goodson N.J, Solomon D.H. The cardiovascular manifestations of rheumatic diseases. Only if such a surface-active agent were present could alveoli with different radii coexist in the lungs. Long-acting β2-adrenergic agonists (LABAs) usually take longer to work (3 to 20 minutes) but last for longer periods (up to 12 hours). Derenne J.P, Whitelaw W.A, Similowski T. In the outpatient setting, the patients should always be asked to bring either a listing of their current prescribed and over-the-counter medications and herbal supplements or the actual medication containers, and these medications should be documented in their outpatient chart. Table 15-1 Pharmacotherapy for the treatment of bronchoconstriction ■ Muscarinic receptor stimulation,→increased cGMP→ enhanced bronchoconstriction ■ Adrenergic β2 receptor stimulation→ increased cAMP→ bronchodilation ■ α1 receptor stimulation results in a decrease in cAMP and facilitates bronchoconstriction.21,22 Parasympathetic stimulation, such as decreased heart rate, bronchial constriction, and increased exocrine gland secretion, can be deleterious to a patient with pulmonary disease. Exercise of a limb that has received an insulin injection should be avoided for at least 60 to 90 minutes or until the peak effect of the insulin has been reached. The epithelium in the laryngopharynx is composed of stratified squamous cells. Life into the third decade for pseudohypertrophic muscular dystrophy is uncommon.54,60 In a recent study conducted by the Centers for Disease Control and Prevention in four states in the United States, survival rates were 100% for males aged 5 to 9 years old, 99% for ages 10 to 14, 85% for ages 15 to 19, and 58% for ages 20 to 24.44 Diagnostic Tests Electromyography, muscle biopsy, and serum enzymes are used for diagnosis of muscular dystrophy.54 Specific to pseudohypertrophic muscular dystrophy, chorionic villi sampling and amniocentesis prenatal diagnostics may be used to analyze DNA. Baltimore: Lippincott, Williams and Wilkins; 2006. The therapist can perform this activity with the help of another person, or independently if necessary, depending on the size and the participation level of the patient. (From Cameron MH, Monroe LG: Physical Rehab ilitation: Evidence-b ased Examination, Evaluation, and Intervention, St. Louis, 2008, Saunders.) BO X 22- 3 Ra nge s for dia gnosis a nd pre ve nt ion of pe riphe ra l a rt e ria l dise a se 1. Douketis J.D, Macie C, Thabane L, et al. This arrangement could mean that the therapist will set up a time with the nursing staff before the start of physical therapy, so that the patient is ready to start at the predetermined time. VT of 4 mL/kg may be required in the care of these patients to avoid ventilator-induced lung injury. It may be important to appreciate that normal electrical conduction through the heart allows for appropriate mechanical activity and maintenance of cardiac output to sustain activity. Cardiovascular complications of human immunodeficiency virus infection. Muscles innervated by the cranial nerves and the spinal nerves frequently are involved, causing problems with dysarthria and dysphagia. Levy R.D, Erns P, Levine S.M, et al. 2013;7:304–383. Johansen K.L. Exercise and chronic kidney disease. Learn About Lung Cancer. Supportive therapy includes avoidance of further exposure, provision of adequate oxygenation, ventilation, and nutrition. Although Fig. White S.A, Shaw J.A, Sutherland D.E.R. Pancreas transplantation. Beta 1- and beta 2-adrenergic receptor-mediated adenylate cyclase stimulation in nonfailing and failing human ventricular myocardium. Reliability and sensitivity to change assessed for a summary measure of lower body function: Results from the Women's Health and Aging Study. 1-1) is conical at both its superior and inferior aspects and somewhat kidney shaped in its transverse aspect. Isolated diastolic dysfunction of the myocardium and its response to CoQ10 treatment. 238. The safety of physical therapy intervention in mechanically ventilated patients has been well described.55 However, because the patient on mechanical ventilation is critically ill and requiring life-sustaining medical intervention, care must be taken to appropriately initiate and titrate intervention so as not to cause undo harm. Laryngopharynx. Criteria for a complicated postmyocardial infarction hospital course as defined by McNeer and coworkers include the following11: ■ Ventricular tachycardia and fibrillation ■ Atrial flutter or fibrillation ■ Second- or third-degree atrioventricular (AV) block ■ Persistent sinus tachycardia (more than 100 beats per minute) ■ Persistent systolic hypotension (lower than 90 mm Hg) ■ Pulmonary edema ■ Cardiogenic shock ■ Persistent angina or extension of infarction Patients who are characterized as "uncomplicated" have significantly lower morbidity and mortality rates following their initial cardiac events. However, there are major complications associated with bulimia, including electrolyte disorders resulting from the abuse of diuretics and laxatives, tooth decay, aspiration pneumonia, esophageal or gastric rupture, pneumomediastinum, pancreatitis, and neurologic abnormalities. This results in lower airway pressures and may improve hemodynamics. MK was independent with functional mobility and ADLs at home and in the community, and also enjoys golfing two to three times per week. 1996;16:366. ■ With circumferential burns of the thorax, eschar formation may severely restrict chest wall expansion. Dent G, Giembycz M.A. Phosphodiesterase inhibitors: Lily the Pink's medicinal compound for asthma? This is achieved by monitoring HR, BP, and other signs and symptoms of exercise intolerance during every PT evaluation. U.S. Carvedilol Heart Failure Study Group. 1994;49:M85–94. Other CV problems include atrial arrhythmias, particularly atrial fibrillation, which has a high risk of thromboembolism; syncope caused by orthostatic hypotension, bradyarrhythmias, or tachyarrhythmias; and MI and sudden death provoked by involvement of the coronary arteries. RR = 20, IMV = 8, 60% oxygenation, SpO2 = 95% • Cardiac: HR = 90 to 110 bpm. J Cutan Med Surg. In Ehrman JK, Gordon P, Visich PS, et al: Clinical exercise physiology, ed 2, Champaign, 2009, Human Kinetics. 1992;86(3):909–918. Rehabilitation and exercise have positive effects on each of the previously mentioned biologic/physiologic variables. B from Harkreader H, Hogan MA, Thobaben M: Fundamentals of Nursing: Caring and Clinical Judgment, ed 3, St. Louis, 2008, Saunders.) ■ Position the patient to allow for trunk extension and flexion. Since the discovery of the important role vascular endothelium plays in the regulation of vascular smooth muscle tone, the identification of endothelium-derived relaxing factor (EDRF) and the fact that EDRF is indistinguishable from nitric oxide (NO), numerous articles regarding the actions and effects of NO have been published.72–75 Nitric oxide is widely distributed in the body and plays an important role in the regulation of the blood circulation. They are also used to prevent or decrease symptoms of bronchospasm that are known to be triggered by specific situations, such as exercise or cold weather. Treatment There is no curative treatment for asbestosis and the disease progresses even though exposure to asbestos has ceased. White R.D. Optimal access to and response by public and voluntary services, including the role of bystanders and family members, in cardiopulmonary resuscitation. Fox M.D, Molesky M.G. The effects of prone and supine positioning on arterial oxygen pressure. d This is not a direct-acting agonist; rather it acts indirectly by inhibiting acetylcholinesterase, thereby increasing acetylcholine. Crit Care Nurs Q. Marchiori D. Predescu D, Predescu S, McQuistan T, Palade G.E. Transcytosis of α1-acidic glycoprotein in the continuous microvascular endothelium. It has been estimated that during sleep, 45% of healthy people aspirate oropharyngeal secretions into the lower respiratory tract.9 However, because of the elaborate defense mechanisms within the pulmonary system, pneumonia usually does not develop. Schwarz M.I, King Jr. T.E. Interstitial Lung Disease. Recent developments in calcium-related obesity research. Pneumothorax denotes the entry of air into the pleural cavity. Resting cell polarity depends on two factors: ■ The membrane permeability to sodium, calcium, potassium, and chloride ions ■ The duration between action potentials (diastole) The cardiac action potential is thought to result from an orderly and sequential change in membrane permeability to various ions. Grotendorst G.R, Chang T, Seppa H.E, et al. Before prescribing aerobic exercise based on heart rate for a patient on β-blockers, it is necessary to know the heart rate response and results of the patient's performance on an exercise tolerance test given with the same drug and dosage that the patient is presently taking. Instructional material including PowerPoint presentations and a test bank are available to instructors in the course, as well as updated information. Subsequent hypoxemia from the hypoperfusion produces cardiac cirrhosis, which is characterized histologically by central lobular necrosis, atrophy, extensive fibrosis, and occasionally sclerosis of the hepatic veins.10 Clinical tip Hepatomegaly, or liver enlargement, is frequently associated with CHF and can be identified readily as tenderness in the right upper quadrant of the abdomen. Physical activity in cancer survivors: Implications for recurrence and mortality. Calcium-channel blockers were initially used as part of an antiischemic regimen17; the ability to decrease vasospasm and facilitate vasodilatation contributes to improved oxygenated blood flow (Table 14-6). 1.0 or higher = normal 3. The physiologic and mechanical events producing these wave patterns can be better analyzed by assessing the heart sounds and their respective location in the cardiac and venous pulse cycles. ■ Lipedema can be treated with the conservative methods described earlier, but with typically slower results. FIGURE 13-22 ECMO. The cycle is as follows: 1. Jones L.W, Haykowsky M.J, Swarz J.J, et al. Sympathetic nervous system innervation of the heart and periphery are decreased at birth and continue to develop during the first few months of life. Patients who have penicillamine-induced SLE may also receive corticosteroids to accelerate the resolution of this pulmonary complication.25,66 Cardiovascular Drugs Amiodarone This antiarrhythmic drug is given for ventricular dysrhythmias that are refractory to other antiarrhythmic drugs. By sharing this information with the therapist, the family can facilitate better communication between the therapist and the patient. Heart and lung sounds should be assessed before each activity and immediately after the last activity. The larynx consists of the endolarynx and its surrounding cartilaginous structures. Single-site cannulation uses the Avalon Dual Lumen Catheter (Avalon Laboratory, LLC, Rancho Dominguez, CA), which can be placed in the right internal jugular vein or subclavian vein. Darovic G.O. Hemodynamic Monitoring: Invasive and Noninvasive Clinical Application. Orens J.B, Boehler A, de Perrot M, et al. NHANES, National Health and Nutrition Examination Surveys. It can be used at any point during the person's disease progression to develop a longitudinal impact of CF on quality of life for that individual. Marumo T, Schini-Kerth V.B, Fisslthaler B, et al. Psychol Sci. There are several recent studies regarding inspiratory muscle training and its benefits in the neuromuscular population.243,244 Patients with neuromuscular and myopathic disorders involving the respiratory muscles are particularly prone to hypoventilation and oxygen desaturation during sleep. This may encourage a deeper-than-tidal inspiration to follow and support a more effective cough. Elevated hematocrit levels suggest that the flow of blood to the tissues may be impeded because of an increase in the viscosity of the blood. ed 22. 1990;16(3):599–606. 1986;112:432–437. Cooke R.A, Chambers J.B. Anorexia nervosa and the heart. 1990;81:78. 5-6).16,18,19 FIGURE 5-6 Pathogenic alterations in IPF. Safety of stress testing with pharmacologic agents is equivalent to the safety found in exercise testing. Hillegass E.A, Fick A, Pawlik A, et al. (From Bruce RL, Kusumi F, Hosmer D: Maximal oxygen intake and nomographic assessment of functional aerobic impairment in cardiovascular disease, Am Heart J 85:545–562, 1973.) FIGURE 8-6 The Balke treadmill protocol. FIGURE 16-8 The sternocleidomastoid muscles often hypertrophy in chronic obstructive pulmonary disease owing to increased work of the accessory muscles to assist with breathing. Mechanics of Breathing Movement of air into and out of the lungs occurs as a result of pressure differences between the two ends of the airway. Hyattsville, MD: National Center for Health Statistics; 2013:4 p 61:4. 1988;9:141–152. J Pediatr Endocrinol Metab. In recent years B-type natriuretic peptide (BNP), a protein produced by the ventricles of the heart, has become an important tool to diagnose heart failure and may have implications for CAD. Pryor et al16 showed that this forced expiratory technique is as effective as airway clearance techniques performed by a therapist or caregiver. Palpation of fremitus is especially important when auscultation has defined an area of decreased breath sounds that may be an area of consolidation resulting from secretions. In paradoxical breathing, the diaphragm descends on inspiration, causing the abdomen to rise and the paralyzed thoracic wall to be pulled inward. Most convenient and functional mode is walking. Originally MRI was used for assessing cardiac anatomy and congenital malformations and to identify masses and thrombi. S4 is also a low-pitched sound best heard with the bell of the stethoscope. 1998;147:1011–1018. Deitmer T. management Goal: BP 130 mm Hg systolic and 80 mm Hg diastolic . Other respiratory accessory muscles may hypertrophy as a result of chronic obstructive pulmonary disease (COPD) because of the demand placed on them due to the diminished capacity of the diaphragm muscle. Exercise training versus angioplasty for stable claudication. Pathologic thickening of the left ventricular wall is evidenced in patients with various cardiovascular complications, including but not limited to, hypertension, aortic stenosis, and heart failure, as a consequence of an increase in the afterload. The atelectasis leads to a decrease in lung compliance and an increase in the work of breathing. III Baltic Meeting on Pharmacology, . 1988;64:1683–1687. Silverman K.J, Hutchins G.M, Weiss J.L, et al. The wheeze on inspiration is not very common and indicates a more severe obstruction of the airway.17 Wheezes may diminish or change in pitch as a result of bronchodilator treatments. 2002;95:2260–2267. • + Dead space ventilation (VD). 1989;7(1):1–9. There are no specific CV abnormalities associated with MS. The heart is also affected by SCD. Myasthenia Gravis Myasthenia gravis is an acquired autoimmune disorder with specific autoantibodies that attack the nicotinic acetylcholine receptors in the neuromuscular junction, producing muscle weakness that is aggravated by repetitive muscle contractions. Notably, patients with PAD may exhibit precipitous rises in blood pressure during exercise due to their atherosclerosis and diminished vascular bed. Components of Exercise: Intensity, Duration, Frequency, and Modes The acute care patient's response to activity or exercise is dependent on the body's ability to meet the oxygen transport demand. Pericarditis produces a chest pain symptom that is constant and sharp and is described as intense and "stabbing." Pericarditis pain usually does not increase with activity (however, in some cases it may increase with activity) and often remains constant 24 hours per day and is very intense. 2008;47(2):303–309. Respiratory muscle strength in congestive heart failure. Giugliano D, Ceriello A, Paolisso G. This mechanism of action is referred to as diastolic augmentation and profoundly improves oxygen delivery to the myocardium.201 In addition to this physiologic assist (greater availability of oxygen for myocardial energy production) to improve cardiac performance, hemodynamic assistance is also obtained as the balloon deflates just before systole, which decreases left ventricular afterload by forcing blood to move from an area of higher pressure to one of lower pressure to fill the space previously occupied by the balloon.201 Consequently, the intraaortic balloon pump causes "a 10% to 20% increase in cardiac output as well as a reduction in systolic and an increase in diastolic arterial pressure with little change in mean pressure. Bansilal S, Farkouh M.E, Fuster V. Firestein G.S, Budd R.C, Gabriel S.E, McInnes I.B, O'Dell J.R. Kelley's Textbook of Rheumatology. Angles greater than 120 degrees are commonly associated with severe RLD and respiratory failure.9 These skeletal abnormalities decrease the chest wall compliance, which may be as low as 25% of predicted.9 Lung compliance is also decreased and dead space increased. Comparison of left ventricular ejection fraction and exercise capacity as predictors of two- and five-year mortality following acute myocardial infarction. Sessler C.N, Gosnell M.S, Grap M.J, et al. ■ A systematic approach should be taken when evaluating the rhythm strip. The outcome measures are addressed from the perspective of physiologic/biologic measures, functional measures, and quality-of-life measures. 46. Adv Otorhinolaryngol. Of course my family and my dogs need to be acknowledged for all the time I spent at the computer working on this edition instead of spending time with them. FIGURE 5-2 Changes in lung volumes and capacities with pulmonary disease. Borow K.M, Braunwald E. Berlowitz DJ1, Tamplin J. Huon C, Rey E, Mussat P, et al. The mean duration between diagnosis and death is 5 months when not treated.32 Death is most often due to renal disease progressing to kidney failure. Lung Sound Definitions Disagreement exists regarding the terms used to identify the auscultated lung sounds.14 Nonetheless, lung sounds may be divided into two types: normal breath sounds and adventitious breath sounds. Reliability and validity in a patient population. Hypoventilation, which is particularly common at night, and microatelectasis give rise to CO2 retention and hypoxemia, which may be exacerbated by different positions (e.g., lying flat in high cervical SCI, sitting in lower cervical SCI). Chapter 16 (Examination and Assessment Procedures) was revised with addition of new tables to help organize assessments and improve the understanding of this material. Drugs suppress arrhythmias (abnormal impulse formation or conduction) by altering cell membrane permeability to specific ions, for example, sodium and calcium. Subjective effects of humidification of oxygen for delivery by nasal cannula. The disease may enter long periods of remission. In: Cannon C.P, Hoeksra J, Jaffe A.S, Waltham M.A, eds. 1991;99(5):1076–1083. 13-4 shows a normal arterial pressure tracing and its relation to the cardiac cycle. Also of concern for patients with advanced CMD is the state of hemostasis (the mechanical and biochemical aspects of platelet function and coagulation), which is frequently disrupted as a result of accompanying liver disease.5 Inhibition of platelet function to the point at which the platelet count drops below 150,000 cells/μL is termed thrombocytopenia and is caused by hereditary factors or drugs, or often is acquired from systemic disease.88 Inherited thrombocytopenia is uncommon; however, thrombocytopenia caused by drugs is much more common and frequently is an adverse reaction associated with use of aspirin, corticosteroids, antimicrobial agents (penicillins and cephalothins), phosphodiesterase inhibitors (dipyridamole), caffeine, sympathetic blocking agents (β antagonists), and heparin.88 Acquired disorders of platelet function are a common complication of renal failure. 14-2, B). This is evidenced by diminished or absent breath sounds in the area of the effusion, is more likely to be in gravity-dependent areas, and is accompanied by reduced lung volumes. Results in shorter duration of ventilation, less need for sedation, and fewer complications than intubation and positive-pressure ventilation. Veno-Thromboembolism Venous thromboembolism is the formation of a blood clot in a deep vein that can lead to complications, including deep vein thrombus (DVT) or a pulmonary embolism (PE). Impact of obesity on cardiovascular disease. Steele B. The drug is discontinued in patients who develop any of these pulmonary complications. 1941;131:659–673. In persons with obstructive disease, bronchodilators are used primarily to measure the reversibility of the obstruction. false-negative results, 676–677 False ribs, 2 Family education, 561–562, 562b Fasting blood glucose, 48 Fatigue, 536–537 Female-specific tests, 293–294 Ferrans and Powers Quality of Life Index-Version (QLI), 684t–687t FEV1, See Forced expiratory volume in 1 second (FEV1) Fight-or-flight response, 39, 93 Filling time test, venous, 296 Fissures, 9–11, 9f Five Times Sit to Stand Test, 684t–687t FK506, 402–403, 404t Fludarabine (Fludara), 244t, 253–256, 254t Fluid-air interface, 28–29 Fluorouracil (5-FU), 244t, 253–256, 254t Forced expiratory volume in 1 second (FEV1), 683 Forced vital capacity (FVC), 350–351, 350f, 350b Fraction, ejection, 38–39 Framingham Heart Study, 43, 43b, 46–47 FRC, See Functional residual capacity (FRC) Friedreich ataxia, 250 Functional mobility advances, 547b training, 559–560 ambulation, 557b, 560, 563f bed mobility, 559–560 timing of, 559 transfers, 557b, 560, 563f Functional residual capacity (FRC), 23–24 Functional Status Questionnaire (FSQ), 684t–687t Fungal pneumonia, 140–145, 141t–142t See also Pneumonias FVC, See Forced vital capacity (FVC) G Gait/walking speed tests, 684t–687t, 690–692, 691t 2-Minute Walk Test (2MWT), 683–690 3-Minute Walk Test (3MWT), 683–690 6-Minute Walk Test (6MWT), 372b, 683–690, 684t–687t, 689f 12-Minute Walk Test (12MWT), 372b, 683–690, 684t–687t, 688b, 689f Gemcitabine (Gemzar), 244t, 253–256, 254t Gemtuzumab (Mylotarg), 244t, 253–256, 254t Gene therapy, 375 Gladiolus/body, 1, 2f Globins, 32 Glucose excursions, 237t physiology, 228, 233f Graded exercise stress tests (GXTs), 675, 683, 684t–687t Grapeseed extract, 660 Great arteries transposition, 631 Guillain-Barré syndrome, 248–249 GXTs, See Graded exercise stress tests (GXTs) H HAART, See Highly active antiretroviral therapy (HAART) HAP, See Human Activity Profile (HAP) HAPs, See Hospital-acquired pneumonias (HAPs) Harvard-Willet Food Frequency Questionnaire, 684t–687t HCAPs, See Health care-associated pneumonias (HCAPs) HDL, See High-density lipoprotein (HDL) Health care-associated pneumonias (HCAPs), 140–142, 141t–142t Health Knowledge Test, 684t–687t Health Profiles-Revised, 684t–687t Heart anatomy of, 15–19, 16f–18f atrium, left, 17–18, 17f atrium, right, 17, 17f chambers, 16–18, 17f conduction system, 18–19, 18f, 19b endocardium, 16, 16f myocardium, 16, 16f, 16b pericardium, 16, 16f point of maximum impulse and, 15, 16b tissue layers, 16, 16f valves, 18, 18f ventricle, left, 17f, 18 ventricle, right, 17, 17f attack, warning signs, 51f blocks, 322–324 first-degree atrioventricular, 322–323, 323f, 323b second-degree atrioventricular, type 1, 323, 324f second-degree atrioventricular, type 2, 323–324, 324f, 324b third-degree atrioventricular, 324, 325f disease, congenital vs. However, nursing continued to ambulate the patient approximately four times per day despite her complaints of severe shortness of breath and abdominal discomfort. Massery M. Nurses in Partnership with Other Health Professionals. There is often a synergistic effect of radiation therapy and some chemotherapeutic agents, and also of some of the drugs when used in combination, which can increase the extent of cardiac or pulmonary injury. Patients with severe peripheral neuropathy should engage in non–weight-bearing exercise to reduce the risk of skin breakdown, infection, and the development of Charcot joint destruction. Anti-IgE Monoclonal Antibodies Allergies are triggered by allergens. From the results of the stress test, the patient's exercise prescription will be determined using a combination of heart rate (not useful in heart transplant recipients), RPE, MET level, oxygen saturation levels, and other limiting symptoms.43,145 At 1 year after heart transplantation, nearly one-third of recipients demonstrate a more normal heart rate response during exercise, making an exercise prescription based on heart rate more feasible.124 Physical therapy goals during this phase may include strengthening large proximal skeletal musculature, continued aerobic conditioning, attention to and resolution of any musculoskeletal problems, independence with a progressive exercise program, and understanding and independence with all areas of education, function, and selfmonitoring.43,145 Whereas cardiac and pulmonary rehabilitation programs are often focused on increased endurance, the physical therapist needs to address the patient's functional level and ability to participate in desired activities at home and in the community. In lung transplant recipients, bronchiolitis obliterans syndrome (BOS) is thought to be a manifestation of chronic rejection.146,153–155 A persistent decline in measurements of small airway function is a predictor for the development of BOS, but it must be histologically proven with specimens from a transbronchial biopsy.153,154,156,157 Development rates of BOS as a long-term complication are high—49% for recipients at 5 years and 76% at 10 years.112 Mortality rates associated with BOS have been reported at 29% for those between 3 and 5 years posttransplant.112 As with transplant allograft vasculopathy after a heart transplantation, BOS in lung transplant recipients is associated with CMV infection.154 Additional causes of death include graft failure and non-CMV infections. 10-32); it has been highly correlated with pathologic cardiac conditions.31 Individuals with exertional hypotension often demonstrate coronary perfusion defects on exercise thallium tests and severe coronary disease, poor ventricular function, or both as documented by coronary angiography.30 A blunted blood pressure response is defined as a slight increase in systolic blood pressure at low levels of exertion with a failure to rise with increasing levels of work. Lee D.C.-S, Johnson R.A, Gingham J.B, et al. 1997;45(8):968–974. Treatment of lymphedema and patient rehabilitation. Detailed information on the risk factors can be obtained from Chapter 3. 2008;36(8):2444–2445. Notice the patient's relatively small lung volumes. In the alveoli without surfactant, if Tsml were the same as Tbig, Psml would have to be many times greater than Pbig; otherwise, the smaller alveolus would empty into the larger one. Thus decreased blood pressure due to blood loss would be compensated for by increased sympathetic outflow and renin release. Spine xrays, myelogram, CT scan, or MRI may be used to visualize areas of the spinal cord affected. The specific pulmonary abnormalities depend on the specific gas inhaled and the length of time exposed to the gas. Physiological response to the 6-minute walk test in chronic heart failure patients versus healthy control subjects. The FVC is generally reduced in both obstructive and restrictive diseases; the primary difference between the curve in the patient with restrictive disease compared with the patient with obstructive disease is the slope of the curve. 173. Electrolytes All electrolyte levels should be observed when evaluating the laboratory results because disturbances in the electrolytes may affect the patient's performance. On entering the patient's room, the therapist should look at positioning and lengths of lines, tubes, and catheters so they can be monitored and protected. Increased vascular markings are indicative of venous dilation, whereas decreased vascular markings may indicate hyperinflation of the lungs. Am J Med Sci. Shumaker S.A, Brooks M.M, Schron E.B, et al. In general the CRQ requires about 20 to 25 minutes to complete. Inspiratory muscles increase the volume of the thoracic cavity by producing bucket-handle and pump-handle movements of the ribs and sternum, as depicted in Fig. Kannel W.B. Some lessons in cardiovascular epidemiology from Framingham. LaMonte M.J, Blair S.N, Church T.S. Physical activity and diabetes prevention. Thus far, no one drug satisfies this goal. Conduction may be delayed through the myocardium due to a dysfunction in the conduction system that is secondary to genetic defect, injury, or infarction. FIGURE 14-2 Clot formation (A), clot lysis (B), and site of action of anticoagulants (C) A. Nevertheless, the organisms Streptococcus pneumoniae and Haemophilus influenzae are generally thought to be the primary cause of infection of the respiratory mucosa in patients with chronic pulmonary disease.64 Often, treatment based on clinical observations suffices, but in nonresponding infections, a precise diagnosis generally requires that sputum samples be obtained by transtracheal aspiration, bronchoscopy, or transpulmonary aspiration. FIGURE 6-2 Radiographic signs of lung hyperinflation. 1997;4:41–46. Additionally, the anterior border of the left lung presents a cardiac notch. Norweg A, Jette A.M, Ni P, Whiteson J, Kim M. The person at the head should coordinate the timing for the roll. Pericardial pain is usually intense but can closely mimic angina in location. J Thorac Dis. 0.68 for a small improvement 4. 1993;23:630. Virchow and his triad: a question of attribution. . One of four known natriuretic peptides (atrial NP [ANP], BNP, Ctype NP [CNP], and DNP), BNP is released from the cardiac ventricles, especially the left ventricle, during pressure or volume overload. The results of the systems review should be documented in the chart. The patient is positioned in side-lying, three-quarter supine, or supine position. The technique progression continues until the patient shows the diaphragmatic breathing pattern at a normal rate and depth for all levels of functioning. Finally, some treatments used to support cancer patients during treatment also have the possibility of inducing pulmonary complications. The pattern of increased pulmonary vascularity often strongly resembles the interstitial pattern. Check telemetry recordings for arrhythmias. Daily E.K, Schroeder J.S. Techniques in Bedside Hemodynamic Monitoring. The therapist, therefore, must have a thorough understanding of how to assess these symptoms. The bronchial drainage positions for infants are the same as for adults because fetal development of the bronchial tree is complete at the end of 16 weeks of gestation. ■ The retention of sodium and water is caused by (1) augmented α-adrenergic neural activity; (2) circulating catecholamines; and (3) increased levels of circulating and locally produced angiotensin II, resulting in renal vasoconstriction. Postoperative physical therapy in the pediatric cardiac surgery patient. 2004;25:623–646. 5-31). 2004;101(2):113–129. Med Devices Evid Res. A support system can improve a patient's ability to respond to disease, whereas a negative home environment can deter the patient's rehabilitation.12 In addition, if the patient requires a great deal of care, the family's ability to supply this care and its financial resources should be assessed. Starnes V.A, Burr M.L, Schenkel F.A, et al. The same inflammation causes destruction of the lung parenchyma and leads to loss of alveolar attachments to the small airways, decreasing the lungs' ability for elastic recoil. Its goal is to be able to measure mobility and potential barriers to mobility for those patients who are in an ICU and whose status may therefore limit may limit the ability to use other mobility tools such as the Functional Independence Measure (FIM). 123. Exercise should not be continued if oxygen saturation drops to 88% or below (unless otherwise noted in the facility policy and approved by the medical director). Medical Tests and Procedures: Chest x-ray (CXR): increased density in pulmonary vasculature markings. The bicycle also takes up less room, requires less coordination to operate, and is less expensive than the treadmill. This exam allows for a more specific examination of symptom-limited performance than the self-paced walk tests because of the incremental nature of the assessment, and was found to show a greater cardiovascular response than the 6MWT. A single-reservoir system in which the reservoir serves as both the collection receptacle and the underwater seal offers greater resistance to the fluid and air leaving the chest, and in order to decrease this resistance an additional reservoir is included. The same sort of paradoxical breathing is found in an infant in respiratory distress. Differentiation of exerciseinduced bronchospasm from exertional angina is performed by assessing the individual's degree of difficulty in breathing. These changes facilitate a further increase in the volume within the thoracic cavity and a subsequent drop in the intrathoracic pressure beyond that caused by the contraction of the diaphragm and external intercostals. Hwang J.H, Kwon J.Y, Lee K.W, et al. Sundaresan S, Trulock E.P, Mohanakumar T, et al. This can be combined with pursedlip breathing or diaphragmatic breathing. Conservative treatment of lymphedema of the limbs. Westphal S.A. Obesity, abdominal obesity, and insulin resistance. When used with cyclosporine, these agents seem to offer greater protection from the nephrotoxicity that is commonly seen with cyclosporine.85 Maintenance Therapy Although the use of certain agents is considered standard therapy, medical centers vary considerably in their pharmacologic protocols for the heart transplant population. The patient may not use the arms during the sit-to-stand transfer, and it is preferred that the patient cross the arms over the chest. Intal Study Group. Executive summary of the clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. The pressoreceptors subsequently relay a message to the kidneys to retain fluid so that a greater volume of blood can be ejected from the heart to the peripheral tissue.69 Unfortunately, this compounds the problem and makes the heart work even harder, which further decreases its pumping ability. At the time of injury, the protein tissue plasminogen activator (tPA) is slowly released from the endothelial cells in the wall of the blood vessel. Because the inspiratory muscles have to work so hard to overcome the decreased pulmonary compliance, an involuntary adjustment is made to increase the respiratory rate and decrease the volumes so that the minute ventilation is maintained. 1996;93:34–41. Autonomic Nervous System and Its Receptors Understanding the autonomic nervous system requires a thorough review of its anatomy; please refer to Chapter 1 for more detail. London: Informa Healthcare; 2007. Patients with cardiopulmonary dysfunction often require the head of the bed to be elevated. Taylor D.O, Stehlik J, Edwards L.B, et al. An increase in carbon dioxide triggers the chemoreceptors and causes a resultant increase in ventilatory rate. Graettinger W.F, Bryg R.J. Left-ventricular diastolic function and hypertension. Reliability and Validity The CFQoL scale has been shown to be valid. 2013;32(10):951–964. Treatment Treatment usually combines plasmapheresis and immunosuppressive therapy to lower the levels of anti-GBM antibodies circulating in the blood. The SOLVD Investigators. At still lower pressures, the sounds disappear completely when laminar flow is reestablished. 2012;26:629–634. Mechanical properties of myocardium from hypertrophied rat hearts. Pastan S.O, Braunwald E. 2007;25:4396–4404. β2-Receptors have a higher affinity for epinephrine than norepinephrine; they are also found in the myocardium, especially the atria, but the majority of receptor sites are found within the peripheral circulation and bronchi. Prevalence, prognosis, diagnosis, and treatment. The first is dyspnea, or shortness of breath. The strength of the patient's cough needs to be assessed, as well as the production of any secretions from the cough (if they are present). Waist circumference and waist-to-hip ration as predictors of cardiovascular events: Multi-regression analysis of prospective studies. Grignani G, Pacchiarini L, Zucchella M, et al. Drexel H, Amann F.W, Beran J, et al. Arteriodilators Hydralazine (Apresoline) and minoxidil (Loniten) decrease afterload by decreasing arterial resistance. The effect of type 2 diabetes on diastolic function. The seated step test takes place in four phases. Use of antithymocyte globulin in human heart transplantation. Heart Fail Oct/Nov. Issues pertinent to prioritizing patient care and planning hospital discharge were also discussed. There is hope that the development of cardioprotective agents, such as the free-radical scavenger dexrazoxane currently under investigation, and medications that can reduce the incidence of radiation pneumonitis will reduce treatment-related toxicity that affects the lungs and heart. 2006;17(4):143. These changes can significantly affect the work of breathing.4 To overcome the decrease in pulmonary compliance, the respiratory rate is usually increased; the normal inspiratory muscles, especially the diaphragm, work harder; and the accessory muscles of respiration, the scaleni and the sternocleidomastoid (see Chapters 1 and 2), are recruited to assist in expanding the thorax.5 These additional efforts require additional oxygen (O2) expenditure. Coats A.J.S, Adamopoulos S. Etiology Free crystalline silicon dioxide is very common and widely distributed in the earth's crust in a variety of forms, including quartz, flint, cristobalite, and tridymite.35 Industries in which silicon dioxide exposure can occur include mining, tunneling through rock, quarrying, grinding and polishing rock, sandblasting, ship building, and foundry work.29 More recent exposure hazards now include hydraulic fracturing (fracking) of oil and gas wells.38 The most important factor in developing silicosis is the cumulative dose of silica inhaled.38 Even after the patient is no longer exposed, lung function impairment worsens as the disease progresses.37 FIGURE 5-10 Coal workers' pneumoconiosis. Both disorders occur predominantly in young, previously healthy females and have specific behavioral and psychological features, as well as physiologic abnormalities, including those involving the heart and lungs, as summarized in Table 7-19. In addition, the developmental and maturational anatomy was moved to the pediatrics chapter (Chapter 20) to help the learner compare the pathophysiology to the normal in this population. Baird M.S. Manual of Critical Care Nursing: Nursing Interventions and Collaborative Management. 1992;231:357–362. With each increase in speed, the increase in the number of shuttles required also increases. 98. 5-5). Yeh H.C, Brown T.T, Maruthur N, et al. 2004;20(3):175–185. Allen S.J, Geissler H.J, Davis K.L, et al. Devereux R.D, Agabiti-Rosei E, Dahlof B, et al. In reactive airway diseases such as asthma, airway inflammation is the primary physiologic factor rather than an increase in vagal tone. It may be the goal of the patient to ambulate independently without an assistive device or oxygen. 2002;347(18):1403–1411. Patients commonly have their medications frequently titrated, especially their diuretic, and it is important for patients to understand that these ongoing changes are a natural part of vigilant medical management. Nath A.R, Capel L.H. Inspiratory crackles—Early and late. Copyright © 1973 The American Journal of Nursing Company. As a result, physical therapy extenders (physical therapist assistants and aides or technicians) often participate in the transplant patient's rehabilitation treatment under the supervision of a physical therapist. 216. Comorbidities: diabetes (treated with an oral insulin secretagogue), HTN (treated with a diuretic and ACE inhibitor). In addition to their use for antiischemia, nitrates may be prescribed for the management of CHF by decreasing preload and for the control of diastolic hypertension. Typically, the CFQoL scale requires about 20 to 25 minutes to complete. These modifications can be weaned as the patient gets stronger and needs less assistance. Curr Probl Surg. Combined arteriolar and venous dilators Nitroprusside (Nipride) affects both arterial resistance and venous capacitance. Prim Care. A, Anteriorly. Can be switched to volume support mode when trying to wean patient from ventilator. ∗∗ Classic symptoms of RLD. 2006;48(2):219–224. A computer is used in conjunction with a system that automatically samples expired air continuously, a system that measures the volume of expired air, a system with oxygen provided electronically, and CO2 analyzers that measure the concentration of gases that are expired. Therefore it is important for clinicians to choose to monitor one or more relevant parameters and note any signs or symptoms before, during, and after providing interventions. Belardinelli R, Georgiou D, Cianci G, et al. Rude R.E, Kloner R.A, Maroko P.R, et al. Either way, an effective cough consists of four stages. The American Thoracic Society and the American College of Chest Physicians (ATS-ACCP) Ad Hoc Subcommittee on Pulmonary Nomenclature further clarified the continuous sounds as wheezes (previously defined as rhonchi) and the discontinuous adventitious lung sounds as crackles (previously called rales).16 Wheezes Wheezes are continuous adventitious lung sounds with a constant pitch and varying duration. 1965;2:213–226. ■ Type 1 DM requires insulin therapy, whereas other antihyperglycemic medications are used for the treatment of type 2 DM, at least until there is significant β-cell dysfunction, when insulin will also be needed. The action of these medications on the kidney is on the renal tubules and collecting ducts, where these electrolytes are allowed to diffuse out or are reabsorbed from the bloodstream. Purpose The purpose of the WIQ is to determine the impact of PAD on function. Other respiratory treatments (e.g., aerosols, bronchodilator treatments, incentive spirometers) that are prescribed should be noted because these treatments can improve the patient's exercise performance if they are administered before exercise; however, they may also be extremely fatiguing to the patient and may nec

Stoelting’s Anesthesia and Co-existing Disease, ed 5, Philadelphia, 2008, Churchill Livingstone.) Disease-Specific Obstructive Lung Conditions In the sections that follow, the obstructive lung diseases will be considered separately to highlight the unique features, such as etiology; pathophysiology; and variations in clinical presentation, medical management, and prognosis. Medicare Physician Quality Reporting System (PQRS). Pediatric values are found in Table 16-14. One of the most classic systolic murmurs is associated with aortic stenosis. Validity of the Patient Specific Functional Scale in patients following upper extremity nerve injury. Whispering pectoriloquy is evident when a patient is asked to whisper, and the whispered words are clearly and distinctly heard through the stethoscope. 5-21. The incidence is increased tenfold in black Americans compared with whites. Patients with diabetes or peripheral vascular disease often have diminished pulses, particularly in the hands and feet. Physiother Theory Pract. The examination includes a systems review before an entire examination, as well as a battery of tests and measures. Physical therapists who bill Medicare for outpatient physical therapy services in private practice settings (using the 1500 claim form or 837-P) are included under this program. Tarazi R.C. Cardiovascular hypertrophy in hypertension. 2003;52:815–820. Egan’s Fundamentals of Respiratory Care, ed 9. A great deal is still to be learned and understood about the body’s metabolism: how food is broken down, stored, and eliminated and how obesity can be reversed so that recurrence is not the norm. Flexibility of the ribs and cartilage allows for separation of the two ends of the sternum to expose the thoracic cavity.3 Ribs The ribs, although considered “flat” bones, curve forward and downward from their posterior vertebral attachments toward their costal cartilages. J Adolesc Health. This means the patient has to work harder just to move air into the lungs. Otherwise, the therapist may not obtain a true reading; the patient may subconsciously or consciously alter the breathing pattern and rate. 22. Abnormal responses indicate the need for treatment modifications. Therefore similar statistics as reported in the fitness literature regarding compliance and long-term commitment to diet, exercise training, and behavior modification would be applicable to this population.5 Although research is somewhat limited in long-term outcomes of primary prevention programs, scientific literature does support the reduction of risk factors as a result of a primary prevention program.2–5 Risk factors that are affected by a primary prevention program include reduction of total cholesterol to high-density lipoprotein (HDL) ratio, reduction in low-density lipoprotein (LDL) cholesterol, improvement in aerobic capacity and exercise tolerance, reduction in weight, reduction in resting blood pressure in hypertensive individuals, improved glucose tolerance and insulin sensitivity, improved feeling of well-being, and improved tolerance to stressful situations. Patients who have developed Goodpasture’s syndrome are also treated with hemodialysis, immunosuppression, and plasmapheresis. These values are highly dependent on the prevalence of the disease. Problems arise in the accurate measurement of blood pressure with activity when a therapist is not using good technique. Thus it is important to monitor BG level 60 and 30 minutes before exercise in order to identify the individual’s glucoregulatory status. Mehlhorn U, Geissler H.J, Laine G.A, Allen S.J. Myocardial fluid balance. Phys Ther 65:613–618, 11005. However, patients with chronic pulmonary dysfunction or congestive heart failure often desaturate their oxygen from hemoglobin with activity. The pulmonary edema fluid in cardiogenic pulmonary edema is characterized by low protein concentrations. 1-15). 1991;53:643–668. B, Midsagittal section through the upper airway. (From Fairchild S: Pierson and Fairchild’s principles and techniques of patient care, ed 5, St. Louis, 2013, Saunders.) Endurance training of the extremities is another technique that has been explored in an effort to increase ventilatory muscle endurance. 2005;29:1153–1167. Normal quiet breathing is mostly performed by the diaphragm, with equal and upward motion of the lower rib cage. 2008;15:83–96. Wenger N.K. Left ventricular dysfunction, exercise capacity and activity recommendations. 2-5).12 In other words, a given transpulmonary pressure will cause a greater or lesser degree of lung expansion, depending on the distensibility or compliance of the lung. Therefore primary prevention is an important component of wellness that should be incorporated into all rehabilitation programs. 5-9).25 Clinical Manifestation The clinical manifestation of bronchiolitis obliterans can be found in Table 5-6. Acute myocardial dysfunction and recovery: A common occurrence after coronary bypass surgery. 1983;244(4):H513–H518. A ten-year follow-up study. Recall that the bronchi and bronchioles have a cartilaginous outer layer, smooth muscle central layer, and an innermost mucous membrane; these work to maintain airflow. Some studies seem to indicate that the disease may be due to a hypersensitivity reaction to an undetermined antigen. The position of the body greatly influences ventilation and respiration. Family history of heart attack as an independent predictor of death due to cardiovascular disease. noninvasive positive pressure ventilation in acute respiratory failure. It is recommended that the physical therapist invest in a personal stethoscope because stethoscopes fit different people in different ways due to the types, sizes, and positions of the earpieces. Swan H.J, Forrester J.S, Diamond G, et al. The 2-minute step test is an option for these patients. However, jet nebulizers are commonly used in hospital settings for patients who have difficulty using inhalers, such as in serious cases of respiratory disease or severe asthma attacks. Although their prevalence is not as well characterized as anxiety, depression, and cognitive impairment, they nevertheless can impair an individual’s ability to participate in physical therapy intervention. Neely J.R, Rovetto M.J, Whitmer J.T, et al. In addition, arrhythmias may be well controlled by medication when the patient is at rest but not when the patient becomes active. Treatment and improvement with edrophonium (Tensilon), which inhibits acetylcholinesterase (required for acetylcholine uptake), may indicate myasthenia gravis. Weaver T, Narsavage G. Nurs Practitioner. 2009;374(9698):1351–1363. Crit Care Med. With the introduction of βblockers, calcium-channel blockers, thrombolytic agents, and the critical care regimen of vasopressors and positive inotropics, hemodynamic stability was able to be established in many individuals who formerly might have led the lifestyle of the “cardiac cripple” at best or faced death at worst. Evidence in the literature suggests that hypotensive or blunted blood pressure responses are most often due to a failing cardiac output.33,34 Because the cardiac output is directly dependent on stroke volume and heart rate, if the stroke volume is unable to increase appropriately for a given level of work, any increase in cardiac output arises solely as the result of an increase in the heart rate. (From Fraser RG, Paré JAP: Diagnosis of Diseases of the Chest, vol 1, ed 2, Philadelphia, 1977, Saunders, pp 174-175.) In the body systems approach to examining chest radiographs, the overall adequacy of the image should first be addressed. In addition, because of its direct delivery, the onset of action is more rapid with inhalation over subcutaneous or oral administration. Ventilation Ventilation, or breathing, often misnamed respiration, involves the mechanical movement of gases into and out of the lungs.1 At rest, an adult breathes at a rate of 10 to 15 breaths/minute, termed the ventilatory rate or respiratory rate. Arteries and veins differ, however, in the size and proportion within each layer. Current immunosuppressive therapy limits organ rejection by interfering with lymphocyte development, activation, and proliferation, as well as cytokine expression. It may also be employed to assess age-appropriate levels of fitness. Antman E, Morrow D. 2007;116:1942–1951. Relation to blood lactate, ventilatory basis, reproducibility, and response to exercise training. In: The Heart Sounds: New Facts and Their Clinical Applications. Then the index finger is placed medial to the right sternoclavicular joint and pushed inward toward the cervical spine (Fig. Case study 12-1 MA is a thin, 35-year-old man with end-stage cystic fibrosis, characterized by lower respiratory tract infections often requiring hospitalization, pancreatic insufficiency, airway obstruction, chest wall hyperinflation, thoracic kyphosis, digital clubbing, and oxygen desaturation with activity. Koike A, Itoh H, Taniguchi K, et al. Delirium is described as a patient’s impaired ability to process, store, receive, and recall information due to an acute onset of inattention with either a perceptual disturbance or a change in cognition.61 Delirium in the ICU has been a predictor of increased length of stay, increased ventilator time, increased mortality, increased long-term cognitive impairment, and increased costs. Scleroderma Systemic sclerosis (SSc, or scleroderma) produces slowly progressive fibrosis and vascular obliteration of the skin, subcutaneous tissues, and often the visceral organs. Belch J.J, Bridges A.B. Oxygen free radicals and congestive heart failure. Gender differences in healthrelated quality of life among postmyocardial infarction patients: Brief report. 2009. Obesity and colorectal cancer: Role of adipokines in tumor initiation and progression. Data from Niset G, Hermans L, Depelchin P: Exercise and heart transplantation: a review, Sports Med 12(6):359–379, 1992; and Kavanagh T, Yacoub MH, Mertens DJ, et al: Cardiorespiratory responses to exercise training after orthotopic cardiac transplantation, Circulation 77:162–171, 1988. 1990;15(6):1261–1269. The medical complications caused by eating disorders occur as a result of starvation, purging behaviors, and binge eating and involve almost all organ systems. Rosendorff C, Black H.R, Cannon C.P, et al. 164. Exercise has been found in some cases to be as beneficial as antidepressant medications in the treatment of symptoms and to provide physiologic changes in the blood that directly affect anxiety.20–22 In addition, exercise has been found to have an overall positive impact on exercise capacity. Heart Protection Study Collaborative Group, . Appropriate physical activity intervention strategies for weight loss and prevention of weight regain for adults. 1991;67(Suppl 1):S69–S72. Carver J.R, Shapiro C.L, Ng A, et al. And, finally, the text ends with the outcomes chapter which was totally revamped and provides great information for measurement of improvement in the cardiopulmonary patient population. World Health Organization. Franz I.W. Blood pressure response to exercise in normotensives and hypertensives. J Sports Med Phys Fitness. Patients should make certain that their blood sugar is appropriate before starting exercise (usually in the 120 to 160 mg/dL range) and may need to take a supplemental snack within the 60 to 90 minutes before beginning (Table 14-21). National Institute for Health and Care Excellence; 2010. Arq Bras Cardiol. Meyer D.M, Bennett L.E, Novick R.J, Hosenpud J.D. Single vs bilateral, sequential lung transplantation for end-stage emphysema: Influence of recipient age on survival and secondary end-points. 268. When the VE/MVV is greater than 70%, respiratory muscle fatigue will occur within minutes. S pinal c ord injury Transec tion of the c ervic al spinal c ord prevents the sympathetic -driven c hanges nec essary to maintain c ardiac performanc e. 2003;44(5):367–373. The PQRI is an initiative in which therapists may qualify for bonus payments for using objective measures in practice. Infection markers, including C. 198. As noted in Table 4-12, there are three “special measures” categories for treating CHF and CMD: dialysis and ultrafiltration, assisted circulation, and cardiac transplantation. Libby P. Dendroaspis natriuretic peptide: Endogenous or dubious? Mediate percussion—hyperresonant bilaterally. Bhatnagar G.M, Walford G.D, Beard E.S, et al. Amer J Crit Care. Sitting balance is poor, with trunk lean to right. Systems Review The systems review is a brief examination of all systems that would affect the ability of the patient to “initiate, sustain, and modify purposeful movement for the performance of actions, tasks or activities that are important for function” (p. Renal dialysis patients with RAS have a 56% 2-year survival rate, 18% 5-year survival, and 5% 10-year survival.308 Clearly, the early diagnosis of RAS and the prevention of end-stage renal disease (ESRD) are important goals. 29. Weissman C, Kemper M, Damask M.C, et al. Boden G. L’Abbate A, Emdin M, Piacenh M, et al. 16-16) or as the result of the movement of secretions during inspiration and expiration.22 Some clinicians still use the term rales for what are now called crackles. And finally, I can never forget my very special friends/mentors to whom I am forever grateful and whose memories and teachings are with me always: Michael Pollock (1937–1998), Linda Crane (1951–1999), and Gary Dudley (1952–2006). Renal failure sometimes results from acute kidney injury (AKI), such as poor renal blood flow while on cardiopulmonary bypass or drug overdose, and is characterized by rapidly progressive loss of renal function, which is potentially reversible with proper treatment, including dialysis, until the kidneys recover sufficient function. The value of diagnostic stress testing is tempered by the amount of variability among examiners conducting the test. These two junctions work together to move the impulse through a low-resistance pathway. Acute cellular rejection, development of donor-specific antihuman leukocyte antigen (HLA) antibodies, aspiration, respiratory viral infections, and gastroesophageal reflux disease may all be associated with development of OB after lung transplant.63,67 Pathophysiology Obliterative bronchiolitis clinically shows both restrictive and obstructive pulmonary function deficits and histologically shows obliteration of the terminal bronchioles.28 In OB there is fibrotic narrowing of the bronchiolar lumen that may be irregular, regular, or totally obliterative. Mechanical Aids for Coughing Inspiratory and expiratory mechanical aids are devices and techniques that involve the manual or mechanical application of forces to the body or intermittent pressure changes to the airway to assist inspiratory or expiratory muscle function (Fig. The clinician should then take that information about the individual’s lung capacity and compare it with functional outcome measures for the full picture of the individual’s lung performance. 1995;151:1136–1142. 1999;8(8):655–659. It is defined as the change in lung volume per change in transmural or transpulmonary pressure, expressed symbolically as ΔV/ΔP (Fig. Cholesterol is transported in the blood within a lipid molecule, which in turn is carried by a protein. FIGURE 1-12 Anterior and lateral views of the bronchopulmonary segments as seen projected to the surface of the lungs. Also, there was a high correlation between maximum CPK-MB levels and size of implants, which means that reaming of the bone for the implant and its heating effect may be responsible for false-elevated CPK-MB levels, aside from the direct muscle damage caused by the surgical incision.2 Table 8-2 Clinical laboratory studies with normative values ∗ Myo/CAIII = myoglobin value/carbonic anhydrase III. Urban N. It includes a three-stage process: exudative, proliferative, and fibrotic. ed 4. Therefore a pulmonary laceration most commonly appears in combination with a pneumothorax and hemothorax. Its inferior border is adjacent to the fifth rib laterally and the sixth rib medially. This may include recommending equipment that is ordered by another health care professional, issuing the equipment from department supplies, or contacting a vendor to supply and deliver needed equipment. J Epidomiol Community Health. ■ The concerns for patients with type 2 DM differ from those for type 1 DM. The individual’s ability to inspire is also affected, leading to the recruitment of accessory muscles of inspiration, including the sternocleidomastoid; the upper trapezius, the scalenes, and the pectoralis muscle group can also be recruited. Finally, pericarditis is also commonly noted after a coronary artery bypass grafting procedure. 1-16, A) consists of a smooth posterior and medial inner wall. Positron Emission Tomography Positron emission tomography is a nuclear technique that provides visualization and direct measurement of metabolic functioning, including glucose metabolism and fatty acid metabolism, as well as blood flow of the heart. The weakened bronchiole airways are kept open by the effects of positive pressure created by the pursed lips during expiration. Respiratory treatment involves prevention of infection with maintenance of good inspiratory effort and good airway clearance to mobilize any secretions. In: Klahr S, ed. Slazchic J, Massie B, Kramer B, et al. It passes laterally downward behind the superior vena cava for approximately 1 inch before giving off its first branch—the upper lobe bronchus—and entering the root of the right lung. In addition, when working with the older patient, the medical team should remain alert to adverse drug reactions and interactions, taking care to avoid provoking a drug reaction that would be worse than the disease itself. The white pH range of 7.35 to 7.45 and PaCO2 range of 35 to 45 mm Hg represent 2 SD from the normal values. Causes of death in lung transplant recipients. However, when respiratory failure has been aggravated by a potentially harmful intervention, such as oxygen and/or narcotics, respiratory stimulants serve a purpose.5,22,32 Clinical tip Prescription of β-blocking medications in patients who have a history of bronchospasm or asthma should be done with caution. 6-2 illustrate the most common signs of lung hyperinflation associated with obstructive lung diseases. After strength measurements are obtained, patients are provided a breathing exercise program at a specific percentage of the MIP or MEP (similar to aerobic exercise training) with a device that resists either inspiration or expiration. Management may mean monitoring input and output and using diuretics. Common complications include subluxation of the upper cervical spine, infection, and GI hemorrhage and perforation, along with renal, lung, and heart disease. ■ Diabetes mellitus is a chronic metabolic disorder characterized by hyperglycemia and caused by inadequate insulin production or ineffective insulin action. Hagberg J.M, Seals D.R. Exercise training and hypertension. It is now 6 months since his surgery, and he is symptom free. Cancer: Principles & Practice of Oncology. New York: Bantam Books; 1981. A chest tube insertion involves the surgical placement of a hollow, flexible drainage tube into the chest. Granular pneumocytes (type II) cells are thick, are cuboidal shaped, cover 7% of the alveolar wall, and are involved in the production of surfactant.13 Surfactant is a lipoprotein that lowers alveolar surface tension at end expiration and thereby prevents the lung from collapsing. doi: 10.1007/s11548-012-0798-y. The progression of the disease is steady, and most patients are confined to wheelchairs by 10 to 12 years of age. Wong C, Marwick T.H. Obesity cardiomyopathy: pathogenesis and pathophysiology. The ventricles eject blood that is received from the atria into arteries that deliver blood to the lungs and the systemic circulation. In: Tobin M.J, ed. 16-4) and demonstrating increased effort with breathing and increased use of accessory muscles, one might begin to assume the patient has chronic obstructive disease. Specifically, decreases in renal function, reduced liver metabolism, and altered blood flow (as in coronary artery disease and congestive heart failure) are responsible for adverse or suboptimal reactions to cardiac drugs. Iriarte M, Murga N, Sagastagoitia D, et al. Inflation and deflation of the intraaortic balloon pump improve diastolic and systolic heart function, respectively. Procarbazine and vincristine (and theoretically cytarabine and chlorambucil) can cause neuropathies that may affect the respiratory muscles, inducing weakness. 2001;104:2996–3007. Physical therapists can use results from spirometry and specialized testing such as methacholine challenges or eucapnic hyperventilaton testing to help instruct patients in using bronchodilators before exercise. With this knowledge, physicians can plan treatment and more accurately prescribe pharmacologic alteration of the action potential. Subclinical cardiomyopathy in Becker muscular dystrophy. Care must be taken with thrombolytic agents to avoid situations of potential tissue trauma such as venipunctures, manual shaving, high-intensity resistive exercises, or soft tissue injury because the patient’s blood-clotting ability is markedly altered during this period. Desc ribe the patient types on whic h the test has been used. Acute cellular rejection is T-cell mediated and can occur anytime, usually in the first 3 to 6 months after transplantation. Early predictors of mechanical ventilation in Guillain-Barré syndrome. A negative (or normal) scan has a less than 5% probability of a PE. Pediatr Transplant. Conversely, conditions that result in decreased blood volume will reduce the venous return to the heart, decreasing CO. SaO2 is a direct measurement of oxygen saturation through an arterial blood sample, whereas SpO2 is an indirect, calculated measurement of oxygen saturation through the use of pulse oximetry. To measure the PCWP, the balloon at the tip of the pulmonary catheter is inflated with air, thus “wedging” the catheter into a branch of the pulmonary artery and effectively occluding it. 1996;2(2):111–117. Anteriorly, it is bounded by the oropharyngeal isthmus (which opens into the mouth) and the pharyngeal part of the tongue. doi: 10.5539/gjhs.v5n5p11. The association of hypertension and diabetes: prevalence, cardiovascular risk, and protection by blood pressure reduction. Hopp J, Lee J, Hills R. 2006;14(Suppl):135S–142S. Hardy J.D, Webb W.R, Dalton M.L, et al. Most of these proteins stored in myofibrils (the area actually bound to the myofibril) are key for calcium-regulated cardiac and skeletal contraction.7 Some troponin is also found in the cytosol (unbound). 1998;19(Suppl A):A45–A52. Cases J. Intensive Care Med. Physiology The heart is an oxygen-dependent organ whose energy needs are met by aerobic metabolism. Blood clot (thrombus formation) can occur acutely as a result of plaque instability. Thrombolytic agents enhance this process. 1983;16:185–192. A thorough assessment includes an interview that should include a series of questions: ■ When did your symptoms start? King K.B. Psychologic and social aspects of cardiovascular disease. Because of the different symptoms that women experience, their symptoms are not assessed as cardiovascular in nature and are often ignored by the medical community. 182. In response to vasodilation, compensatory sympathetic activation, such as tachycardia, reflex vasoconstriction, increased aldosterone, and elevated plasma renin, often occurs. Smith Jr. S.C. Risk reduction therapies for patients with coronary artery disease: A call for increased implementation. Biofeedback for increasing tidal volume and relaxation has been shown to reduce weaning time.66 Breathing strategies, including manual hand placement on the abdomen for recruitment of the diaphragm, can be utilized in conjunction with watching the tidal volume monitor on the ventilator. A number of chemotherapeutic agents are associated with cardiac and pulmonary toxicity, which can occur acutely or may become apparent months to years following the completion of treatment. Sleep-disordered breathing, including central apneas and hypopneas and obstructive sleep apnea, is seen in many patients, including those with quadriplegia, postpolio syndrome (PPS), ALS, and the muscular dystrophies. Whaley M.H, Brubaker P.H, Kaminsky L.A, et al. ■ The kidneys are complex organs whose major functions include the control of extracellular fluid volume; the regulation of serum osmolality, electrolyte, and acid– base balances; and the secretion of hormones, such as renin and erythropoietin. Lower R.R, Shumway N.E. Studies of orthotopic homotransplantation of the canine heart. 99. In some obstructive diseases, secretion production and cough are prominent features. 237. Deep vein thrombosis usually refers to the development of a clot in a deep vein of the lower extremity or pelvis, with a smaller percentage occurring in the arm (Fig. BO X 4- 3 Re sponse s obse rve d during subm a x im a l a nd m a x im a l e x e rcise t e st ing in pa t ie nt s wit h C MD 1. The recognition of the barriers to xenotransplantation at the cellular level is leading to the development and testing of therapeutic solutions in the realm of clinical xenotransplantation.166 Table 12-15 Patient survival rates for transplants performed in the united states: 1997 to 2004 From UNOS, ABI values above 0.50 are usually considered to be found in individuals with critical limb ischemia and may be accompanied by rest pain, atrophy, pulselessness, or wounds on the lower extremities. 281. 4-10 shows that increased cAMP synthesis ultimately increases the force of myocardial contraction (the inotropic effect).75 FIGURE 4-15 Neural control of cardiopulmonary function. Notice the bilateral lower zone reticulonodular infiltrates and the loss of lung volume in the lower lobes. Carter J.L, Noseworthy J.H. Ventilatory dysfunction in multiple sclerosis. The left lateral chest radiograph should be viewed as if the patient’s left side was facing you; the reverse is true for the right lateral view. Pleurisy (pleuritis) is an inflammation of the visceral and parietal pleurae. Facial expressions of distress or fatigue may indicate a need for change in the therapeutic treatment. 1997;112:49S. The remainder of this chapter focuses on appropriate measurements that would fall under each of these categories. Some congenital defects such as pectus excavatum (funnel chest) or pectus carinatum (pigeon chest) are important to observe, although they often have little effect on pulmonary function unless they are a severe deformity (see Figs. 1995;25:212–217. Pulmonary amyloidosis can occur along with systemic disease or as a localized entity, resulting in progressive diffuse parenchymal infiltrates, restrictive lung disease (RLD), and impaired gas exchange versus localized tracheobronchial plaques or diffuse parenchymal nodules and possible pulmonary HTN, obstructive sleep apnea caused by massive infiltration of the tongue, and respiratory failure induced by infiltration of the diaphragm. Table 16-12 Normative values for resting HR Age Low (beats/minute) Infant: Birth to 1 year 100 Toddler 1 to 3 years 90 Presc hooler 3 to 6 years 80 Elementary sc hool age 6 to 12 years 70 Adolesc ent 12 to 18 years 60 Adult 18+ years 60 High (beats/minute) 160 150 140 120 100 100 FIGURE 16-29 Heart rate response to increased workload in a normal sedentary individual (A) versus a trained individual (B). From Paz JC, West MH: Acute Care Handbook for Physical Therapists, ed 3, St. Louis, 2009, Saunders. Kahn S.R, Shapiro S, Wells P.S, et al. To create a more forceful inspiration during exercise or cardiopulmonary distress, accessory muscles assist with the inspiration. Donnelly J.E, Jacobsen D.J, Heelan K.S, et al. ↑ Elevated creatinine 6. Associations between central obesity and indexes of hemostatic, carbohydrate and lipid metabolism. The understanding of transplant allograft vasculopathy has progressed significantly over the past 10 years; however, the exact cause of transplant allograft vasculopathy is unknown. In RLD, both lung and chest wall compliance and lung volumes may decrease. Patients should be encouraged to carry a readily available carbohydrate source, for example, hard candy or jelly beans, and to meet with a nutritionist for specific diet instruction. The resultant temperature change is sensed by a thermistor near the tip of the catheter located in the pulmonary artery. Risk factors and atherosclerosis in youth autopsy findings of the Bogalusa Heart Study. The suggested goal is to treat with fibrinolytics within 30 minutes of hospital presentation14; however, when that time frame is not possible, “[the writing group believes] that every effort should be made to reduce the time … from first medical contact to fibrinolytic therapy when that is considered the appropriate reperfusion strategy.”14 The ACC/AHA guidelines state that the overall goal in treatment of this patient population is to keep total ischemic time less than 120 minutes from onset of symptoms to reperfusion, either via PCI or thrombolytics.14 In the consideration of thrombolytics, a history of bleeding abnormalities, cerebrovascular events, or uncontrolled hypertension may be contraindications. The force of myocardial contraction and cardiac performance in general appears to be dependent on the level of thiamine, and it has been suggested that “the possibility of thiamine deficiency should be considered in many patients with heart failure of obscure origin.”55 In addition, patients undergoing prolonged treatment with furosemide (Lasix)—the first drug of choice in the treatment of CHF—have demonstrated significant thiamine deficiency, which may improve with replacement.105 Two other nutritional concerns include carnitine deficiency and coenzyme Q10. Appropriate exercise training provides many benefits for these patients.246–253 Hemiplegia can result from a number of events, including CVA due to thrombosis, embolism, or hemorrhage; surgical excision of a brain tumor; and trauma. Infants and small children often need assistance in clearing secretions loosened by bronchial drainage, percussion, or vibration. 104. Arterial Blood Gases Arterial blood gases are a measurement of the acid–base and oxygenation status of patients via arterial blood sampling. Pathophysiology 3. nonclinical factors of, 675, 675b data selection criteria, 678–690, 678t–679t definitions of, 675–677, 675b factors of, 675, 675b Guide to Physical Therapist Practice, 675 diversity of, 675, 675b exercise-related, 684t–687t functional performance, 683–692, 684t–687t 2-Minute Step Test, 688 6-Clicks Mobility Forms, 691 6-Minute Walk Test (6MWT), 372b, 688, 689f Activity Measure for Post-Acute Care (AM-PAC), 691 activity testing, 692, 692b gait/walking speed tests, 690–692, 691t Modified Shuttle Test, 689–690, 689b, 690f Patient-Specific Functional Scale (PSFS), 692 Perme Intensive Care Unit (ICU) Mobility Score, 691 seated step and chair rise tests, 687–688, 687t Short Physical Performance Battery (SPPB), 692 Timed Up and Go (TUG) tests, 690, 691b generalized, 676, 684t–687t Medical Outcomes Study Short Form 12 (SF-12), 675–676 Medical Outcomes Study Short form 36 (SF-36), 675–676 importance of, 674–675, 677–678 intended populations, 676, 676t measurement instruments, comparisons of, 676t, 683, 684t–687t, 690–692 overviews of, 674, 696–697 psychological measures, 684t–687t psychometric properties of, 676, 676t pulmonary-specific, 684t–687t quality-of-life (QOL) measures, 684t–687t, 693–696 Chronic Respiratory Disease Questionnaire (CRQ), 695 COPD Assessment Tool (CAT), 695 Cystic Fibrosis Quality of Life Scale (CFQoL), 696 generic vs. However, there is little evidence that patients benefit from this intervention, and it is being used less frequently.28 A new procedure, thoracoscopy, uses a rigid scope with a light source to explore the entire hemithorax. According to the results, 85% of the individuals identified as having a moderate-to-high level of PAD had followed up with a medical physician and were continuing to receive care 6 months after screening.50 In addition, studies show that PAD can be an indicator of severity of CAD. Francis G.S. Which drug for what patients with heart failure, and when? Cardiopulmonary Physical Therapy. Within the thoracic cavity exist the heart, housed within the mediastinum centrally, and laterally are two lungs. It is the most common of the muscular dystrophies, with a prevalence rate of 15 per 100,000 males in the United States.44,53,61 Pathophysiology Pseudohypertrophic muscular dystrophy typically appears when boys who have this recessive gene are 3 to 5 years of age.53,60 Muscle biopsy at this time shows both muscle fiber hypertrophy and necrosis with regeneration. The body is not twisted. In: Fishman A.P, ed. Patients who have been markedly obese over a long period usually can demonstrate expertise in dieting and remarkably significant will power. 1974;25:282–284. Essentials of Cardiopulmonary Physical Therapy cannot provide you with everything there is to know about the assessment and treatment of cardiovascular and pulmonary disorders. Arterioscler Thromb Vasc Biol. (Courtesy of CardiacAssist. Special regards to mucociliary transport in malignant lesions of the human larynx. (Courtesy of Blickman Inc.) The therapist may continue with the wheeled walker or progress the patient to the next least restrictive assistive device as indicated. When used judiciously, oxygen therapy has few side effects. Inspiratory neurons are located in the inspiratory center, or dorsal respiratory group, of the medulla. BO X 4- 2 C ha ra ct e rist ic signs a nd sym pt om s of he a rt fa ilure 1. Patients demonstrating life-threatening arrhythmias on the Holter monitor may be referred to electrophysiologic mapping studies (EPS), particularly if they demonstrated sustained or nonsustained ventricular tachycardia. Munich, Germany: Elsevier, Urban & Fisher; 2006. Boston: Kluwer Academic; 1998. Although most individuals will show only minor pharmacologically insignificant differences, some individuals will indeed show major differences that can result in unexpected and sometimes dangerous clinical situations. 122. Table 7-14 General strategies for limiting blood glucose excursions associated with exercise BG = blood glucose concentration; CHO = carbohydrate; CSII = Continuous Subcutaneous Insulin Infusion. A randomized trial of low-dose aspirin in the primary prevention of cardiovascular disease in women. These agents inhibit the formation of thrombin and thereby prevent the influence of thrombin on fibrinogen. The RUL bronchus divides into three segmental bronchi about a half inch from its own origin: the first—the apical segmental bronchus—passes superolaterally toward its distribution in the apex of the lung; the second—the posterior segmental bronchus—proceeds slightly upward and posterolaterally to its distribution in the posteroinferior aspect of the upper lobe; the third—the anterior segmental bronchus —runs anteroinferiorly to its distribution in the remainder of the upper lobe. Serum cholesterol, lipoproteins, and the risk of coronary heart disease: The Framingham study. (Redrawn from Nichols DG: Critical Heart Disease in Infants and Children, ed 2, Philadelphia, 2006, Mosby.) Reentry is probably responsible for many cardiac arrhythmias, including atrial and ventricular flutter and fibrillation, supraventricular tachycardia involving accessory pathway or nodal reentry, and many ventricular tachycardias.39 Electrophysiologic testing enables precise identification of the origin and physiology of the reentrant rhythm. 56. A temperature–time curve is constructed and calculated.17 The mean SV is calculated by dividing the CO by the ventricular rate over a specific period. Pericardial pain is also more common in some of the inflammatory diseases such as systemic lupus erythematosus. Am J Physiol Renal Physiol. 1973;49(8):666–673. Boston: Little, Brown; 1983. BO X 3- 7 Ex e rcise re com m e nda t ions for individua ls wit h pe riphe ra l a rt e ria l dise a se Perform exercise in intervals as short as 1 to 5 minutes, alternating with rest periods. Hasleton P.S. Spencer’s Pathology of the Lung. A comparison between hypertrophy induced by senescence and by aortic banding. BO X 10- 2 Adva nt a ge s a nd disa dva nt a ge s of che st com put e d t om ogra phy com pa re d wit h port a ble che st ra diogra phy From Rubinowitz AN, Siegel MD, Tocino I: Thoracic imaging in the ICU, Crit Care Clin 23(3):539–573, 2007. Lidocaine is a very effective drug for ventricular arrhythmia. In UpToDate: . Stimulation of the sympathetic division increases the heart rate, conduction velocity, and contractile force, and stimulation of the parasympathetic division (acting primarily via the vagal nerve) slows the heart rate and the conduction through the AV node. Dias, PT, DPT, CCS, Associate Professor, Physical Therapy Program, Maryville University, St. Louis, Missouri Christen DiPerna, PT, DPT, Physical Therapist, Indiana University Health Methodist Hospital, Indianapolis, Indiana Anne Mejia-Downs, PT, CCS Assistant Professor, Krannert School of Physical Therapy, University of Indianapolis, Indianapolis, Indiana Physical Therapist, Department of Rehabilitation Services, Clarian Health Partners, Indianapolis, Indiana Jennifer Edelschick, PT, DPT, Coordinator of Pediatric Acute PT/OT Services Physical and Occupational Therapy, Duke Medicine, Durham, North Carolina Tara Marie Dickinson Fahrner, PT, DPT, CCS, Sacred Heart Hospital, Pensacola, Florida Physical Therapist, Physical Medicine, Ann Winkel Fick, PT, DPT, MS, CCS Director of Clinical Education Associate Professor, Physical Therapy, Maryville University, St. Louis, Missouri PRN Physical Therapist, Physical Therapy, Barnes-Jewish Hospital, St. Louis, Missouri Danielle L. Therefore the description of dyspnea of phonation is made by identifying how many words can be expressed before the next breath. Patient complains of general discomfort in the right upper extremity, but no specific pain. Risk Factors for Heart Disease From the history and physical examination, one usually can determine whether the patient has any of the following major risk factors for heart disease3: ■ Hypertension ■ Smoking ■ An elevated serum cholesterol or a diet high in cholesterol ■ A family history of heart disease ■ Stress (anger and hostility; personality factors) ■ A sedentary lifestyle ■ Older age ■ Male gender ■ Obesity ■ Diabetes An awareness of the patient’s risk factors enables the therapist to develop realistic goals for the patient’s long-term treatment, to identify other rehabilitation team members to whom the patient should be referred, discuss a plan for prevention, and most important, decide on precautions to and monitoring of increased activity, depending on the risk for heart disease. Physiology To understand how antiarrhythmic agents suppress rhythm disturbances, it is necessary to review the unique characteristics of normal myocardial pacemaker and conduction system functioning. Note the widened QRS interval. Keltikangas-Jarvinen L, Raikkonen K, Hautanen A, Adlercreutz H. As understanding of the pathophysiology of HF has evolved, however, neurohormonal interventions such as beta-blockers and ACE inhibitors are the initial drugs of choice (see Table 14-7). Phonation, Cough, and Cough Production Evaluation of a patient’s speech also is an assessment of shortness of breath at rest. Fitzsullivan E, Gries C.J, Phelan P, et al. 2006;81(4):1505–1507. Expiratory musc le training Performed in a variety of ways; most c ommonly with weights upon the abdomen and hyperpneic breathing. It may be useful as a relaxation technique or to control breathing during an activity such as ambulation. In addition to the sputum odor, the individual’s breath odor should be assessed. In addition, when hemoglobin concentration is reduced, as in anemia or in conditions that cause hemoglobin to desaturate, the administration of oxygen is considered beneficial. PT Plan of Care/Interventions: Inpatient monitored therapeutic exercise progression, functional mobility training, ambulation, and patient education, one to two times daily for 3 days. Coronary artery disease and cardiac events with asymptomatic and symptomatic cerebrovascular disease. 16-25). Video of a complete cardiac transplant: 104. 2007;81:636–649. The CAT should not be used to diagnose COPD and should not replace spirometry, as it is self-reported. The functional status score combines the physical limitation and symptoms domains. FIGURE 17-6 Trendelenburg position. 2009;6:20–27. Is the evidence sufficiently strong? FIGURE 17-12 The SARA Plus hydraulic assist standing lift. 2009;27(10):610–619. Box 13-1 outlines some of the changes in rhythm that would indicate caution with physical therapy intervention. Elkins M.R, Robinson M, Rose B.R, et al. Left ventricular assist device and drug therapy for the reversal of heart failure. These pathologic changes are heightened in the supine position. In the acute care setting, simply placing a towel roll under the patient’s ischial tuberosities can help achieve this position. Blood gas determinations can identify the effectiveness of a treatment designed to improve airway clearance and ventilation. The activity evaluation is an assessment of the patient’s responses to the following situations: rest (supine), sitting, standing, some type of activity of daily living (e.g., dressing lower or upper extremities, combing hair, brushing teeth), and ambulation of some distance; in some cases, Valsalva maneuver is also performed. This syndrome can also result in the development of bronchopulmonary dysplasia. In other words, have we chosen and implemented the most appropriate intervention for the patient, based on the evidence, to produce the optimal result? The Chronic Respiratory Disease Questionnaire Background and Administration The Chronic Respiratory Disease Questionnaire (CRQ) was once administered by an interviewer, but a newer version allows the tool to be self-administered.181 The questionnaire has 20 questions divided into four domains (dyspnea, fatigue, emotional functioning, and mastery). The patient’s tidal volume increases, as well as respiratory rate. In addition, a sustained elevation of the diastolic blood pressure during the recovery phase of activity is considered abnormal.37 The mechanism behind the progressive rise in diastolic blood pressure is thought to be a response to the need for an increased driving pressure in the coronary arteries, which is necessary to overcome the increased resistance to flow within the coronary arteries. The process of discontinuing mechanical ventilation is called weaning. ■ Calcium-channel blockers can lead to worsening heart failure and are associated with increased risk of cardiovascular events. Promote diet adherenc e. The clinical summary score is a combination of the functional status with the quality of life and social limitation domains.85 A clinically significant change in the total score is defined as greater than or equal to 5 points.179 Purpose The purpose of the KCCQ is to provide a valid and reliable health status measure that goes beyond a general or generic questionnaire. Timing of the physical therapy treatment is essential for optimizing patient success and meeting functional goals. The steps are as follows: • Assess the technical quality of the study. 1994;96:15–19. St. Louis: Mosby; 1988. Remove the catheter packaging without causing contamination; maintain sterility of any part of the catheter that will touch the patient’s trachea. The CPAP delivers a predetermined level of pressure throughout the entire respiratory cycle. The instructions for the examination include sitting the patient in a chair with a seat that is 17 inches in height. Studies by Cole et al and Jolly et al have shown this.140–142 Heart rate recovery may be used with both low-level and maximal exercise testing. Pulmonary Complications Acute or chronic renal failure is also associated with a number of pulmonary complications. Chapters 1 and 2, which explain anatomy and physiology, increased the number of figures to help the learner relate the pathophysiology to

RLD, See Restrictive lung dysfunction (RLD) RLL, See Right lobe RML, See Right lobe Robotic techniques, 372, 372f ROM activities, See Range-of-motion (ROM) activities Roots, 9 Roux-en-Y gastric bypass (RYGB), 223–224 Rubex, See Doxorubicin (Adriamycin, Rubex) Rubor dependency tests, 295–296 RUL, See Right lobe R wave measurements, 310, 311f RYGB, See Roux-en-Y gastric bypass (RYGB) S Sarcoidosis, 246 Saturation, oxygen, 558, 558b, 560f Scalene muscles, 5–6, 6f See also Muscles SCD, See Sickle cell disease (SCD) SCIs, See Spinal cord injuries (SCIs) SCL-90-R, See Symptom Checklist-Revised (SCL-90-R) Scleroderma, 245–246 Sclerosis, 46 Scoop technique, 551 Seated step and chair rise tests, 684t–687t, 687–688 Seattle Angina Questionnaire (SAQ), 684t–687t Secondary cardiomyopathies, 81f, 81t See also Cardiomyopathies Segmental bronchi, 13–14, 14f See also Bronchi Segmental limb pressures, 295 Segments, 9–11, 9f, 10t, 10b Self-management techniques, 116–117 Serial electrocardiography (ECG), 511 Serratus anterior, 6–7, 6f posterior superior, 6f, 7 Serum enzymes, 267–270, 270t SGRQ, See St. George's Respiratory Questionnaire (SGRQ) Shift, mediastinal, 15 Shock, cardiogenic, 426b Shortness of breath, 536 Short Physical Performance Battery (SPPB), 684t–687t Sickle cell disease (SCD), 250–251 Sick lung circulation, 83, 83f Sickness Impact Profile (SIP), 684t–687t Simulect, See Basiliximab (Simulect) Sinus tachycardia, 100 SIP, See Sickness Impact Profile (SIP) Six-Clicks Mobility Forms, 684t–687t, 691 Six-Minute Walk Test (6MWT), 372b, 683–690, 684t–687t, 689f Six-second tracing, 310, 311f Skeletal muscle function, 95–96 SLE, See Systemic lupus erythematosus (SLE) Slow channels, 305–306 Smoking, cigarette, 47, 194 Sniffing technique, 551 Social Support Survey, 684t–687t Specific Activity Scale, 684t–687t Spider veins, 65, 66f Spinal cord injuries (SCIs), 84 Spondylitis, ankylosing (AS), 246 SPPB, See Short Physical Performance Battery (SPPB) SSc, See Systemic sclerosis (SSc) St. George's Respiratory Questionnaire (SGRQ), 684t–687t, 689–690 Stacked breathing, 550 Stages chronic kidney disease (CKD), 238, 238t congestive heart failure (CHF), 106f STAI, See State-Trait Anxiety Inventory (STAI) Starling equilibrium, 655 State-Trait Anxiety Inventory (STAI), 684t–687t Status asthmaticus, 30, 30f Sternal angle, 1 Sternocleidomastoid muscles, 5, 6f See also Muscles Sternotomy, median, 365, 366f Sternum, 1–2, 2f–3f Stimulation, angiogenesis, 375 Strength training for acute cardiopulmonary conditions, 557 vs. Guelfi K.J, Jones T.W, Fournier P.A. New insights into managing the risk of hypoglycemia associated with intermittent high-intensity exercise in individuals with type 1 diabetes mellitus. ■ Blocking β-adrenoceptors on juxtaglomerular cells responsible for the release of renin limits vasoconstriction. Rodeheffer R.J, Gerstenblith G, Beard E, et al. Patients are timed (in seconds) when performing the TUG—three conditions • TUG alone-from sitting in a chair, stand up, walk 3 meters, turn around, walk back, and sit down. Hyperactive airways may become irritated with the deep breathing and huffing. Individual patients in risk category C without cardiovascular disease (CVD), but with multiple CVD risk factors or with a blood pressure higher than 180/110 mm Hg, may benefit from exercise testing before engaging in moderate-intensity exercise (40% to 60% VO2max) but not for light or very light activity (60% VO2max) should begin at cardiac rehabilitation centers where medical supervision is available.43 A normal blood pressure response to exercise is also an important consideration. 1991;18(2):309–325. Signs Associated with Congestive Heart Failure Breathing Patterns A rapid respiratory rate at rest, characterized by quick and shallow breaths, is common in patients with CHF. 1997;27:568–577. Preventive Cardiology. 1972;129:836. All patients with ARDS suffer some degree of muscle wasting and weakness, which continues past 1-year postdischarge. Rudas L, Pflugfelder P.W, Kostuk W.J. Comparison of hemodynamic responses during dynamic exercise in the upright and supine postures after orthotopic cardiac transplant. Three types of sounds are typically produced with percussion. 61. Giannini C, de Giorgis T, Mohn A, et al. Mulrow C.D, Feussner J.R, Velez R. 3. The diaphragm eventually meets resistance against the abdominal viscera, causing the costal fibers of the diaphragm to contract and pull the lower ribs up and out—the bucket-handle movement. Right coronary artery occlusions cause inferior or posterior infarctions and affect the functioning of the SA node in the right atrium. The normal lung parenchyma can be completely replaced, and the blood vessels in the area then show an obliterative arteritis. 2005;42(4):535–545. Pravastatin, another 3-hydroxy-3-methylglutaryl– coenzyme A (HMG-CoA) reductase inhibitor, does not cross the blood-brain barrier, as does lovastatin, and therefore may have less effect on the central nervous system. Venous thromboembolism: a public health concern. In addition, propranolol, a nonselective β-adrenergic antagonist, can cause confusion, sleep disturbance, and depression in older persons. To completely ablate muscular tone during general anesthesia, the level of anesthesia must be profound, a situation that is not wholly desirable. Cardiovascular complications of cancer treatment. Treatment of hypertension in the prevention and management of ischemic heart disease: a scientific statement from the American Heart Association Council for High Blood Pressure Research and the Councils on Clinical Cardiology and Epidemiology and Prevention. Br Heart J. Organ donation. Computed tomography scanning of the chest primarily has been used for diagnosis of tumors versus calcifications or nodules. BO X 7- 3 Guide line s for physica l t he ra py int e rve nt ion a nd e ndura nce t ra ining BP, blood pressure; HR, heart rate; PT, physical therapy. Diabetes Assess: Diabetes present: HbA1C and fasting blood gluc ose (FBG); c urrent treatment strategies and patient's adherenc e. Nitroglycerin acts physiologically in at least three ways13: ■ As a venodilator, thus decreasing venous return (preload) ■ As an arteriodilator, thus decreasing afterload ■ As a relaxant for coronary artery smooth muscle, thus possibly increasing coronary blood supply These factors decrease myocardial oxygen demand, specifically in their ability to decrease venous return and left ventricular filling pressures. New York: McGraw-Hill; 1998:1877–1923. 22-3. While performing bed mobility, the patient is instructed to breathe out during rolling and inhale as he or she extends the trunk to sit. (From Kacmarek R, Stoller J, Heuer A: Egan's Fundamentals of Respiratory Care, ed 10, St. Louis, 2013, Mosby.) If the infant does not adequately respond to surfactant administration, then the infant, if large enough, may be treated with extracorporeal membrane oxygenation (ECMO) or nitric oxide administration delivered in the inspiratory gas to cause pulmonary vasodilation.10 An alternative to treatment is prevention of the disease by maternal/fetal treatment with corticosteroids. Statistical data support prediction of death within 6 months on low levels of coenzyme Q10 and other entities. Soffer M, et al. These adverse effects include tremor, palpitations, headache, nervousness, dizziness, nausea, and hypertension, as well as inotropic (enhanced myocardial contractility) and chronotropic (enhanced heart rate) effects. In: Katzung B.G, ed. Koch C, Li L, Lauer M, et al. 199. J Appl Physiol. Kidney Int. These rod-shaped bodies with clubbed ends seem to be an asbestos fiber coated by macrophages with an iron–protein complex.3,8,32,35 There is often a dormancy period of 20 to 30 years for asbestos-related lung disease to reveal itself. Unfortunately, such major differences cannot be predicted and manifest themselves only after drug exposure. 1996;17(Suppl 3):S164–S172. aureus causes approximately 5% of community-acquired pneumonias.32 This type of pneumonia is usually seen in infants and children under the age of 2 years, in patients with cystic fibrosis or COPD, or in patients who are recovering from influenza. A radioactive tracer is injected intravenously, and a gamma camera acquires images from the tracer. Changes in lymphatic function after complex physical therapy for lymphedema. 2006;1:488–495. When working with children in general, the therapist can reduce patient anxiety, generate interest, and build rapport by being creative and making treatment sessions as playful as possible. The lungs show increased black pigmentation. 2001;119(5):1371–1378. The 4 meters walked is then divided by the seconds for the walk, and a gait speed is calculated and can be converted to miles/hour (see Table 22-7). Beta- and alpha-cell dysfunction in type 2 diabetes. 17-1). FIGURE 16-2 Types of data that may be generated from a client history. Kaplan N.M. Long-term effectiveness of nonpharmacological treatment of hypertension. The disease may affect only the ocular or bulbar muscles, but the limb and respiratory muscles are often involved. 4-24). This condition can lead to retained secretions and, if left untreated, can progress to atelectasis, hypoxemia, pneumonia, and potentially respiratory failure. S c ar formation and ↓ c ontrac tility may oc c ur, as well as reduc ed (myoc ardial isc hemia) relaxation. Aaronson K.D, Mancini D.M. Is percentage of predicted maximal exercise oxygen consumption a better predictor of survival than peak exercise oxygen consumption for patients with severe heart failure? 1992;145(2 Pt 1):377–382. 178. Surgical intervention in both populations is common. Effects of drug and exercise intervention on functional capacity and quality of life in heart failure with preserved ejection fraction: A meta-analysis of randomized controlled trials. 1997;25(4):620–628. Therefore inhibition of the action of leukotrienes potentially plays an important role in the treatment of asthma and other allergic conditions such as allergic rhinitis, atopic dermatitis, and chronic urticaria.33 There are two ways to achieve this goal. MA returned to the transplantation center outpatient clinic 1 week posttransplantation, and the physical therapist performed a 6MWT at that time: MA covered 1946 feet on room air with an SpO2 of 95% to 98%, a heart rate of 120 to 148 beats per minute, and an RPE of 14/20. A possible increase in diastolic blood pressure 5. Blood pressure changes associated with activity typically reflect the amount of work the heart must do to meet the metabolic demands of the activity. The model defined low-, medium-, and high-risk groups based upon 1-year event-free survival rates of 93%, 72%, and 43%, respectively. ■ Conservative methods of treating lymphedema are divided into two phases: phase I is the treatment phase and phase II is the self-management phase. However, for prolonged use, an oral or inhalational route of administration is used.32 Inhalation is preferred because it is associated with fewer side effects. However, many V/Q scans are nondiagnostic, which makes V/Q scans less sensitive and specific for PE than CT scans.15 Bronchography Bronchography is occasionally needed for the evaluation and management of some congenital pulmonary anomalies as well as some acquired diseases, usually of the tracheobronchial tree.16 Bronchograms permit the study of normal and variant anatomy and of gross pathologic changes in the bronchial wall and lumen. An individual who has a general cyanotic look (bluish color most noticeably at lips and fingernail beds) may have a low PO2 and may be in need of supplemental oxygen. This signal is used both to trigger the ventilator ("neural" trigger function) and to assist patient inspiratory effort in proportion to the diaphragmatic electrical activity. While a maximal inspiration is performed by the patient, the therapist should allow the hands to glide with the movement of the rib cage, and the extent of the movement, as well as the symmetry, should be documented (see Fig. 181. 210. Independent with personal-care ADLs. Systems Review: HR = 70 bpm, regular. The normal AP diameter is one half the size of the transverse diameter (measured as shoulder to shoulder). Riddell M.C, Iscoe K.E. Physical activity, sport, and pediatric diabetes. Some clinicians still advocate using the term rhonchi to describe lowpitched continuous adventitious lung sounds. The tool is simple to administer, but may take some time. Drugs are selective regarding the type of receptor to which they are attracted and which they are affecting. The Prospective Cardiovascular Münster Study: Prevalence and prognostic significance of hyperlipidemia in men with systemic hypertension. The data obtained provide the initial information to begin to identify impairments and functional limitations that may be identified during a physical examination, as well as provide information identifying areas that may require intervention or education to prevent additional health problems. Pathophysiology The virus is neurotropic and has a predilection for the motor cells of the anterior horn and the brainstem. Sustained hypertension results in increased morbidity and mortality rates associated with renal failure, coronary disease, and stroke. Awareness and education are crucial components to the success of any primary prevention program. The other classic symptoms to be aware of are dizziness, pallor, and fatigue. Respiratory pharmacology. Hypertension Assess: Resting blood pressure (BP), c urrent treatment strategies, and patient's adherenc e. Identifiers: LCCN 2016002395 | ISBN 9780323430548 (hardcover : alk. McCartan C.1, Mason R, Jayasinghe S.R, Griffiths L.R. Cardiomyopathy classification: Ongoing debate in the genomics era. This cycle of leakage and inflammation is worsened by the release of inflammatory mediators from the activated neutrophils. 1976;295:369–377. Calcium-channel blockers are typically the long-term pharmacologic choice for the treatment of variant angina. Initially, these nodules are small and discrete, but as the disease progresses, they become larger and coalesce. European Respir Rev. This fourth edition has gone through update and revision from the third edition to make the text more user friendly and provide more interactive learning. Or, because ARDS can be associated with multiorgan failure, it may mean the use of highly technical interventions such as continuous arteriovenous hemofiltration (CAVH) or dialysis in patients with chronic renal insufficiency.9 The final focus of treatment is to prevent and treat complications of the patient's condition, along with intensive care measures. Rifampin may also be used in addition to erythromycin.32 Haemophilus influenzae H. Evaluation of Fremitus Fremitus is defined as the vibration that is produced by the voice or by the presence of secretions in the airways and is transmitted to the chest wall and palpated by the hand. 13-16). MacKay-Lyons M.J, Howlett J. Bekn Haim S.A, Becker B, Edoute Y, et al. 2009;3:75–90. Prompt and careful wound debridement is also important. The primary function of the atrioventricular valves is to prevent backflow of blood into the atria during ventricular contraction or systole, and the semilunar valves prevent backflow of blood from the aorta and pulmonary artery into the ventricles during diastole. Repetitive periodic apneas occur in 35% to 40% of the elderly, predominantly in males during sleep stages 1 and 2.9 Clinical Manifestation The clinical manifestation of normal aging can be found in Table 5-3. The domed shape of the diaphragm is largely maintained until the abdominal muscles end their extensibility, halting the downward displacement of the abdominal viscera, essentially forming a fixed platform beneath the central tendon. They can be destroyed in the GI tract—for example, insulin. Mentz R.J, et al. However, gastrointestinal distress, nausea, and constipation, as well as dizziness, may also occur. This latter substance is a potent vasoconstrictor that influences aldosterone production and subsequent sodium retention, all factors that result in blood pressure elevation. . The average decline in FEV1 is in the range of 40 mL per year for men and 30 mL per year for women.21 After the late twenties to midthirties, a progressive decline in the FEV1 of from 20 to 50 mL per year can be expected in healthy persons, but in adults with chronic obstructive lung disease the decline is as much as 50 to 80 mL per year. Carter P.M, Heinly T.L, Yates S.W, et al. Young J.B, Dunlap M.E, Pfeffer M.A, et al. Cytokine. Conversely, expiration occurs when the intrapulmonary pressure exceeds the atmospheric pressure, allowing the lungs to recoil inward and expel air into the atmosphere. The skin on the patient's chest may need to be mobilized to position the palms down with the thumbs touching. FIGURE 10-4 Summation of the effect of position, projection, and respiration. ■ Numerous methods can be employed to measure heart rate from the ECG tracing, but often the 6-second strip method is the easiest if the rhythm is regular. Keteyian S.J, Marks C.R.C, Brawner C.A, et al. For example, Moussa and associates studied 800 patients referred for coronary angiography and found that individuals with PAD were significantly more likely to have left main and multivessel CAD.51 Patients with claudication in the lower extremity often present to physical therapy with limitation in tolerance for ambulation as a result of ischemic leg pain and cramping. Prevention of venous thromboembolism may include simple leg exercises (ankle dorsi and plantar flexion), low-dose subcutaneous or adjusted-dose heparin, external pneumatic compression devices, and gradient compression stockings.28 FIGURE 5-31 Increased muscle tone in and around the incision is known as muscular splinting of the incision. September 26, 2013 doi: 10.1007/s12471-013-04730. Hill S.A, McQueen M.J. Reverse cholesterol transport—A review of the process and its clinical implications. Inspiratory muscle training with a pressure threshold breathing device in patients with chronic obstructive pulmonary disease. The definition of dyspnea is "the patient's subjective report of discomfort with breathing." Shortness of breath is thus the actual symptom observed. Nonpharmacologic therapy and exercise in the prevention of type 2 diabetes. Effect of body position on pulmonary function. High density lipoprotein cholesterol as a predictor of coronary heart disease risk. The negative predictive value for PE has been defined as 99.1%; therefore a good CT angiogram with a negative conclusion for PE indicates individuals should not have treatment for PE unless the prediagnostic Wells clinical score demonstrated high risk.8 In contrast, a low clinical risk score but a positive CT report indicates further diagnostic testing (small vessels may be involved).8 Computed tomography has evolved from mere static assessment of morphology into a dynamic and quantifiable tool for regional assessment of the lung. Similarly, receptors in the effector organ can be partially or completely blocked by pharmacologic agents (e.g., adrenoceptor or cholinoceptor blocking agents or sympathetic or parasympathetic nervous system antagonists). Therefore during exercise, hypoxemia may occur earlier or be more pronounced. Research data are not available to support or refute the use of herbal medicines. 1987:198–209. Extra care must be exercised during routine management and therapy (Box 13-9). Functional capacity of patients with chronic left ventricular failure. Only a small minority, known as suprarenal aneurysms, arise between the level of the diaphragm and the renal arteries.309 Table 3-9 Risk factors of aneurysms Risk Factors S moking (c urrent or past) Age Gender Family history Hypertension Hyperlipidemia Atherosc lerosis Complications Fivefold inc rease vs. The therapist may want the assistance of other staff, or may raise the bed up to a level that prevents a forward flexed posture. 1979;317:440. Pneumatic compression devices for in-home management of lymphedema; Two case reports. Erlanson-Albertsson C. 1996;24(5):879–882. Immunological detection of human cardiac rejection. Management of type II diabetes: evolving strategies for the treatment of patients with type II diabetes. 2012;21(126):271–305. 264. Bernard A.W, Yasin Z, Venkat A. London, UK: Edward Arnold; 1995. A pathologic condition in the lungs can change the transmission of the sounds. Nonetheless, improvement in ventilatory muscle strength may decrease the dependency, impairment, and possibly even cost associated with chronic CHF. Diaphragmatic breathing reduces efficiency of breathing in patients with advanced chronic obstructive pulmonary disease. Inflates lungs to moderate pressures to maintain functional residual capacity, and CO2 removal occurs via lowflow partial venovenous bypass.45 Table 13-9 Suggested initial volume and frequency for mechanical ventilation based on disease state or condition ∗ For ALI/ARDS, maintain Pplat at ≤30 cm H2O. Short-term prognosis after emergency department diagnosis of TIA. Katzung B, Parmley W. Philadelphia: FA Davis; 1985. Roig J, Domingo C, Gea E. Mello B.H, et al. In the lungs, receptors on the smooth muscles of the bronchi are muscarinic in nature. The patient is then exposed to a radio signal that stimulates those nuclei whose magnetic resonance is the same as the frequency of the radio signal. 1997;4:13–18. From Scherer SA, Wilson CR: Revisiting outcomes assessment, Cardiopulm Phys Ther J 18(1):21–24, 2007. Because the circumflex artery supplies primarily the lateral and posterior aspects of the myocardium, an occlusion of the circumflex artery is suspected in a lateral infarction. 1987;10:608–618. This means that at levels of less than 70 mm Hg, the level of oxygen saturation decreases dramatically compared with the normal level of 60 mm Hg. Thus patients with anemia have less reserve before their oxygen stores desaturate.87 FIGURE 4-16 Mechanisms of hematologic function. Integrating survival and quality of life data in clinical trials of lung disease: The case of lung volume reduction surgery. Gee L, Abbott J, Conway S.P, Etherington C, Webb A.K. Development of a disease specific health related quality of life measure for adults and adolescents with cystic fibrosis. See Table 14-5 for a list of anticoagulants. These drugs tend to be associated with mental confusion in this population. This infection can now be prevented by vaccine. Weber-Mzell D, Kotanko P, Schumacher M, et al. Injury Prevention and Equipment Provision Patient safety is paramount in all areas of physical therapy. The respiratory rate should rise proportionally to the workload. Paroxysmal Nocturnal Dyspnea Another common complaint of individuals suffering from CHF is paroxysmal nocturnal dyspnea (PND), in which sudden, unexplained episodes of shortness of breath occur as patients with CHF assume a more supine position to sleep.5 After a period of time in a supine position, excessive fluid fills the lungs. Myocardial infarction is irreversible and involves permanent tissue death. Consequently, in addition to a blood pressure cuff, intraarterial monitoring is required. Metabolic measurements during exercise testing reveal that maximal oxygen consumption and anaerobic threshold are reduced in patients with AOD.266,268 Yet, even though the anaerobic threshold may be so low that it cannot be detected, evidence of systemic lactic acidosis may be minimal because of the reduced muscle perfusion. 2006;10:7–10. J Pers Soc Psychol. The cholesterol/saturated-fat index: An indication of the hyper-cholesterolaemic and atherogenic potential of food. 2004;110(17):2618–2626. Knutson K.L, Spiegel K, Penev P, et al. The patient can also be taught to perform this exercise independently. In caring for premature infants, careful evaluation of the risks and benefits of treatment is required due to the infant's limited tolerance to handling. Supplemental oxygen can be titrated to keep the O2 saturation within the appropriate range according to hospital guidelines. 1965;58:110–119. Földi E, Földi M, Weissleder H. The bundle of His appears as a triangle of nerve fibers within the posterior border of the interventricular septum. Under the influence of clotting factor VII and calcium, factor X is activated (a) to Xa 2. Initially, a patient was hospitalized as long as 1 to 2 months after surgery. 1986;30:920–923. Miller L. A few months later her arm started to feel heavy. The left bundle branch (LBB) arises perpendicularly and divides into two branches or fascicles.8 The left anterior bundle branch crosses the left anterior papillary muscle and proceeds along the base of the left ventricle toward the aortic valve. 2014;63(9):190–193. Asthma: the irreversible airways disease. The Free Library. The essential muscles to achieve the active process of inspiration at rest are the diaphragm and internal intercostals. Kjær M, Hollenbeck B, Frey-Hewitt B, et al. If the pauses and the palpable beats were counted, one might not see a decrease in heart rate with exercise but rather an increase in heart rate with exercise. Umakanthan R, Hoff S.J, Solenkova N, et al. Boris M, Weindorf S, Lasinski B.B. The risk of genital edema after external pump compression for lower limb lymphedema. Clinical Manifestation The clinical manifestation of ALS can be found in Table 5-21. The balloon is then deflated.14 Cardiac Output The amount of blood pumped by the heart per unit of time is termed the cardiac output (Q or CO). Signs and Symptoms of Impending Heart Failure For the therapist who is seeing a patient on an outpatient basis, the signs and symptoms of impending HF may be subtle, developing over a period of days; therefore the therapist should be alerted to any complaints of dyspnea, ankle swelling, weight gain (1 to 2 lb in 2 days), or the presence of an S3 heart sound or lung crackles. Although the success of HAART has sharply reduced the incidence of opportunistic infections, pulmonary complications continue to be a major cause of morbidity and mortality in individuals with HIV/AIDS.303 Noninfectious pulmonary complications are common in HIV and include malignancies (lung, Kaposi sarcoma, and non-Hodgkin lymphoma), pulmonary HTN (possibly through increased production of inflammatory cytokines and chemokines by infected lymphocytes and alveolar macrophages, as well as due to endothelial dysfunction), and lymphoproliferative disorders (lymphocytic interstitial pneumonitis and alveolitis).304 Human immunodeficiency virus also increases the risk of developing active TB and TB recurrence, which are associated with accelerated progression and mortality of HIV, partially due to a number of drug–drug interactions between the various medications used to treat the two diseases.303 Fungal (e.g., Pneumocystis pneumonia [PCP]) and bacterial infection (e.g., Streptococcus pneumoniae, Haemophilus influenzae, Staphylococcus aureus, Pseudomonas, and Mycobacterium avium) also occur more frequently and are a major problem where HAART is not available. They are generally placed in the operating room or in the interventional radiology department. Why did this patient's angina return less than 5 years after bypass surgery? life support, 429–443 See also Life support measures and equipment noninvasive monitoring, 419–423 bispectral index sensor (BIS), 422–423 blood pressure monitoring, 420–422, 421b, 422t Confusion Assessment Method in the ICU (CAM-ICU), 423 electrocardiography (ECG), 419–420, 419b–420b, 420f level of consciousness, 422–423 pulse oximetry, 420, 420b respiratory rate, 422, 422t, 422b Richmond Agitation and Sedation Scale (RASS), 423 supplemental oxygen and, 421f overviews of, 419, 443 resources for, 443 temperature monitoring, 427, 427b Monoclonal antibodies, 244t, 253–256, 254t MOS Social Support Survey, 684t–687t MRI, See Magnetic resonance imaging (MRI) MS, See Multiple sclerosis (MS) MTX, See Methotrexate (MTX) Multidimensional Health Locus of Control Inventory (MHLOC), 684t–687t Multigated acquisition imaging, 278 Multiple sclerosis (MS), 249 Muromonab (Orthoclone), 402–403, 404t Muscle dysfunction, cardiac, See Cardiac muscle dysfunction (CMD) Muscle failure, cardiac, 78–124 Muscle receptors, 26, 26f Muscles abdominal, 6f, 7 accessory, 5–7, 6f breathing, 3–7 See also Breathing cardiac muscle dysfunction (CMD), 78–124 See also Cardiac muscle dysfunction (CMD) case studies of, 118b–119b clinical tips for, 85b, 92b, 94b–95b, 97b–98b congestive heart failure (CHF), 86–88 expiration, 6f, 7 expiratory, training of, 115 inspiratory, training of, 115–116 internal intercostal, 6f, 7 receptors, 26, 26f scalene, 5–6, 6f scalene, anterior, 5–6 skeletal muscle function, 95–96 sternocleidomastoid, 5, 6f ventilation, 3–7, 4f–5f, 4b See also Ventilation ventilatory, training of, 115–116 Muscular dystrophies, 162, 162t, 250 Duchenne (DMD), 249 facioscapulohumeral, 162 limb-girdle, 162 myotonic, 162 pseudohypertrophic, 162, 162t clinical manifestations of, 162, 162t diagnostics tests for, 162 etiology of, 162 pathophysiology of, 162 treatments for, 162 Myasthenia gravis (MG), 249 Mycoplasmal pneumonia, 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250 myasthenia gravis (MG), 249 myotonic dystrophy, 249–250 Parkinson disease, 248 postpolio syndrome, 250 Neuropathy, autonomic cardiovascular, 236t New York Heart Association (NYHA) functional classification, 684t–687t NHANES, See National Health and Nutrition Examination Survey (NHANES) NHP, See Nottingham Health Profile (NHP) Nitrosoureas, 244t, 253–256, 254t Nodal/junctional arrhythmias, 321–322 Nodal myocytes, 305 Nonalcoholic cirrhosis, 252 Noninvasive tests, 274–277 contrast echocardiography, 276–277 Holter monitoring, 274–275, 274f Noninvasive ventilatory devices, 429–433, 429b Normal sinus rhythm (NSR), 314–317, 315f Normative values, 268t See also Clinical laboratory studies Nottingham Health Profile (NHP), 684t–687t NSR, See Normal sinus rhythm (NSR) Nutritional supplementation, 205 NYHA functional classification, See New York Heart Association (NYHA) functional classification O Obesity, 214–227 bariatric surgery, 223–224 body mass index (BMI) and, 214, 214b, 219, 219t complications of, 217–219, 218t cardiometabolic, 219, 220t cardiovascular, 220–222 pulmonary, 220–222 definition of, 214 development factors of, 216–217, 216t energy balance and, 216–217, 217t epidemiology of, 215, 215f–216f exercise and, 224–225 See also Exercise health hazards of, 217–219, 218t hormone influences, 216–217, 217t National Health and Nutrition Examination Survey (NHANES) and, 215 National Heart, Lung, and Blood Institute (NBHLI) classification of, 219 peptide influences, 216–217, 217t pharmacologic therapies, 223–224, 223t–224t physical therapy clinical implications for, 225, 225b total daily energy expenditure (TDEE) and, 215, 215t treatments for, 223b, 222–225, 223t–224t Obstructive pulmonary diseases, 187–213 adult obstructive lung conditions, 192–201 bronchiectasis, 198–201, 198t–199t, 199f–200f, 199b chronic bronchitis, 187–189, 188f, 193, 193f chronic obstructive pulmonary disease (COPD), 192 See also Chronic obstructive pulmonary disease (COPD) emphysema, 187–189, 188f, 192–193, 192f associated symptoms of, 189, 191–201 case studies of, 210b–211b clinical tips for, 189b, 191b, 194b, 208b dyspnea on exertion (DOE) in, 189 etiology of, 187–189, 188f impairments in, 189–191 cognitive impairment, 190–191 physical vs. Olson R.E. Discovery of the lipoproteins, their role in fat transport and their significance as risk factors. 1953;152(12):1090–1093. Low-dose aldosterone antagonists are also recommended in individuals with moderately severe heart failure symptoms or with left ventricle (LV) dysfunction after acute coronary syndrome (as long as serum creatinine is 28 mm Hg), causing fluid to flood the alveoli and possibly invade the large airways. Although this is usually transient, bec ause of the extremely short half-life of safer c hoic e. Progression of the neuromuscular disease usually results in the development of ventilatory failure. Globally, it is estimated that one death occurs each minute as a result of lung cancer.30 Currently, lung cancer accounts for 33% of all cancer deaths in men and 23% of all cancer deaths in women and is the second most common cancer. Published guides that provide a classification system of standardized MET may form a basis for estimating energy cost of physical activity in individuals but are not intended to determine precise energy cost in ways that account for differences in body mass, age, efficiency of movement, and environmental conditions.88 By starting at a low level of exercise, progressing slowly, and monitoring the patient's response, the clinician can progress the patient safely and effectively. New York: Elsevier Health Sciences; 2014:310– 337. Both bundles terminate into a network of nerve fibers called the Purkinje fibers. Another category of β-blockers is that of β-blockers with both antagonistic and agonistic properties. Boris M, Weindorf S, Lasinski B. Early in the course of RLD, there may be overcompensation, with the respiratory rate increasing to the point that minute ventilation is increased and alveolar hyperventilation occurs, resulting in greater exhalation of carbon dioxide (CO2). Niset G, Hermans L, Depelchin P. Immediately after the exercise test, the patient is scanned using a gamma camera to assess thallium-201 uptake and scanned again 4 hours later after the thallium has been redistributed. This inflammation may be initiated by the release of free radicals.30 Pulmonary injury after radiation of the thorax is usually divided into two clinical syndromes: acute radiation pneumonitis and chronic radiation fibrosis.10 The onset of acute radiation pneumonitis is insidious, beginning 2 to 3 months after radiation. School of Medicine; 1987. source=search_result&search=pathogenesis+of+atherosclerosis&selectedTitle=1~1 July 14, 2015). The lungs and neuromuscular diseases. The overall scores of the KCCQ were strongly associated with a 1-year cardiovascular mortality and hospitalization (the higher the score, the greater the risk of mortality). The head-down positions should be avoided if intracranial bleeding is suspected. Patients with COPD have hyperinflated lungs and a flattening of the diaphragm, which alters the length–tension relationship of this muscle. Colucci W.S. Use of Digoxin in Heart Failure due to Systolic Dysfunction. For patients requiring maximal assist, the therapist should remember to avoid injuring themselves by utilizing various functions of the bed, for example, head-of-bed elevation or the chair position. Primary prevention became an active goal in drug (and lifestyle) management for those with risk factors for atherosclerosis, and secondary prevention took on even more importance for those already diagnosed. In the most severe case, an anaphylactic reaction occurs, which is characterized by life-threatening bronchoconstriction and hypotension. The MAP is the same in all parts of the cardiovascular system when the patient is supine.12 The MAP is closer to the diastolic than the systolic pressure because the duration of diastole is greater than that of systole. For this reason, physical therapy discontinued ambulation but continued chest physical therapy and bedside exercise to the upper and lower extremities. (From Hicks GH: Cardiopulmonary Anatomy and Physiology, Philadelphia, 2000, Saunders.) Pectus excavatum is a common congenital deformity of the anterior wall of the chest in which several ribs and the sternum grow abnormally (see Fig. Validation of a new depression scale for cardiac patients in quality of life assessment. Clin Biochem. Nawa R, Lettvin C, Winkelman C, Evora P, Perme C. The coronary sinus empties into the right atrium above the tricuspid valve. It is hypothesized that the asbestos fiber causes an alveolitis in the area of the respiratory bronchioles, which then progresses to peribronchiolar fibrosis due to the release of chemical mediators. Table 15-5 Common antimicrobial medications a Often used as supplements to the penicillins. 1999;341:709–717. Drugs delivered intravenously bypass the absorption process; however, choosing the intravenous route increases the risks of fluid overload. Tissue hypoxia caused by disturbances in cardiac output can rarely be improved by the administration of oxygen. Shusterman S, Meadows A.T. Long-term survivors of childhood leukemia. Table 8-1 Cardiovascular diagnostic tests and procedures and their indications Tests Rhythm abnormalities Indications Holter monitor 12-Lead ECG Exerc ise ECG Elec trophysiologic studies (EPS mapping) Isc hemia Resting ECG (if isc hemia or c omplaints of angina are oc c urring at time of ECG being taken) Exerc ise ECG (with or without dye or stress ec ho) Pharmac ologic stress testing S ingle-photon emission c omputed tomography (S PECT) Positron emission tomography (PET) Ergonovine c hallenges Contrast ec hoc ardiography Cardiac c atheterization Cardiac magnetic resonanc e imaging (MRI) Digital subtrac tion angiography Valve integrity Ec hoc ardiography Contrast ec hoc ardiography Cardiac c atheterization Ventric ular size and ejec tion frac tion Chest x-ray Multigated ac quisition or angiogram (MUGA) imaging Ec hoc ardiography Cardiac musc le pump func tioning MUGA Ec hoc ardiography Ventric ulography Digital subtrac tion angiography Ac ute myoc ardial infarc tion Cardiac enzymes and markers Resting ECG Vasc ular diagnostic testing Ankle–brac hial index S egmental limb pressures Pulse volume rec ordings Arterial duplex ultrasonography Exerc ise studies Diagnostic Test Interpretation and Probability of Disease Because all diagnostic tests are not 100% accurate, a brief description of terminology used to define accuracy of testing is included. In Frown-felter D, Dean E, editors: Principles and practice of cardiopulmonary physical therapy, ed 3, St. Louis, Mosby-Year Book, 1996. From Cooper K: The Aerobic Ways, New York, 1981, Bantam Books. However, with deep inspiration, there is more significant inferior depression of the diaphragm, causing the heart to descend and rotate to the right, displacing the point of maximum impulse away from the normal palpable position.1 Clinical tip The point of maximum impulse is relatively more lateral in patients with left ventricular hypertrophy caused by an increase in left ventricular mass. He now has a 2-year history of chronic stable angina, which in the past month has become more frequent, occurring with minimal exertion and occasionally while at rest. The entry-level practitioner should not be expected to be competent in auscultation of all heart sounds. Future studies documenting their efficacy in identifying CAD will be necessary before routine screening is recommended. In patients at high risk for developing pneumonia, hospital admission may be indicated for close observation and for aggressive pulmonary hygiene in addition to pain relief.28 Flail Chest Flail chest may have to be managed by mechanical ventilation when the patient's respiratory rate exceeds 40 breaths per minute, the VC progressively decreases to less than 10 to 15 mL/kg of body weight, the arterial oxygenation falls to less than 60 mm Hg with an FiO2 of 40%, and hypercapnia develops with the PaCO2 higher than 50 mm Hg, or other injuries sustained in the trauma necessitate its use.32 Mechanical ventilatory support may be needed for 2 to 4 weeks. Screening takes place anywhere along this pathway. Elevations in albumin are rare, but low levels of albumin may be found in chronic liver disease, protein malnutrition, chronic infection, and acute stress. 18 Interventions and prevention measures for individuals with cardiovascular disease, or risk of disease Danielle Fioriello, and Ellen Hillegass CHAPTER OUTLINE Primary Prevention 569 Rehabilitation of Patients with Documented Cardiovascular Disease 570 Patient Populations 570 Rehabilitation Programs 570 The Beginning in Acute Care 571 Management and Evaluation of Patients during the Acute Phase 572 Initial Assessment/Examination 572 Activity Program Guidelines 573 General Precautions 573 Relative Contraindications to Continuing Exercise 574 Other Components of the Acute Phase 574 Outcome Measures 575 Discharge Planning 575 Postacute Phase Rehabilitation 576 Candidacy 576 Home-Based Cardiac Rehabilitation 576 Rehabilitation/Secondary Prevention in the Outpatient Setting 577 The Rehabilitation Team 577 Program Components 577 Efficacy of Cardiac Rehabilitation 577 Initial Assessment 578

against previously established standards. When a pathologic condition of the lung is suspected because of increased or decreased transmission sounds, then further evaluative measures must be taken. By approximately age 55, small airways are closed at or above FRC in the supine position. Railings at both. However, other pathophysiologic processes may produce the fluid overload that caused CMD.24 Consequently, CMD is seldom reversed by the correction of fluid volume alone. The formation of thrombin from prothrombin requires a highly complex, integrated network. The Salmeterol Multicenter Asthma Research Trial. Supplemental oxygen should be titrated as needed to keep oxygen saturation levels above 90%. It is important in the diagnosis and management of certain lung conditions to know what the various lung volumes are. 4-8). Textbook of Respiratory Medicine. Branson R.D, Hess D, Chatburn R.L. Respiratory Care Equipment. The LUL bronchus extends laterally from the anterolateral aspect of the left mainstem bronchus before dividing into correlates of the right upper and middle lobar bronchi. The structure of arteries and veins reflects their unique pressure demands. Case study 3-1 Mr. H is a 38-year-old white male, who, at the age of 30 years, was experiencing angina with low levels of exertion and was found to have severe obstructions of his left anterior descending (LAD), first diagonal (DI), circumflex (CIRC), first obtuse marginal (OMI), and right coronary (RCA) arteries. Therefore muscarinic antagonists that reduce vagal tone influence are integral to the management of bronchoconstriction in COPD. 2006;25(9):1024–1042. The KCCQ is also best at reflecting clinical changes in heart failure with regard to direction (improvement vs. Clinical observation has been that patients on β-blockers have a difficult time achieving weight loss. However, important differences do exist in the anticipated outcomes for each of these conditions. FIGURE 1-17 Nomenclature for the leaflets and cusps of the principal valves of the heart. In addition, a number of lymphedema certification programs are available to those postgraduate physical therapists seeking additional expertise. 1998;81:306–313. With a valid and reliable tool such as the CRQ, clinicians hopefully can identify issues specific to their patients' conditions and eliminate any issues that may have been overlooked by a general evaluation tool. 1982;242(6):H927–H941. The bronchiole is identifiable only by the presence of smooth muscle bundles or discontinuous elastic tissue around a central scar. The heart and great vessels occupy the lower two-thirds of the mediastinum, giving the mediastinum a characteristic profile. Longer warm-up time required in colder environments because of peripheral vasoconstriction. This activity can be a first step of independence for the patient. Maturational Causes of Restrictive Lung Dysfunction Abnormalities in Fetal Lung Development ■ Agenesis is the total absence of the bronchus and the lung parenchyma. Kodama S, Tanaka S, Saito K, et al. Donohoe C.L, Doyle S.L, Reynolds J.V. Visceral adiposity, insulin resistance and cancer risk. Chronobiology of the bronchial system. Soc Sci Med. Enos W, Holmes R, Beyer J. The Pediatric Cardiology Pharmacopeia: 2013 update. Approximately 60% of patients with ESRD participate in no physical activity beyond basic ADLs, and their sedentary behavior may contribute to a number of adverse effects, as illustrated in Fig. 2005;99:1112–1119. A Comparison of Rate Control and Rhythm Control in Patients with Atrial Fibrillation. Gray H, Bannister L.H, Berry M.M, et al. Additionally, 2% to 10% of patients with cirrhosis may develop POPH (the coexistence of pulmonary HTN and portal HTN), which is characterized by pulmonary HTN induced by increased pulmonary blood flow, which results from splanchnic vasodilatation and a hyperdynamic high-flow circulatory state that are provoked by portal HTN. The "6 Clicks" forms have been found to be valid in the acute care setting, regardless of the patient's diagnosis.108 Both of the "6 Clicks" forms were found to have internal reliability below 0.9 in 95% confidence interval.108 The "6 Clicks" forms were also shown to be valid with regard to mobility status related to age, social situations, and first session "6 Clicks" scores (all p values < 0.005).108 Both of the "6 Clicks" forms also showed good correlation with FIM scores by discharge (r values > 0.65 for both forms).108 Patient-Specific Functional Scale Background and Administration The Patient-Specific Functional Scale (PSFS) has been around since 1995.109 It was developed to view a wide range of clinical impairments and give a comparison of present function compared with preinjury state. Gray's Anatomy: The Anatomical Basis of Medicine and Surgery. Atlanta: Emory University; 1983. Pulmonary arterial hypertension (PAH), defined by a mean arterial pressure of 25 mm Hg or higher, is an uncommon lung disorder in which the arteries that carry blood from the right heart to the lungs become narrowed, making the blood flow through the vessels difficult. Given that the posterior aspect of the myocardium may be supplied by either the right coronary artery or the circumflex artery, a posterior infarction may indicate a problem in either one of these arteries. Obesity and type 2 diabetes mellitus. Kelley's Textbook of Internal Medicine. Whatever methods are deemed effective must be utilized consistently to further enhance reliability of communication, and they must be reinforced by all staff. Initial volume difference between the right and left upper extremities is 2100 mL. Kirklin J.K. Heart-lung transplantation [editorial]. 34).1 The systems review is a limited examination performed before the full examination and used as a screening of all the major systems. As a result of ischemia, injury, or infarction, conduction of electrical impulses is altered, and therefore depolarization of the muscle changes. Deep inspiration may be difficult for the intubated patient, in which case lung inflation by means of a manual resuscitator bag may be used. Table 17-6 lists the stages of stable angina. Site of action of anticoagulants 1. Muscular dystrophies of all types lead to a higher incidence of dilated cardiomyopathies and hypertrophic cardiomyopathies with a risk of sudden cardiac death. 245. The calves of the legs should be observed for skin color changes of blue or purple. Complications of viral pneumonias include secondary bacterial infections, bronchial hyperreactivity and possibly asthma, chronic air flow obstruction, tracheitis, bronchitis, bronchiolitis, and acellular hyaline membrane formation. Pediatr Diabetes. Rezkalla S.H, Hale S, Kloner R.A. Cocaine induced heart diseases. The Wells Decision Tool can assist the therapist in assessing the probability of a DVT (see Chapters 8 and 16). At no time should a patient be ambulated with moderate-to-severe pain (whatever the location or cause), as it most likely represents a pathologic process (in this case, ischemia of the small intestine). Patients may have fever, shaking chills, dry cough, headache, malaise, sore throat, earache, arthralgias, arthritis, immune dysfunction with an autoantibody response, meningoencephalitis, meningitis, transverse myelitis, cranial nerve palsies, Guillain–Barré syndrome, myocarditis, pericarditis, gastroenteritis, pancreatitis, glomerulonephritis, hepatitis, generalized lymphadenopathy, and erythema multiforme, including Stevens–Johnson syndrome.30 The chest radiograph shows interstitial infiltrates, usually unilateral in the lower lobe; 20% of patients have a pleural effusion. The following will present pulmonary medications in terms of their principal mechanism of action: bronchodilators, antiinflammatory agents, decongestants, antihistamines, antitussives, mucokinetics, respiratory stimulants and depressants, paralyzing drugs, and antimicrobial agents. (From Urden L, Stacy K, Lough M: Priorities in Critical Care nursing, ed 6, St. Louis, 2011, Mosby.) Indications for CRRT include:31 ■ Cardiovascular instability ■ Parenteral nutrition ■ Cerebrovascular or coronary artery disease ■ Acute renal failure with multiple organ failure ■ Inability to tolerate hemodialysis ■ Azotemia ■ Sepsis As long as the patient is hemodynamically stable in the ICU, it is possible to receive physical therapy before, during, and after dialysis. Wiklund I, Berry P, Lu K.X, Fang J. Arrhythmias and conduction disturbances are common findings. Indian J Chest Dis Allied Sci. Smith R.B, Perdue G.D. Diseases of the peripheral arteries and veins. The cholesterol-saturated fat index for coronary prevention: Background, use, and a comprehensive table of foods. In addition, the treatment or exercise prescription may require alterations in duration, intensity, or both. The patient ambulated approximately 250 feet with an adaptive heart rate and blood pressure response, without angina. Approximately half the patients also complain of fever. Approximately 50% to 70% develop pneumonia in the contused segment, 35% develop an empyema, and some patients develop ARDS, with complete "white out" of the injured lung on chest radiograph.4,28,32 Diagnostic Tests Chest radiographs are often used in an attempt to visualize rib fractures; however, rib fractures are not always seen on the image if they are not displaced. Patients who are prescribed exercise training and other interventions need to be without any overt signs of decompensated heart failure, and should be monitored during treatment to observe for abnormal responses and symptoms. 1990;98(4):816–820. 1990;20(Suppl 1):102–112. BO X 13- 8 Re a sons t o m e a sure PC WP • Assess severity of left ventricular failure • Assess mitral and aortic valve dysfunction • Assess and treat pulmonary edema (PCWP >20 mm Hg) • Assess pulmonary hypertension • Assess and treat hypovolemic states Clinical tip To trend temperature over time, the same site and same device must be used for each temperature measurement. 14-4 demonstrates slowing of the heart rate by changes in any of these three action potential parameters. 1997;156:800– 806. Todd T.R. Early postoperative management following lung transplantation. Lymphatic vascular defects promoted by Prox1 haploinsufficiency cause adult-onset obesity. The cause of poor transport at the lungs is often excessive blood and extracellular fluid in the alveoli and interstitium, interfering with diffusion and causing a reduction in vital capacity.5 However, the cause of poor transport at the cellular level may be less apparent. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. FIGURE 2-1 Lung volumes and capacities as displayed by a time-versus-volume spirogram. The costophrenic angles are moderately deep, and they are approximately equal in size on the two sides. Hosenpud J.D, Novick R.J, Breen T.J, Daily O.P. The Registry of the International Society for Heart and Lung Transplantation: Eleventh official report—1994. 22 Outcome measures A guide for the evidence-based practice of cardiopulmonary physical therapy Kristin Lefebvre, and Pamela Bartlo CHAPTER OUTLINE Outcomes Defined 675 Psychometric Properties 676 Intended Population 676 Validity 676 Reliability 677 Responsiveness/Sensitivity to Change 677 Minimal Detectable Change 677 Minimally Clinically Important Difference (MCID) 677 Importance of Measuring Outcomes 677 Selection of Data to Measure 678 Biologic/Physiologic Variables 680 Vital Signs 680 Functional Performance 683 Functional Performance Measures 690 The Timed Up and Go Test Measures 690 Gait Speed 690 Additional Functional Performance Measures 692 Quality-of-Life Measures 693 Health-Related Quality of Life 693 Summary 696 References 697 The practice of physical therapy is grounded in meeting the needs of the individual patient by optimizing his or her overall health. Dairy consumption, obesity, and the insulin resistance syndrome in young adults. Kelly D.G. A Primer on Lymphedema. The patient is to concentrate on abdominal contraction to help force the air out. The first, second, tenth, eleventh, and twelfth ribs are unlike the other, more typical ribs. 1988;115:242–249. An essential role for Prox1 in the induction of the lymphatic endothelial cell phenotype. Images are taken of anatomic structures; in this case, cardiac structures are viewed in slices and analyzed, and the slices are approximately 1 to 3 mm apart. Cytomegalovirus is treated with the acyclovir analog dihydroxyphenylglycol (DHPG). Treatment There is no specific treatment for poliomyelitis. Therefore individuals with any of these diseases should be examined for all other diseases. Effects of a long-term exercise program on lower limb mobility, physiological responses, walking performance, and physical activity levels in patients with peripheral arterial disease. Auscultation—lungs with crackles (rales), bilateral bases, heart S1, S2. Anest Intensive Care Med. 2007;88:1452–1464. This condition is also rare.8 ■ Hypoplasia is the development of a functioning although not always normal bronchus with the development of reduced amounts of lung parenchyma. 1988;12(1):265–273. The camera records the positrons and turns the recording into pictures on a computer. 2009;120:1640–1645. This disease follows a slow progressive course, with the onset of systemic disorders and infections causing most of the common crises. 1971;24:1. Acta Paediatr. The bundle bifurcates to give rise to the right and left bundle branches carrying the impulse to the right and left ventricles, respectively. Clinical tip Physical therapists develop a diagnosis that is a physical therapy diagnosis, not a medical diagnosis. Use of assistive devices such as a wheeled walker with a seat and oxygen tank holder provides the patient with balance support and energy conservation. Addition of inspiratory muscle training to aerobic training improves cardiorespiratory responses to exercise in patients with heart failure and inspiratory muscle weakness. Suggested Usage The CFQoL scale can be used with any adolescent or adult with CF. 2003;21:23–30. Pulmonary toxicity caused by cytotoxic drugs. King TE Jr, Bradford WZ, Castro-Bernardini S, et al.: ASCEND Study Group: A phase 3 trial of pirfenidone in patients with idiopathic pulmonary fibrosis, N Engl J Med 370(22):2083–2092. Table 16-7 Normal breath sounds IN: inspiration EX: expiration These normal sounds are produced from the turbulence of airflow in the airways. Rehabilitation of the postsurgical cardiac patient. Furthermore, chronic alcohol consumption is associated with higher prevalences of HTN, cerebrovascular accident, cardiac arrhythmias, sudden death, and CHF. Kidney Regulation Drug receptor sites within the kidneys are found within the proximal tubule, collecting tubule and ducts, and Henle loop. Cardiac involvement typically takes the form of sclerosing inflammatory lesions involving the aortic cusps, proximal aortic root, and adjacent atrioventricular nodal tissue, which can be identified in up to 100% of patients and induces aortic regurgitation in 10% of cases and varying degrees of atrioventricular conduction disturbances in about 5% of patients.229 Left ventricular dilatation and diastolic dysfunction are very common. It is apparent that as individuals at rest become short of breath, gain weight, and develop a faster resting heart rate, their ability to exercise is dramatically decreased. 256. The last is thicker and broader at its middle, where it projects a hook-shaped process downward and backward from its lower border—the carina—between the two mainstem bronchi. Hamilton, Ontario: McMaster University Medical Center; 1988. The FEV1/FVC ratio decreases as the severity of lung obstruction increases. In these cases, the patient experiences chest fullness and severe pain, or angina pectoris. FIGURE 2-5 A-C, Lung compliance changes associated with disease. If the patient reaches the opposite end of the course prior to the beep, he or she is instructed to wait there until the beep and then proceed forward. 2009 Focused Update Incorporated into the ACC/AHA 2005 Guidelines for the Diagnosis and Management of Heart Failure in Adults: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Medical treatment of pulmonary hypertension in chronic lung disease. Riddell M.C, Perkins B.A. Exercise and glucose metabolism in persons with diabetes mellitus: perspectives on the role of continuous glucose monitoring. Mancini D.M, LaManca J, Donchez L, et al. Abnormalities can exist with the systolic or diastolic response or both. Physical therapists should also look for other signs of PAD in the extremity, including dry, shiny skin; hair loss; thick toenails; muscle atrophy; impaired sensation; and decreased pulses. As intracellular potassium falls, maximal diastolic membrane potential decreases (less negativity), and the slope of phase 4 depolarization increases (see Fig. Perme C, Nawa R, Winkelman C, Masud F. Møller S, Henriksen J.H. Cirrhotic cardiomyopathy: A pathophysiological review of circulatory dysfunction in liver disease. (From Frazier M: Essentials of Human Diseases and Conditions, ed 6, St. Louis, 2016, Saunders.) Summary ■ Coronary heart disease is the most common disease in the industrialized world. More recently, blood levels of the troponins have been assessed to determine myocardial damage and are now considered the gold standard. Clinical Interpretation. Eur J Appl Physiol. At this point, MA resumed exercise on the treadmill and bicycle ergometer while still an inpatient. 72. Excess deposition of iron in the liver can be fatal but can be prevented by regular therapeutic phlebotomy to reduce circulating iron levels. Immunopharmacology. Continuous positive airway pressure (CPAP) and bilevel positive airway pressure (BiPAP) ventilation (Fig. Home care and hospice services can play an important role with elderly patients, including intravenous infusion to treat heart failure.63 Table 14-18 Average changes in body composition and function with age Area of change Change from age 20 to age 80 (%) Body fat/total body weight +35 Plasma volume −8 Plasma albumin −10 Plasma globulin −10 Total body water −17 Extrac ellular fluid (from age 20 to age 65) −40 Conduc tion veloc ity −20 Cardiac index −40 Glomerular filtration rate −50 Vital c apac ity −60 Cardiac output −30–40 S planc hnic and renal blood flow −40 From Kalant H, Roschlau W, Sellers M: Principles of Medical Pharmacology, ed 4, New York, 1985, Oxford University Press. He was independent with ambulation, stairs, and activities of daily living (ADLs) before admission. A study of family with inherited disease of cardiac and skeletal muscle. Angiotensin-receptor blockers Angiotensin-converting enzyme inhibitors remain the first choice for inhibition of the renin–angiotensin system in chronic HF. Warren A.G, Janz B.A, Borud L.J, Slavin S.A. Evaluation and management of the fat leg syndrome. Cardiopulmonary exercise testing following allogeneic lung transplantation for different underlying disease states. Acetylcysteine's primary adverse effects include mucosal irritation, coughing, bronchospasm (especially in those with a reactive airway component), and nausea. ■ Antitussives are used to suppress the ineffective, dry, hacking cough associated with minor throat irritations and the common cold. 2012;62:134–137. 5-18).47 FIGURE 5-17 The technique of thoracentesis involves passage of a needle just superior to the rib. Forced flow rates measured during exhalation are used to: ■ Quantify the degree of airway obstruction present ■ Document improvements in lung function after the administration of medications ■ Follow the progression, or worsening, of an obstructive lung disease Clinical tip Individuals with obstructive pulmonary disease require increased time to expel air from their lungs. 2005;37:256–260. A randomized controlled trial. Individuals with elevated fibrinogen levels in the highest quartile demonstrated a double risk of CAD, whereas the Multiple Risk Factor Intervention Trial found that an elevated WBC count is associated with increased risk.39 Inflammatory markers and infection markers have shown some relationship to CAD. ■ The plaques that obstruct the coronary arteries are a combination of atheroma and thrombus, and they begin to form early in life, probably in the second decade. 2007;99(4):436–441. Mechanical ventilation and supplemental oxygen may be required until the patient can maintain tissue oxygenation independently.28,32 A tension pneumothorax is treated as an emergency by inserting a needle into the pleural space to allow air to escape. Because COPD is a combination of diseases, it presents as a combination of pathologic features, including hyperplasia of the mucus-secreting cells, reactive airways and destruction of terminal bronchioles, and actual alveolar sac destruction (Fig. ■ Patients with multiple medical problems and acute respiratory failure may require prolonged periods of mechanical ventilation. This results in an increase in left atrial pressure, which is transmitted back to the pulmonary circulation. The distance of walk test chosen is based on the therapist's assessment of patient tolerance for activity. During the course of the test, the overall speed will increase from 0.50 m/sec to 2.37 m/sec. To perform vibration, the palmar aspect of the clinician's hands is in full contact with the patient's chest wall, or one hand may be partially or fully overlapping the other (Fig. The metabolic consequences of sleep deprivation. In addition, bulbar dysfunction causes upper airway obstruction and aspiration and increases the risk of ventilatory failure. Amrinone can also cause thrombocytopenia in 2% to 3% of patients, as well as a variety of other side effects (e.g., gastrointestinal dysfunction, myalgia, fever, hepatic dysfunction, cardiac arrhythmias). It has been suggested that delay in cardiac transplantation until 6 weeks of exercise conditioning have been performed may improve postoperative recovery and surgical success.239 The reason for a lack of further improvement in exercise tolerance and functional capacity after week 6 was most likely because of the mechanical constraints of the LVAD. American College of Sports Medicine position stand. As soon as you can, begin taking deep breaths." Specific techniques for breathing can be discussed, including diaphragmatic breathing, lateral costal expansion, unilateral expansion, and use of an inspirometer. Another oral anticoagulant commonly used to treat and prevent venous thrombosis and PE is warfarin (Coumadin). Troponin elevations have also helped clinicians detect reinfarctions and estimate infarct size.7 Levels of troponin are not elevated in unstable angina.9,11 The assay used to measure cTnT levels has cardiac specificity equivalent to that of assays for cTnI. This causes the lung on the involved side to collapse. As the lungs' ability for elastic recoil diminishes, the small airways are unable to remain open during expiration,2 which is a detriment to the lungs' ability to perform gas exchange necessary for oxygen to perfuse to the body's tissues. Mäkinen T, Norrmén C, Petrova T.V. Molecular mechanisms of lymphatic vascular development. When pressure is applied to a piezoelectric crystal, its shape is distorted, causing a reorientation of electrical charges within the crystal. Smart N, Haluska B, Jeffriess L, et al. Nat Clin Pract Cardiovasc Med. J Intern Med. J receptor: The juxtapulmonary receptors (J receptors) are located near the pulmonary capillaries and are sensitive to increased pulmonary capillary pressures. It has been reported that the majority of these drugs can cause pulmonary fibrosis.8 They are also responsible for causing pulmonary infiltrates, secondary neoplasms, and non-Hodgkin lymphoma, all of which compromise lung function. When a patient on digitalis presents with adverse side effects, the medication should be considered the cause. 1996;124:1051–1057. The residual volume (RV) is usually decreased, but with some causes of RLD (spinal cord injury, amyotrophic lateral sclerosis [ALS], and other neuromuscular disorders), it may be increased. For example, a high sensitivity means the test will have low falsenegative rates. Physiotherapy. Pulmonary edema: Cardiogenic and noncardiogenic. The nasopharynx is a continuation of the nasal cavity, beginning at the posterior nasal apertures and continuing backward and downward. With special reference to the limitation of the maximal physical working capacity. It was designed to evaluate the person's whole life, including relationships, feelings about work, and physical presentations. Variant angina usually responds to nitroglycerin and is typically diagnosed when nitroglycerin is found to be effective or when other long-term pharmacologic therapy is found effective. Then, after continuing to descend posterolaterally, the lower lobe bronchus yields the medial basal segmental bronchus (distributed to a small area below the hilus) from its anteromedial surface. Kahn S.R, Shrier I, Kearon C. SvO2 is the direct measurement of the venous oxygen reserve and is expressed as a percentage of oxygen left combined with Hb after the tissues have extracted the oxygen needed. Thomas Jefferson University Hospital; 1989. Yasue H, Matsuyama K, Matsuyama K, et al. The intensity varies according to the proximity to the valve and chest wall. Widdicombe J.G. Pulmonary and respiratory tract receptors. Hyperglycemic emergencies in athletes. Maher C.A, Williams M.T, Olds T.S. The six-minute walk test for children with cerebral palsy. More information about bronchiectasis can be found later in this chapter. Bays H.E, Toth P.P, Kris-Etherton P.M. Obesity, adiposity, and dyslipidemia: A consensus statement from the National Lipid Association. Physical Examination The physical examination is the third step in the initial evaluation of the patient. Pulse oximetry is based on two physical principles: (1) the presence of a pulsatile signal generated by arterial blood, which is relatively independent of nonpulsatile arterial, venous, and capillary blood and other tissues; and (2) the fact that oxyhemoglobin (O2Hb) and reduced hemoglobin (Hb) have different absorption spectra.2 In ICU patients, a probe is attached to the patient's finger, forehead, or earlobe, and the reading is displayed continuously on the monitor. Abnormal Systolic Responses There are three abnormal systolic blood pressure responses to activity that are described in the literature: hypertensive, hypotensive, and blunted or flat. 10-6). The Minnesota Regional Peripheral Arterial Disease Screening Program: Toward a definition of community standards of care. Li Z, Maglione M, Tu W, et al. Excessive pressure in multichambered cuffs used for sequential compression therapy. Clinical decision making therefore depends on the constellation of symptoms presented by the patient and the effect the associated dizziness has on his or her activity. Hoene M, Weigert C. 1978;14(9):537–540. 2014;12:CD011273. Exercise and obesity. The presence of hypertrophy or adaptive shortening of the sternocleidomastoid muscles may indicate a chronic pulmonary condition. Lung volumes are decreased, lung compliance is decreased, ventilation–perfusion mismatching is increased, and gas exchange is impaired.2 A tension pneumothorax means air can enter the pleural space but cannot escape into the external environment. The emergent drug and interventional management of the patient with ACS involves eliminating the coronary thrombosis as quickly as possible, decreasing myocardial oxygen demand, identifying the culprit lesion, and enhancing myocardial oxygen supply. (From Boron WF: Medical Physiology, updated ed, St. Louis, 2005, Saunders.) The resting position of the diaphragm is an arched position high in the thorax. Drugs should be used to only suppress the ineffective, dry, hacking cough associated with minor throat irritations and the common cold. It usually takes 36 weeks of normal gestation to achieve lung maturity in the fetus. It targets those patients with advanced symptoms of heart failure. Ovbiagele B. Intensity Acute care patients' responses to exercise intensity can be measured in several ways. J Crit Care. Three β-blockers have been shown to be effective in reducing the risk of death in patients with chronic HF: two β1-selective receptors—bisoprolol (Zebeta) and sustainedrelease metoprolol succinate (Toprol XL)—and a nonselective β-blocker with α1 antagonist properties—carvedilol (Coreg).25 The choice of which drug to use is multifactorial, including the patient's symptoms and etiology of heart failure. Vandiver J.W, Vondracek T.G. Antifactor Xa levels versus activated partial thromboplastin time for monitoring unfractionated heparin. The TandemHeart pVAD is operated by a controller console designed to continuously monitor the system. c Isoproterenol is also called isoprenaline. Leukocytic insinuation between endothelial cells (emigration) 7. Int J Nurs Stud. Clinical Manifestations of Congestive Heart Failure Heart failure is commonly associated with several characteristic signs and symptoms (Box 4-2). Patients experience a combination of spasticity and hyperreflexia and muscle wasting, weakness, and fasciculations. Although even with regular activity about 0.45 mL/kg/min of oxygen consumption is lost each year, the fit elderly person has a greater maximum oxygen consumption than the sedentary person. Altered respiratory physiology in obesity. Mosa L, Banka C.L, Benjamin E.J, et al. The most common symptoms reported by PPS patients include fatigue and weakness, joint and muscle pain, respiratory difficulties, cold intolerance, and dysphagia. Sciaky A.J. Patient education. Finally, this chapter provides the HRQL measures available for use in the physical therapy practice. 1994;12(10):S129–S132. Cardiac Arrhythmia Suppression Trials. The fourth and fifth classic signs are apparent from PFT. Katzung B, Scheinman M. Wadden T.A, Vogt R.A, Andersen R.E, et al. Weaning Criteria The process of weaning begins with determining whether or not the patient meets a set of criteria. Arterial hypoxemia, which is found in 30% to 70% of patients with cirrhosis, is usually mild to moderate, but oxygen desaturation may occur during exercise. Yacoub M, Mankad P, Ledingham S. Lowest normal value of R-R expiration/inspiration ratio is 1.17 for ages 25 to 29 years, 1.15 for ages 30 to 34, 1.13 for ages 35 to 39, 1.10 for ages 40 to 44, 1.08 for ages 45 to 49, 1.07 for ages 50 to 54, 1.06 for ages 55 to 59, 1.04 for ages 60 to 64, 1.03 for ages 65 to 69, and 1.02 for ages 70 to 74. 2000;32:99–103. Exercise training of patients with severe heart failure. Infection with resultant inflammatory response within the pleura is termed pleuritis or pleurisy and is best appreciated through the presence of pleural chest pain and an abnormal pleural friction rub on auscultation.9 A pleural effusion refers to a buildup of fluid in the pleural space commonly seen after cardiothoracic surgery or with cancer. Although the respiratory muscle pump is very resistant to fatigue, these patients can experience respiratory muscle fatigue, overuse, and failure as RLD progresses. Clin Transplant. Nasopharynx. The generic name is the scientific description of the drug, whereas the brand name is the name that the individual drug company assigns to its own product. Skeletal Muscle Function Skeletal muscle myopathy has been identified in patients with CHF and in those with CHF and preexisting cardiomyopathy.89,90 Among the causes of heart failure, including coronary artery disease, high blood pressure, and diabetes, skeletal muscle diseases can also cause cardiomyopathy and lead to heart failure. St. Louis: Mosby; 2006. They are usually sharply defined lesions, which may be necrotic or cavitate. The number of stenotic coronary arteries and passive smoking exposure from husband in lifelong non-smoking women in Xi'an, China. Table 15-4 presents the short-term neuromuscular blocking agents most frequently used clinically. Improvements in exercise tolerance and functional capacity continued until week 6 of conditioning, after which further improvements were minimal. Single lung transplantation: Alternative indications and technique. This can be further qualified by using a numerical scale, similar to a pain scale, rating dyspnea from 0 to 10, with 0 indicating no shortness of breath and 10 indicating the worst imaginable shortness of breath.63 Dyspnea is a clinical manifestation of work of breathing. See Chapter 7 for the effects of chemotherapy and radiation on the cardiopulmonary system. The two layers of the pericardium include an outer parietal pericardium and an inner visceral pericardium, also referred to as the epicardium.8 The parietal pericardium is a tough, fibrous layer of dense, irregular connective tissue, whereas the visceral pericardium is a thin, smooth, and moist serous layer. Painter P. J Cyst Fibros. J Orthop Sports Phys Ther. Exercise and Chronic Kidney Disease and Failure Patients with CKD exhibit impaired exercise tolerance and reduced muscle strength and endurance, which become more limiting as kidney disease progresses. The radiograph thus produced is referred to as a roentgenogram, named after Wilhelm Konrad Roentgen, who received the first Nobel Prize for Physics in 1901 for his work in defining the major properties of x-rays and the conditions necessary for their production. The ACSM recommendations regarding exercise evaluation and hypertension are the following. 1991;39:142–148. 1998;92(6):820–827. Shoenfeld Y, Gerli R, Doria A, et al. Cardiopulmonary physiology in adult and pediatric lobar transplantation recipients: One year follow-up [abstract]. ■ The amount of lymph transported by the lymphatic system is called the lymphatic load. Galvão D.A, Newton R.U. Review of exercise intervention studies in cancer patients. In this case omalizumab binds specifically to IgE antibodies and prevents their action. In addition, because the measurement of outcomes and the demonstration of effectiveness is now a requirement for reimbursement, the CRQ provides an easy and inexpensive way to demonstrate those outcomes in the respiratory therapy environment. 1989;76:384. Following the exam or upon termination by the patient, the Borg scale and vital signs should again be recorded and the patient should be questioned as to what, if anything, might have limited him or her from going further. Chapter 19, Pulmonary rehabilitation was revised to correspond with changes in the new pulmonary rehabilitation (PR) definition and in the changing practice since Medicare revised payment for PR. FIGURE 22-4 Preparation for the modified shuttle walk test. 1999;84(3):348–350 A9. Probable speech and swallowing dysfunction increase the risk for aspiration pneumonia and may impair cough effectiveness. ■ In 40% to 50% of patients with CHD, SCD (death within 1 hour of onset of symptoms) is the initial presenting syndrome. What causes the production of this antibody is unknown. Creager M, Liby P. This type of pulmonary edema is also named ARDS and was discussed under the section "Pulmonary Causes of Restrictive Lung Dysfunction."9,32,43 Pathophysiology As the left ventricle fails, its ability to contract and pump blood into the systemic circulation efficiently is diminished. Effect of physical training on exerciseinduced hyperkalemia in chronic heart failure: Relation with ventilation and catecholamines. S moking Assess: S moking status: c urrent, rec ent (quit 6 months), former, never. Cruz F.E.S, Cheriex E.C, Smeets J.L, et al. Noncontrast magnetic resonance image of the pelvis demonstrating bone marrow replacement by granulomatous tissue. Metabolic syndrome risk and incident cardiovascular events and death. 1992;92:34–38. Exercise performance during assisted ventilation with bi-level positive airway pressure (BiPAP). 2008;22:483–492. Pharmacologic evidence of an important cause of contractile dysfunction in patients with end-stage heart failure. Learning how to perform glossopharyngeal breathing or how to operate a portable ventilator may also be necessary for selected patients.57 Amyotrophic Lateral Sclerosis Amyotrophic lateral sclerosis is a progressive degenerative disease of the nervous system that involves both upper and lower motor neurons, causing both flaccid and spastic paralysis.2,3 Etiology The cause of the disease is unknown.54 Recently, the genetic component has become clearer in families with a history of ALS. 2006;13:795–801. "This reaction is catalyzed by angiotensin converting enzyme (ACE), which is located in many organs, including the lung, the luminal membrane of vascular epithelial cells, and the juxtaglomerular apparatus itself."29 Angiotensin II has two key effects: an increase in systemic vascular resistance due to its effects as a vasoconstrictor, and an increase in extracellular volume due to renal sodium and water retention via aldosterone stimulation.29 When the conversion of angiotensin I to angiotensin II is inhibited, the clinical effects of angiotensin II are significantly reduced and limited. For acutely ill patients with reduced cough effectiveness and the ability to follow instructions, the first line of intervention is positioning and teaching proper coughing technique. The distortion causes a displacement of the positive and negative charges within the crystal, producing surface changes in polarity on opposite sides of the crystal. The microprocessor then calculates the percentage of hemoglobin saturated with oxygen. ■ For all thoracic transplant patients, the following vital signs should be monitored: heart rate, blood pressure, respiratory rate, RPE, and SpO2. Guerrera G, Melina D, Colivicchi F, et al. ed 11. The density of capillaries within a capillary bed is greater in active tissue, including the muscle. Cardiovascular diagnostic tests and procedures Diagnostic Test Interpretation and Probability of Disease Sensitivity/Specificity of Testing Clinical Laboratory Studies Other Noninvasive Diagnostic Tests Other Imaging Modalities Exercise Testing Pharmacologic Stress Testing Cardiac Catheterization: Coronary Angiography and Ventriculography Digital Subtraction Angiography Endocardial Biopsy Vascular Diagnostic Testing for Aortic, Peripheral, and Carotid Disease Peripheral Arterial Disease and Dysfunction and Diagnosis Carotid Artery Disease and Diagnosis Summary 9. Nathan S.D, Ross D.J, Belman M.J, et al. Manual of the Symptom Questionnaire [unpublished]. Khaghani A, Tadjkarimi S, Al-Kattan K, et al. Boston: Little Brown; 2005. 68. ■ The availability of donor organs dictates the pace of transplantation. Arterial vasodilators are useful only when arterial hypotension is not present. Pulmonary complications of radiation therapy. 187. β2-Receptors of the liver activate glycogenolysis; however, a nonselective β-blocker suppresses this action. Pursed lips breathing training using ear oximetry. 1990;141:343–346. A decortication removes the restrictive pleural rind, which is usually done through a minithoracotomy.32,33 An empyema may also develop if the hemothorax is not completely resolved. 2003;26:1553–1579. The Atrial Fibrillation Follow-up Investigation of Rhythm Management Investigators. Muiesan M.L, Salvetti M, Rizzoni D, et al. Z Lymphol. The prevalence of RAS is approximately 20% to 30% in the high-risk population.307 Renal artery stenosis is a progressive disease that is associated with loss of renal mass, progressing to renal insufficiency, refractory HTN, and renal failure. Preferably the patient is alert and cooperative, but at the minimum he or she should be initiating breaths spontaneously. For example, a patient experiencing mucosal edema may complain of congestion and take an over-the-counter decongestant or antihistamine. Time of diagnosis is largely dependent on the first presenting symptom. This muscle rigidity can become so severe that the chest wall is immobilized, resulting in asphyxia and death. For example, albumin, a small blood protein, is the first protein detected in the urine when there is renal damage (e.g., burns, shock, low cardiac output). Orthostatic hypotension often occurs in the initiation and regulation of dosages of nifedipine (Procardia), so the clinician should be sensitized to watching for orthostatic signs and symptoms when initiating an increase in activity orders or when assisting the patient out of bed for the first time. Through this diastolic augmentation, the oxygenation to the myocardium is greatly improved. Then, in a relaxed tone of voice, the therapist instructs the patient to sniff quickly through the nose three times with slow, relaxed exhalations. (Accessed July 21, 2015.) 46. The short forms and computerized adaptive testing forms are to increase the ease of use by the therapist. With severe chest wall injuries or marked displacement of the fracture fragments, surgical stabilization may be required. Int J Rehabil Res. National Center for Health Statistics Health E-Stat. 2009;119:e391–479. 2007;8:58–65. Anxiety Stress Coping. The control of ventilation undergoes significant change (Fig. 11. A review of lung transplant donor acceptability criteria. Hickey A.J. Inhalation Aerosols: Physical and Biological Basis for Therapy. 201 of-atherosclerosis? Guidelines for Cardiac Rehabilitation and Secondary Prevention. If the vital capacity is less than 1.5 liters, insufflating or air stacking to the maximum insufflation capacity (MIC) becomes crucial to optimize cough flows. 88. Blood within the right ventricle is received from the right atrium through a one-way valve present between the atrium and ventricle termed the tricuspid atrioventricular valve. Auscultation of heart sounds requires both the diaphragm and the bell and, again, a quiet environment. Corticosteroids are not routinely regarded as primary bronchodilators. As a general rule, physicians most commonly prescribe MDIs for their patients, largely because they are more convenient and portable than nebulizers. Cardiovascular medications Pharmacokinetics Pharmacodynamics General Considerations of Pharmacologic Management Cardiac Drugs Used in Critical Care Cardiac Pharmacology in the Geriatric Population Cardiac Pharmacology in the Neonate and Pediatric Populations Pharmacologic Management of Diabetes Heart Transplantation Vascular Pharmacology Summary 15. The individual was symptomatic when the arrhythmias were frequent. The lymphatic system Anatomy and Physiology Pathophysiology The Role of the Lymphatic System in the Cardiovascular System and in Cardiovascular Disease Medical Management Lipedema Summary 22. 2011;154(3):311–324. As increasing numbers of patients with end-stage disease are offered thoracic transplantation as a therapeutic option, the importance of keeping abreast of new developments in this evolving field cannot be overstated. Clinical signs may be resting tachycardia and postural hypotension. With repeated thrombus formation and embolic events, surgical placement of a transvenous device (e.g., Greenfield filter) to prevent migration of thrombi may be utilized.54 Heparin therapy is most commonly used to treat pulmonary embolism. Weir M.R. Angiotensin-II receptor antagonists: a new class of antihypertensive agents. B, A characteristic flow-volume loop as seen in a patient with severe chronic airflow limitation caused by smoking. Aswania O.A, Corlett S.A, Chrystyn H. Many fibrin strands surround the aggregated platelets to form a thrombus. Guidelines for the six-minute walk test. Turbulent airflow, created by the conchae, causes inhaled dust and other particulate matter larger than approximately 10 μm to "rain out" onto this sticky layer, which is then moved by ciliary action backward and downward out of the nasal cavity into the nasopharynx at an

bloc ker Two-drug c ombination Thiazide and ACE or other ACE, angiotensin-converting enzyme; NHLBI, National Heart, Lung and Blood Institute. (From Gilbert-Barness E, Kapur R, Oligny LL, et al, editors: Potter's Pathology of the Fetus, Infant and Child, ed 2, St. Louis, 2007, Mosby.) B, Thirteen-year-old boy with pectus carinatum. Human Physiology. The respiratory system in connective tissue disorders. It can be used across settings, including cardiac rehabilitation; outpatient, subacute, or acute rehabilitation; or in-home care. The RLL bronchus first gives off a branch from its posterior surface—the superior segmental bronchus—which passes posterosuperiorly to its distribution in the upper portion of the lower lobe. 2005;60:715–734. Patient is able to identify his risk factors for coronary artery disease. Furthermore, autonomic denervation interferes with temperature regulation so that body temperature tends to fluctuate according to the ambient temperature, especially in higher lesions; therefore hypo- and hyperthermia can develop. Kaski J, Crea F, Meran D, et al. Wanstall J.C, Jeffery T.K. Recognition and management of pulmonary hypertension. The association between congestive heart failure and chronic renal disease. Implications for Physical Therapy Through effective screening, examination, and interventions, physical therapists can be instrumental in prevention and further development of complications from venous disease experienced in patients. c Perceptions of hyperglycemia vary among individuals: some persons notice symptoms only when blood glucose is very high, whereas others notice symptoms with more mild degrees of hyperglycemia. Cardiopulm PT Journal. In: Humes H.D, DuPont H.L, Gardner L.B, et al., eds. During maximal inspiration, the inferior border of the RLL may extend to the second lumbar vertebra and superimpose over the superior aspects of the kidney. Ham R.J, Sloane P.D, Washaw G.A, et al. 1995;107:973–980. Simon J.A, Fong J, Bernert Jr. J.T, Browner W.S. Relation of smoking and alcohol consumption to serum fatty acids. These impairments can be few or many and, in the case of patients with COPD, include not just the physical impairments but the psychological as well. Reduction in the use and/or dosage of cyclosporine (and increased use of the CI tacrolimus) has reduced the occurrence of hypertension and chronic renal insufficiency and failure. Thromboembolic lysing agents (e.g., streptokinase) can be used to lyse the emboli, but this therapeutic intervention is no more effective than heparin therapy in terms of the patient's morbidity or mortality.28 Pulmonary embolectomy is being performed less frequently due to the increased mortality rate (50% to 94%) compared with the mortality rate (10% to 20%) for conventional medical treatment.28 However, this emergent surgical intervention may be indicated in patients who have large emboli and cannot receive heparin therapy or have overt right ventricular heart failure leading to cardiac arrest. Dysrhythmias Disturbances in cardiac rhythm are known as dysrhythmias, which are usually called arrhythmias (although this actually means "no rhythm"). Evidence-based guidelines for weaning and discontinuing ventilatory support: A collective task force facilitated by the American College of Chest Physicians; the American Association for Respiratory Care; and the American College of Critical Care Medicine. The immature organism can demonstrate unpredictable responses because of the unique pharmacokinetic and pharmacodynamic reactions found during each stage of development. 2006;30:63–71. Grodstein F, Stampfer M.J, Manson J.E, et al. 207. Beers M.H, Fletcher A.J. The Merck Manual of Diagnosis and Therapy. The alveoli, like the bronchi, contain cellular components of inflammation and immunity. Shoji T, Nishizawa Y, Kawagishi T, et al. He has three adult children. Further research is needed to better understand the molecular mechanisms of the influence of exercise on cognitive function. sound with inc reasing intensity 2 S tart swishing sound Bec ause of the c ompressed artery, blood flow c ontinues to be heard while the sounds c hange as a result of the c hanging c ompression on the artery. Patterson G.A. Double lung transplantation. Physical activity in aging: Changes in patterns and their relationship to health and function. Clinically Oriented Anatomy. Pharynx. Measuring cardiac health knowledge. Guyatt G, Berman L, Townsend M, et al. Heart The heart is the primary pump that circulates blood through the entire vascular system. The effect of diet on plasma lipids, lipoproteins, and coronary heart disease. Notably, drugs used to treat CV problems, such as quinidine, procainamide, lidocaine, and morphine, may adversely affect myasthenia gravis. By using the pitting edema scale to determine the severity and location of peripheral edema (pretibial or sacral, distal or proximal) and obtaining girth measurements of the lower extremities and the abdomen, important information regarding patient status can be obtained. Hostetter T.H, Pfeffer J.M, Pfeffer M.A, et al. With the patient in a comfortable position such as side-lying or reclined, the therapist may assist the patient in placing both hands on the abdominal area to provide proprioceptive feedback. Pilch U, Wozniewski M, Szuba A. tetani.2 This anaerobic bacillus is found in the soil and the excreta of humans and animals and usually enters via a contaminated wound. Ciesla N. After inflation of the cuff, auscultation of the first audible sound designates the systolic pressure, whereas the diastolic pressure is the value when the sounds become muffled. of Health and Human Services, Public Health Service, National Institutes of Health, National Heart, Lung, and Blood Institute; 2007. Zemp E, Elsasser S, Schindler C, et al. The CRQ allows respiratory problems such as dyspnea to be evaluated at baseline and readministered throughout treatment to look for possible gains or losses made during the treatment period. Whether this is due to decreased metabolism, fatigue, lipocyte inhibition, or some other factor or combination of factors remains to be seen. 1993;12:27–33. When this occurs, there is a greater tendency for the alveoli to collapse. Society of Actuaries & Association of Life Insurance Medical Directors of America. Early activity is safe and feasible in respiratory failure patients. High-resolution CT has become the optimal diagnostic method for recognizing parenchymal abnormalities. Summary ■ Causes of CMD include: • Myocardial infarction or ischemia • Cardiomyopathy • Cardiac arrhythmias • Heart valve abnormalities • Pericardial effusion or myocarditis • Pulmonary embolus • Pulmonary hypertension • Renal insufficiency • Spinal cord injury • Congenital abnormalities • Aging ■ The term cardiac muscle dysfunction accurately describes the primary cause of pulmonary edema, as well as the underlying pathophysiology, which essentially impairs the heart's ability to pump blood or the LV's ability to accept blood. After the first minute, the patient must then pace himself or herself. The history taking is a very critical part of the examination, and according to a McMaster study, is a key distinctive difference between novice clinicians and experienced clinicians.2 According to the McMaster study, experienced clinicians are much better history takers than the novice clinician, and this may be related to the value the experienced clinicians have found over the years they have practiced. Normally 60% of an individual's maximal ventilatory reserve is utilized during activity. Heart Valves Four heart valves (Fig. SECT ION 3 Diagnostic Tests and Procedures OUT LINE 8. During the seated step test, the patient will alternate placing the foot up on the step in front of him or her at the 60 beats per minute pace. Doxapram (Dopram) is thought to stimulate chemoreceptors in the carotid arteries and/or cortical and spinal neurons,59 which, in turn, stimulate the respiratory center in the brainstem. Thoracoscopy can be used to biopsy the pleura, biopsy the lung, obtain pleural fluid samples, remove pleural fluid, and perform a pleurodesis, and, if necessary, lysis of adhesions can be accomplished (Fig. Normal and abnormal V/Q scans are shown in Fig. The patient should be psychologically ready for the weaning process. 266. Costanzo M.R, Johannes R.S, Pine M, et al. Reynolds J.P. LOS: SOS? HF-ACTION Trial Investigators. Colucci W.S. Overview of the Therapy of Heart Failure Due to Systolic Dysfunction. Cholinergic stimulation of the appropriate receptor catalyzes (via guanyl cyclase) the conversion of guanosine triphosphate (GTP) to cyclic GMP, eliciting contraction of the affected bronchial smooth muscle. 1997;30:1002–1008. The utilization of a standardized tool has been recommended in numerous clinical practice guidelines and should be used by physical therapists as part of their examination process, especially in the presence of signs and symptoms.4,5 The Wells Criteria for DVT is the most commonly used tool to determine likelihood of DVT and should be utilized in the initial assessment.6 See Table 16-1. 329. 1990;11(Suppl E):197–211. Go A, Mozaffarian D, Roger V, et al. Ischemia, Infarction, or Injury A review of a 12-lead ECG to detect ischemia, infarction, or injury is performed in a variety of situations, including after any episode of chest pain that brings a patient to the physician's office or to the hospital, during hospitalization, during a follow-up examination after a cardiac event, or before conducting an exercise test. Mechanical percussion has been found to be similar in effectiveness to manual percussion.13 Electrically or pneumatically powered percussion devices (Fig. 2001;17(2):102–108. The placement of a nasopharyngeal airway or nasal trumpet may reduce trauma with recurrent blind suctioning procedures in these patients. doi: 10.4037/ccn2011556 PubMed PMID: 21965386. Coyne K.S, Margolis M.K, Gilchrist K.A, et al. Only the first three are discussed within the scope of this chapter.2,5 Etiology The leading cause of penetrating wounds to the thorax is gunshot wounds and stab wounds. Traditionally, the following techniques have been described for use in rehabilitation and outpatient settings; however, they can be useful in the acute care setting as well. Table 10-1 defines the most common PFTs and data obtained. High-cardiac output states. Start now or whenever you are ready." From Singh S, Morgan M, Scott S, et al: Development of a shuttle walking test of disability in patients with chronic airways obstruction, Thorax 47:1019–1024, 1992. 2007;115:387–397. An elevated serum glucose value is suggestive of a prediabetic state and warrants testing for diabetes, such as administration of a glucose tolerance test (performed in the fasting individual following the ingestion of 100 g of glucose). The conducting airways terminate in gas-exchange airways made up of respiratory bronchioles, alveolar ducts, and alveoli (Fig. Maintenance of near euglycemia despite a drastic decrease in insulin dose. Current Medical Diagnosis and Treatment. How c an it be used for groups of patients? Coronary vasomotor response to acetylcholine relates to risk factors for coronary artery disease. 2005;11:208–212. 1987;59(6):634–638. Prescribing exercise by rate of perceived exertion (RPE) is a reasonable alternative to exercise prescription by heart rate; however, the physical therapist must document the physiologic response at the desired RPE. (From Rubinowitz AN, Siegel MD, Tocino I: Thoracic imaging in the ICU, Crit Care Clin 23(3):539–573, 2007.) The silhouette sign (present when the normal line of demarcation between two structures is partially or completely obliterated) may be used to localize lesions within the lung fields (Fig. Nutritional and Biochemical Aspects Nutritional concerns are very important when assessing and treating patients with CMD. Blood pressure and heart rate response to isometric exercise and mental arithmetic in normotensive and hypertensive subjects. Knowledge of the anatomy of these systems provides clinicians with the foundation to perform the appropriate examination and provide optimal treatment interventions for individuals with cardiopulmonary dysfunction. Garrow J.S, Summerbell C.D. Meta-analysis: effect of exercise, with or without dieting, on the body composition of overweight subjects. Holter monitoring tracings must be reliable to capture, recognize, and reproduce any abnormality in heart rhythm, particularly those that threaten life or cardiac hemodynamics. Buse J.B, Ginsberg H.N, Bakris G.L, et al. Use of continuous bispectral EEG monitoring to assess depth of sedation in ICU patients. ■ The impaired contraction of the ventricles during systole that produces an inefficient expulsion of blood is termed systolic heart failure. Physical therapists can also use SBP measurements to predict the severity of PAD by performing an ankle–brachial index (ABI). Dallas: American Heart Association; 1987. FIGURE 5-27 Lung volumes and capacities during pregnancy. However, Belman and Kendregan examined the effects of upper and lower extremity training on ventilatory muscle endurance with adult patients with COPD and found no correlation.49 Clinical tip Surfactant production is reduced postoperatively, making patients at risk for serious pulmonary complications such as pneumonia and respiratory failure. Lateral Costal Breathing Unilateral costal expansion or bilateral costal exercises address one side or both sides, respectively, of the rib cage and corresponding intercostal muscles. Psychologic and physiologic factors related to dyspnea in subjects with chronic obstructive pulmonary disease. Centers for Medicare and Medicaid Services, . Postpolio syndrome affects survivors of polio years (21 plus) after recovery from the initial illness. 1959;108:285– 290. In addition, brand name and generic drugs are available. Therefore use of the short forms or computerized forms will result in similar findings of completion of the entire AM-PAC. Exercise training in patients receiving maintenance hemodialysis: A systematic review of clinical trials. 318. Acting at various sites along the renal tubule or Henle loop, diuretics alter the reabsorption of sodium, consequently affecting the retention of water (Fig. Role of ventilatory drive in asthma and chronic obstructive pulmonary disease. Further, FD6 PET imaging allows for quantification and qualification of regional myocardial tracer distribution. When mobilizing patients with a temporary pacemaker, be aware of the location of the pacemaker and the wires, monitor the patient continuously when being mobilized, keep the area around the pacemaker dry, and check with nurse or doctor regarding restrictions because of underlying pathology. Although these types of tools are in no way a substitute for the supervision and care of a physician, resources such as these are helpful in identifying problem areas and guiding treatment. Berger G.M. High-density lipoproteins, reverse cholesterol transport and atherosclerosis—Recent developments. Validity Desc ribe whic h c onstruc ts or items the test was designed to measure. Philadelphia: WB Saunders; 1991:424–425. Aldosterone antagonist Although also a diuretic, spironolactone is primarily used as an aldosterone antagonist. Ventricular Fibrillation Ventricular fibrillation is defined as an erratic quivering of the ventricular muscle resulting in no cardiac output. 17-2, A1).12 Air is trapped between each cupped hand and the patient's chest with each clap. Patients who demonstrate a progressive rise in diastolic pressure usually have numerous risk factors for heart disease, are deemed high risk for or already have coronary artery disease, or have a previous history of coronary angioplasty or bypass surgery. The impact of a rehabilitation program on functional status of patients with chronic lung disease. Perme C, Nawa R.K, Winkelman C, et al. Shah A.M, Prendergast B.D, Grocott-Mason R, et al. Approximately 50% of patients treated with chemotherapeutic drugs develop some degree of interstitial pneumonitis.25 Some patients who take chemotherapeutic drugs demonstrate pathologic alterations with no radiologic, symptomatic, or physiologic abnormalities. Stigt J.A, et al. Faling L.J. Pulmonary rehabilitation: Physical modalities. Another disadvantage is that many patients feel claustrophobic with the mouthpiece or headpiece and may actually hyperventilate with the mouthpiece. The important components of the evaluation include the amount of movement of the hands, the presence or absence of symmetry of movement, and the timing of the movement (Fig. Regression of left ventricular hypertrophy as a surrogate end-point for morbid events in hypertension treatment trials [published erratum appears in J Hypertens 15(1):103, 1997]. Chest Motion Palpation is performed segmentally to compare the chest wall motion over the upper, middle, and lower lobes while the patient is breathing quietly and while breathing deeply. This effect has been observed repeatedly in patients with CHF and is the result of the interrelationships among the pathophysiologies briefly discussed.5 Table 4-9 Weber classification of functional impairment in aerobic capacity and anaerobic threshold as measured during incremental exercise testing VO2max, peak exercise oxygen consumption. The current availability of herbal medicines without prescription in the United States contributes to their use. Trends Cardiovasc Med. Most sympathetic nervous system postganglionic fibers release norepinephrine (noradrenaline). "Specific drugs" that are poorly tolerated by older persons include class IB antiarrhythmics (see Table 14-12). 1992;15:29–38. Singer J.P, Chen H, Phelan T, Kukreja J, Golden J.A, Blanc P.D. Survival following lung transplantation for silicosis and other occupational lung disease. (Courtesy ARJO Huntleigh International, Inc.) Acutely ill patients with cardiovascular and/or pulmonary impairments often have multiple comorbidities. If a cell has oxygen, a single molecule of glucose can undergo aerobic metabolism and produce 36 adenosines triphosphate (ATP). The sympathomimetics are a group of drugs that mimic the activity of the endogenous catecholamines epinephrine, norepinephrine, and dopamine. non-STEMI, 50, 53–54 angina, 50, 52t See also Angina angina, chronic stable, 50 angina, unstable, 34–40, 50 atherosis, 45–46 clinical course of, 50–57 complications of, 56–57, 57t heart attack, warning signs of, 51f medical management of, 54 natural history of, 57 pathophysiology of, 45–46 prevention of, 57b prognosis for, 57 risk factors of, 46–49, 46b sclerosis, 46 sudden cardiac death, 50, 50b vasospasm, 46 ventricular remodeling, 57 case studies of, 69b cerebrovascular accidents (strokes), 62 physical therapy interventions, 63 prevention of, 62–63 risk factors of, 62 transient ischemic attacks (TIAs), 62 treatments for, 62–63 clinical tips for, 44b, 47b, 59b, 61b coronary arteries, anatomy of, 43, 43f inner layer, 43, 43f middle layer, 43, 43f outer layer, 43, 43f epidemiology of, 43 Framingham Heart Study and, 43, 43b, 46–47 historical 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272, 272b coronary artery disease (CAD) risk factors, 271–272 creatinine, 273, 273b electrolytes, 273 normative values of, 268t serum enzymes, 267–270, 270t LADA, See Latent diabetes of adults (LADA) LAGB, See Laparoscopic adjustable gastric banding (LAGB) Laminar flow, 29–30, 29f Lanoxin, See Digoxin (Lanoxin) Laparoscopic adjustable gastric banding (LAGB), 223–224 Laryngopharynx, 12 Larynx, 12, 12b Latent diabetes of adults (LADA), 227–228 Lateral costal breathing, 551, 554f Lateral thoracotomy, 365 See also Thoracotomy Latissimus dorsi, 6f, 7 LDL, See Low-density lipoprotein (LDL) Left coronary artery, 20, 20f Left lobe lower (LLL), 8 middle (LML), 8 upper (LUL), 8 Left ventricular assist devices (LVADs), 440–441, 441b Lesions acyanotic, 629, 629b cyanotic, 631–632 Leukeran, See Chlorambucil (Leukeran) Level of consciousness, 422–423 LHFQ, See Living with Heart Failure Questionnaire (LHFQ) Life support measures and equipment, 419–444 clinical tips for, 432b–435b, 437b, 440b–442b 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high-frequency oscillatory ventilation (HFOV), 435–443 innovative ventilation systems, 437–438 intrinsic PEEP (PEEPi), 437 mechanical ventilation, 435, 435b, 437t neurally adjusted ventilatory assist (NAVA), 437–438, 438f nontraditional, 435–443 pressure control-inverse ratio ventilation (PC-IRV), 435–443 pressure control ventilation (PVC), 435–443 pressure-regulated volume control (PRVC), 435–443 vs. Patients should be reminded not to inject insulin into muscle but into subcutaneous tissue. FIGURE 5-5 Respiratory changes with aging. 1999;3:1–12. Case study 9-1 A 68-year-old man has a history of an acute myocardial infarction that occurred 7 months ago. 2-10 which represents a specific percentage of oxygen saturation for a given concentration of arterial oxygen. These agents also inhibit the respiratory centers in the medulla and therefore depress ventilation so that lung volumes are significantly reduced. If hyperlipidemia persists, nonstatin therapy, such as niacin, fish oils, fibrates, and bile acid sequestrants, may be added based on an individual's medical profile and response to the side effects of the drugs (Table 14-15). Comm., anterior communicating artery; CCA, common carotid artery; ECA, external carotid artery; E-I anast., extracranial–intracranial anastomosis; ICA, internal carotid artery; MCA, middle cerebral artery; PCA, posterior cerebral artery; PICA, posterior inferior cerebellar artery; Post. His pretransplant treatment program was again begun, and JJ was discharged to home 2 weeks later. FIGURE 16-26 Normal resonance pattern of the chest. J Card Surg. Intermittent claudication is considered a classic symptom during activity. Ventricular dyssynchrony has also been associated with increased mortality in heart failure patients.197 As a result, electrical stimulation (activation) of the right and left ventricles in a synchronized manner can be provided by a biventricular pacemaker device. Restrictive lung dysfunction may be complicated further by persistent patency of the ductus arteriosus, resulting in a left-to-right shunt within the infant's heart. 2014;129:e28–e292. Heart failure is a dominant deficiency of coenzyme Q10 and challenges for future clinical research on CoQ10. Secondary prevention clinics for coronary heart disease: Randomised trial of effect on health. Table 22-2 Summary of patient assessment and outcomes evaluation in cardiac rehabilitation and secondary prevention programs Core component Assessment and outcome evaluation Patient assessment Review medic al history: diagnoses, interventional proc edures, c omorbidities, test results, symptoms, risk fac tors, and medic ations. Examples of β-agonist adrenoceptors are found in Table 14-10. It is attached to the arch of the aorta by the ligamentum arteriosum. If BG levels are low, supplemental carbohydrates may be required to prevent exercise-induced hypoglycemia. Alboliras E.T, Shub C, Gomez M.R, et al. Besides the fixed defect representing the MI in the anterior wall and apex (arrowheads), there is extensive inducible ischemia both within and remote from the infarct territory (septum and inferior walls, arrows), involving 25% of the ventricle. In: Mason R.J, Murray J.F, Broaddus V.C, et al., eds. A common practice is to perform Holter monitoring routinely before discharging any patient who has had an MI, because arrhythmias are commonly associated with coronary disease, ischemia, and injury. 3, Munich, 2012, Urban & Fischer Verlag.)† deceased BO X 21- 8 Unt a ngling t he confusion be t we e n lipe de m a a nd obe sit y Lipedema is not the same as being overweight or obese. Beckett W.S, Wong N.D. Effect of normobaric hyperoxia on airways of normal subjects. www.uptodate.com UpToDate (DOI 11/19/2013). Borg G. The major psychological manifestations are a distorted body image and an unreasonable concern about being "too fat," as well as denial of hunger, fatigue, and emaciation. Actions are increased by other antihypertensive drugs, and some drugs can decrease the effectiveness of lithium. In doing so, the resting dome shape of the diaphragm is reversed to a flattening of the diaphragm. Douglas L.M. Pathophysiology of heart failure. Assessment of cardiac and respiratory function during surgery on patients with acute quadriplegia. Eston R.G, Thompson M. The excision of a tumor or aneurysm is occasionally performed, and the excised area is replaced with Dacron patches.18 Ablative procedures are also used less frequently, but for patients with persistent and symptomatic Wolff–Parkinson–White syndrome or intractable ventricular tachycardia, ablation (e.g., via laser or cryotherapy) of the reentry pathways appears to be very therapeutic.18 The surgical implantation of automatic implantable defibrillators is increasingly common and appears to be of great therapeutic value for those with ventricular tachycardia that is unresponsive to medications and ablative procedures.18 FIGURE 4-24 Left ventricular assist device (LVAD). (A from Linton AD: Introduction to medical-surgical nursing, ed 5, St. Louis, 2012, Saunders. The patient should also be encouraged to continue activity and exercise at whatever level is possible. When used appropriately, these medications can be safe and effective. (From Kacmarek R, Stoller J, Heuer A: Egan's Fundamentals of Respiratory Care, ed 10, St. Louis, 2013, Mosby.) Because all lung volumes are decreased with RLD, all lung capacities are also decreased. Hum Genet. These patients should be alerted that special governmental and industrial programs are available that might help in getting the proper drugs either free or at a greatly reduced rate. Fonarow C.C, Stevenson L.W, Walden J.A, et al. Facial Characteristics Facial expression and effort to breathe are two characteristics that can be observed easily; both give important information for the clinical evaluation of the patient. Did your heart failure prevent you from living as you wanted during the last month by Copyright University of Minnesota, 1986. From: (2008, March 1). Glycoprotein IIb/IIIa (gp2b/3a) inhibitors block platelet receptors from binding to fibrinogen, consequently limiting platelet aggregation. Zillich A.J, Garg J, Basu S, et al. Labels for the ascending, arch, thoracic, and abdominal aorta and their corresponding arteries are shown. Severin P.N, Awad S, Shields B, et al. It is considered to be the gold standard for blood flow measurement and metabolic assessment of the heart, but it requires specialized technologic equipment and highly trained personnel and therefore is extremely expensive and not available at many hospitals.73 Positron emission tomography has the highest resolution gain, yet given the high cost associated with PET imaging, it is unlikely it will become used routinely for cardiac imaging because there are comparable tests that are more widely available and cost less.74 Positron emission tomography is a test that uses a special type of camera and a tracer (radioactive chemical) to examine organs in the body. It is now appreciated that the "shrinkage" of the lower lobes, elevated diaphragms, and bibasilar atelectasis can be attributed largely to diaphragmatic weakness. Surfactant replacement therapy and highfrequency ventilation (HFV) have also been added as traditional treatment approaches. Furthermore, transplantation can be complicated by a number of early and late immunologic, surgical, and medical events, as well as problematic side effects of the immunosuppressive medications that are required. However, it seems to be more severe and unrelenting in patients with pulmonary or cardiac involvement.33,35,63 Diagnostic Tests Internal malignancy must first be ruled out, as diagnosis is difficult and can present like several other diseases. (Accessed December 19, 2014.) 300. (Courtesy Dr. R.H.K. Ströbenreuther†, Ottobrunn. However, because walking is a functional activity, the muscles do not fatigue as rapidly as they do with cycling, and therefore the treadmill is considered to have greater diagnostic benefits. Drugs that increase arterial lumen size by decreasing either coronary arterial spasm or thrombus increase myocardial oxygen supply. Pirfenidone is an antifibrotic medication currently marketed as Esbriet and similar to Ofev. A rate above this range is termed tachypnea and a rate below this range is termed bradypnea (Box 13-3).6 Along with the rate, the pattern and depth of breathing should be assessed (Box 13-4). (From McCance KL, Huether SE, Brashers VL, et al, editors: Pathophysiology: The Biologic Basis for Disease in Adults and Children, ed 6, St. Louis, 2010, Mosby.) Lung Receptors There exist three types of receptors on the lung that send signals to the respiratory centers within the brainstem: 1. ■ Lipedema (in contrast to lymphedema) is a disorder characterized by a gradual symmetrical accumulation of fat in the subcutaneous tissue, typically found only in women, where it is usually located in the buttocks and lower extremities. The use of imaging techniques such as thallium-201 or sestamibi scanning and SPECT allows for greater diagnostic accuracy and sensitivity, particularly in individuals with atypical chest pain syndromes, or in females who demonstrate low sensitivity to exercise testing alone.143,145,146 Two-dimensional echocardiography is often used immediately after exercise testing as well. Cardiac Catheterization Data Cardiac catheterization, which is an invasive diagnostic procedure, provides information about the anatomy of the coronary arteries and can provide a dynamic assessment of the cardiac muscle. Crackles Crackles are discontinuous adventitious lung sounds that sound like brief bursts of popping bubbles. 2009;13(3):252–256. The disease is twice as common in women.53,63 Pathophysiology Approximately 5% to 20% of patients exhibit involvement of the lung parenchyma.30 Aspiration pneumonia is the most common pulmonary abnormality and is seen in 15% to 20% of patients.30 Other changes can include interstitial pneumonitis and fibrosis, bronchiolitis obliterans, or diffuse pulmonary infiltrates. 1997;27:325–351. 1989;26:673–752. Another goal of pharmacologic therapy in these individuals is to achieve "immune tolerance," whereby the immune system is "shut down" just enough to control organ rejection yet not shut down enough to affect the individual's ability to fight infection or develop cancer. 1996;11:409–413. As the diaphragm flattens, its ability to contract and relax affects the individual's ability to perform a normal passive exhalation. Venodilators, such as morphine sulfate or sodium nitroprusside, and diuretics, such as furosemide, are used to decrease the venous return and decreased afterload. 1997;31:114–119. One study looked at hs-CRP levels in individuals who took aspirin regularly versus those who did not take aspirin and found that hs-CRP levels were predictive of MI in those who did not take aspirin.40 Normative values for hs-CRP are less than 1.0 mg/L, indicating a person has a low risk of developing cardiovascular disease. As fluid is retained and the heart's ability to pump is further compromised, the retained fluid "backs up," not only into the lungs, but also into the venous system, of which the jugular veins are the simplest to identify and evaluate. For these patients, the following two formulas are recommended: for males, 205 − 1/2 age; for females, 225 − age.27 Therefore, if an individual were performing near maximal capacity, it is reasonable to expect the measured maximal heart rate to approximate predicted maximal heart rate. Recurrent hemorrhages can lead to interstitial fibrosis. 1996;15(1). 2003;30(2):109–113. Seemingly simple items such as reading drug labels, removing bottle caps, or distinguishing pill color can present major obstacles to visually impaired or physically disabled elderly patients. Half-Life The elimination of most drugs follows first-order kinetics, and the time it takes for the plasma concentration of the drug to be reduced by 50% is known as the half-life. Pulmonary complications of chronic neuromuscular diseases and their management. Does the patient or caregiver learn best by reading, watching a demonstration, physically performing the task, or a combination of methods? The left lung is relatively smaller than the right lung and has only two lobes, including the left upper lobe (LUL) and left lower lobe (LLL). It is recommended to start working at 20% to 30% of PImax. Mancini D, Eisen H, Kussmaul W, et al. Inpatient education is usually inadequate as well, as individuals do not retain what they are taught in the hospital. Life Support Equipment Noninvasive Ventilatory Devices Noninvasive Positive-Pressure Ventilation Noninvasive positive-pressure ventilation (NPPV) is a form of mechanical ventilation that uses a mask instead of an artificial airway. 2011;378(9807):1949–1961. (Courtesy Respironics, Inc., Murrysville, PA.) Bilevel positive airway pressure delivers two levels of pressure. Those who develop communityacquired pneumonias usually have been infected with an exceedingly virulent organism or a particularly large inoculum or have impaired or damaged lung defense mechanisms.32 Table 5-9 Clinical manifestation of asbestosis DLCO, diffusing capacity of the lungs for carbon monoxide; FEV1, forced expiratory volume in 1 second; RV, residual volume; TLC, total lung capacity; VC, vital capacity. 128. Neurol Clin. Within the physical therapy department, avoiding situations that may bruise the patient is very important for all patients but particularly for diabetic patients. Oppenheimer S.M, Hachinski V.C. The cardiac consequences of stroke. In its course, the anterior interventricular artery gives off right and left anterior ventricular and anterior septal branches. In both cases, smooth muscle constriction is reversed. Evaluation of Legs for Life National Screening and Awareness Program for Peripheral Vascular Disease: Results of a follow-up survey of screening participants. Development and prospective validation of a clinical index to predict survival in ambulatory patients referred for cardiac transplant evaluation. With these considerations, furosemide (in bolus or continuous infusion) is generally effective to achieve diuresis, sometimes with the addition of intravenous thiazides.129 Aldosterone Antagonists Aldosterone antagonists (e.g., spironolactone) are often added to the medical regimen of individuals with mild-to-moderate symptoms of heart failure in addition to other diuretics.23 Digoxin (Lanoxin) and Other Positive Inotropic Agents Digoxin (digitalis) is one of medicine's oldest drugs, and most of the digitalis drugs in use today are steroid glycosides derived from the leaves of the flowering plant foxglove, or Digitalis purpurea. 85. ed 7. Antihistamines Treatment of the respiratory allergic responses associated with seasonal allergies is one of the most common uses of antihistamines. Manifestations of transplant allograft vasculopathy include myocardial infarction, congestive heart failure, and sudden cardiac death. Males with CRP levels in the highest quartile may have a fivefold increase in risk of developing an MI. Respiratory Physiology The Essentials. 1991;18:I153–I160. New Orleans, LA: Presented at the American College of Cardiology, 48th Scientific Session; March 7–10, 1999. Because MS can cause focal lesions anywhere in the CNS, different patterns of respiratory impairment can occur but are relatively rare. The tidal volume is measured under resting conditions. Alteration in Drug Elimination Newborns and infants show different pharmacokinetics. Once communication is established, tools for assessing dyspnea can be utilized. Exerc ise with c ontinuous positive airway pressure (CPAP) Breathing exerc ises Exerc ise program set at a spec ific perc entage of the maximal inspiratory pressure or maximal expiratory pressure (similar to aerobic exerc ise training) with a devic e that resists either inspiration or expiration. Adult patients may be able to complete it independently or may require assistance of the physical therapist. 2006;25(7):745–755. What is the level of pain she is describing? However, if the tracing appears to be ventricular fibrillation, the patient does not have a long-term history of recurrent ventricular tachycardia or ventricular fibrillation, and the patient is able to carry on a conversation, the therapist should assume this is probably only lead displacement creating an artifact. The KCCQ provides patients and clinicians with a disease-specific approach used to evaluate and appropriately monitor and treat those with heart failure. Interpreting pulse oximetry values must take into consideration the factors that can provide false readings (Box 13-2).3 A published algorithm see Fig. Dementia or physical inability may also hamper adequate utilization of cardiovascular drugs. Fiveyear survival rates after lung transplantation in IPF are estimated at 50% to 56%. For the paired t-test, p = 0.10 to 0.77, showing that there was no significant difference between the two episodes of filling out the questionnaires. Most patients with an ABI in the range of 0.51 to 0.90 will typically present with some form of claudication, but can be asymptomatic. Arrhythmias are recognized clinically as irregularities in the rhythm of the heartbeat on palpation, auscultation, or electrocardiographic tracing. 97. Mainstem and lobar bronchi. Copyright Gunnar Borg. Furthermore, given that patients with CKD often have CVD and DM, they are often taking multiple medications that may have adverse effects on exercise responses and tolerance, which are also described at the end of the section on diabetes. The tool can screen for patients who present with multiple risk factors or as an objective measure that provides solid data on outcomes from physical therapy intervention. A review of the metabolic syndrome. The responses should be recorded and interpreted throughout the entire evaluation. Several airway clearance techniques are effective in the mobilization of secretions, including postural drainage and percussion (avoiding Trendelenburg positioning), shaking, manual hyperinflation, the active cycle of breathing, and use of the flutter valve.53 Because the transplanted lung is denervated, the patient may not be able to sense the need to cough and should be taught to cough on a regular schedule (directed coughing techniques). • Keep items within easy reach. 17-7). Fibrothorax is an encasement of the lungs with fibrous tissue that obliterates the pleural cavity. Gardner R.M. Accuracy and reliability of disposable pressure transducers coupled with modern pressure monitors. Radiation responses are seen first in cells with rapid rates of cell replication. Percussion Chest percussion aimed at loosening retained secretions can be performed manually or with a mechanical device (see Table 17-3). Microvasc Res. Therefore fatigue should never be the only symptom the therapist uses to make a clinical decision regarding exercise prescription or progression. In critically ill patients who experience frequent episodes of hypotension, the pressure gradients between the artery and the vein are too weak to create a significant driving pressure necessary to achieve adequate filtration rates. Learning is a continuous process, and technology and treatment are forever improving; therefore this text provides clinicians as well as educators with the most current information at the time of publication. Intravenous amrinone in left ventricular failure complicated by acute myocardial infarction. Harvey N.L, Srinivasan R.S, Dillard M.E, et al. Sherrod M.M, Graulty R, Crawford M, Cheek D.J. Intravenous heart failure medications: an update for home health clinicians. 1995;107:144–149. 1989;17:143–147. However, other symptoms occur with chronic obstructive disease that will be discussed in this chapter. This content provides the basis for an understanding of the pathophysiology of these systems and lays a foundation for the development of relevant examination and treatment strategies to use when managing patients with cardiopulmonary dysfunction. 4-15 illustrates

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arrhythmias, 80 cardiomyopathies, 80–82, 81f, 81t See also Cardiomyopathies coronary artery disease (CAD), 79–80 heart disease, congenital vs. The ABI has been found to have high validity, high intra- and interrater reliability, and high sensitivity and specificity for diagnosing lower extremity ischemia by using either a stethoscope or handheld Doppler ultrasound unit (Box 22-4).59,60 BO X 22- 4 Inst ruct ions for pe rform ing t he a nkle bra chia l inde x 1. Currently MRI is being used for assessment of valvular disease, cardiac shunts, quantification of cardiac flow, and coronary artery anatomy.102 Fayad demonstrated that the human coronary vessel wall could be noninvasively imaged in vivo with MRI, thereby providing a technique to show atherosclerotic plaque without the use of coronary angiography.103 Future work with MRI indicates it may be the choice for detection of vulnerable plaque before an acute clinical event.103,104 Yang et al assessed the new cardiac MRI (CMRI) system, comparing it with echocardiography.105 The new CMRI system allows for continuous real-time dynamic acquisition and display. Victor R. Treatment Treatment is defibrillation as quickly as possible followed by cardiopulmonary resuscitation, supplemental oxygen, and injection of medications. 1987;75(2):331–339. Compliance The lung can be compared with a balloon during inspiration, where there exists a tendency to collapse or recoil while inflated. Sciurba F.C, Rogers R.M, Keenan R.J, et al. Assessing coping strategies: A theoretically based approach. The instructions for the 6MWT are based on guidelines created by the American Thoracic Society.146 Table 22-4 Comparison of measurement instruments Key: Under “Self”, yes = self-administered, no = structured interview. In fact, this dysfunction may result from many different diseases arising from the pulmonary system or almost any other system in the body. Longitudinal changes in cardiovascular risks from childhood to young adulthood in offspring of parent with coronary artery disease: The Bogalusa Heart Study. 1-16, B), and left ventricle (see Fig. As pulmonary edema worsens (B), fluid fills the alveoli, and “air bronchograms” (arrows) become apparent. Because of the increased acuity level of patients being discharged from the acute care setting, an increasing involvement of family members is needed in determining the site for the next level of care. Overall, it will increase the proportion of fatigue-resistant slow-twitch fibers.41,42 The recommendations include two to three daily sessions of 30 to 60 minutes of deep breathing, concentrating on using a diaphragmatic breathing pattern.18 An early-stage IMT technique is sniffing. To maintain inflation, the transmural pressure, or pressure difference between the intrapulmonary pressure and intrapleural pressure, must be maintained. Prevalence estimates have varied from 2 to 29 cases per 100,000 in the general population, and more men have been reported with IPF than women.17 Etiology The cause of IPF is unknown; however, it appears to be a disease that likely arises from the interplay between genetic and environmental factors.16 Initially, the disease was thought to be a chronic inflammatory process. Traumatic Causes Crush Injuries Crush injuries to the thorax are usually caused by blunt trauma that results in pathologic damage, particularly rib fractures, flail chest, or lung contusion.2 Etiology The leading cause of blunt trauma to the thorax is motor vehicle accidents. 2005;23:463–473. Multiple factors determine the demand for myocardial oxygen, such as afterload, systolic wall tension, wall thickness, contractile state, preload, heart rate, and LV volume and diameter. 2009;11(2):110–115. ■ Obesity is associated with both pulmonary and CV dysfunction, and obese individuals usually exhibit abnormal physiologic responses to exercise and reduced exercise tolerance. Optimal function of the left ventricle is essential for an effective CO. The effect of primary graft dysfunction on survival after lung transplantation. Internal Intercostal Muscles Eleven internal intercostal muscles exist on each side of the sternum. Discussion This case demonstrates changes in the heart rhythm with increased activity. Wood-Dauphinee S. In 2012 whereas only 29 heart–lung transplants were performed in the United States, 78 heart–kidney, 22 heart–liver, and 1 heart–liver– kidney transplant surgeries were performed.24 Similar to heart transplantation, lung transplants are being offered to older patients; from 2000 to 2005, 3% of recipients were over 65 years of age and 0.3% were older than 70 years of age, compared with 10% and 3%, respectively, from 2006 to mid-2012.112 The use of mechanical circulatory support systems has continued to increase and has enabled critically ill patients to survive long enough to receive organ transplantation. It is beyond the scope of this chapter to describe the predictive values for every potential population. The laryngopharynx extends from the upper border of the epiglottis to the inferior border of the cricoid cartilage and the esophagus. ■ Many neurologic and neuromuscular diseases and disorders are associated with pulmonary and cardiac complications, and symptoms often do not correlate well with the degree of dysfunction in slowly progressive disorders. Diamond J.M, Lee J.C, Kawut S.M, et al. However, because of the rapid increases in speed and the fact that the subject starts on a 10% grade, the average time a nontrained subject actually exercises during the test is between 6 and 12 minutes. Milrinone (Primacor) and inamrinone (Inocor; previously amrinone) belong to this group of inotropes. Clinical manifestations include higher resting HR and reduced HR variability, orthostatic hypotension, impaired exercise tolerance, and painless myocardial ischemia and infarction (due to cardiac denervation). 171. The pattern of ventilation during sleep is irregular more often in the elderly than in young adults. See Box 8-4 for contraindications to testing and low-level testing. Nunn’s Applied Respiratory Physiology. These receptors are stimulated when carbon dioxide concentrations rise in the cerebrospinal fluid. Gait Speed Test 4. Drugs That Increase Myocardial Oxygen Supply Pharmacologic interventions to increase myocardial oxygen supply in CAD are limited. 22-2, A). Williams P.T. Vigorous exercise, fitness and incident hypertension, high cholesterol, and diabetes. She requires moderate assistance to roll supine, right side; maximal assistance to roll to left; and maximal assistance of one to come to sitting at edge of bed. This fluid, which is a filtrate created in the pleural capillaries and lymphatics, is mostly reabsorbed by the lymphatics of the parietal pleura. Breathing Strategies, Positioning, and Facilitation Therapeutic Positioning Techniques and Ventilatory Movement Strategies Employing therapeutic positioning techniques and ventilatory movement strategies can assist with the progression from dependence to independence in mobility and breathing.18 The techniques involve selecting positions to assist the patient with efficient, diaphragmatic breathing patterns. J Chronic Dis. Data from Smeltzer SC, Bare BG, Hinkle JL, et al, editors: Management of patients with neurologic dysfunction. It is reported most commonly in children. S uggestions for use in the c linic Provide suggestions for test administration or interpretation in c linic al settings. Out-of-bed activities are contraindicated until the IABP catheter is removed or relocated to the left axillary/subclavian artery. Patients with CAD may develop myocardial ischemia with mild anemia. On May 15, a DDD pacemaker (permanent) with rate modulation (upper heart rate [HR] limit = 120 bpm) was placed. FIGURE 6-6 Subtypes of emphysema. 1993;13(5):344. 144. Antiremodeling effect of long-term exercise training in patients with stable chronic heart failure: Results of the Exercise in Left Ventricular Dysfunction and Chronic Heart Failure (ELVD-CHF) Trial. See Table 16-16 for a summary of normal responses to activity. Exercise training improves overall physical fitness and quality of life in older women with coronary artery disease. Body substance precautions such as gowns, masks, gloves, and goggles apply to the performance of airway clearance techniques. Women who were defined as having a moderate to high risk of stroke demonstrated a 17% reduction in risk with the inclusion of aspirin in their daily regimen as defined in the Women’s Health Study.259 Aspirin in combination with sustained-release dipyridamole was found to reduce risk of a second stroke by 37%.255,260 Anticoagulation (warfarin/Coumadin) has been used for years to reduce the risk of a first event of embolism due to conditions like mechanical heart valves, atrial fibrillation, and cardiomyopathy; however, the Warfarin-Aspirin Recurrent Stroke Study (WARSS) found a slight advantage with the use of aspirin compared with warfarin for prevention of a second stroke because of the risk of bleeding complications with warfarin and the need for additional monitoring.261 The role of statins is well documented in the management of patients with CAD and is also well documented in the primary prevention of stroke. Cardiac Arrhythmias Cardiac arrhythmias can also cause CMD for reasons similar to those given for myocardial infarction.5 Extremely rapid or slow cardiac arrhythmias can impair the functioning of the left or right ventricle, or both, and an overall CMD ensues. Measurement of walking endurance and walking velocity with questionnaire: Validation of the walking impairment questionnaire in men and women with peripheral arterial disease. The recommendation is to keep the O2 saturation above 90% during exercise unless otherwise ordered by the physician. Pleurisy is the most prevalent pulmonary complication, occurring in at least 45% to 60% of patients at some time during the disease228; it is often asymptomatic but sometimes causes recurrent or intractable pleuritic chest pain, pleural rub, and effusion. Rheumatoid (necrobiotic) nodules usually occur subpleurally in the upper lung fields or in the interlobular septa. Therefore the differential WBC count is important to assess in order to determine possible causes of the abnormal WBC count. The interstitial fibrosis is progressive and nonreversible. 1990;11(2):247–257. Immobility, hypoxemia, and pulmonary arteriovenous shunting. Serial ECG monitoring provides a historic record of the patient’s cardiac injury and rhythm disturbances and allows the correlation of the history of rhythm disturbances with changes in medications or medical status. The inner intrapulmonary pressure is relatively greater than the outer intrapleural pressure, allowing the difference in pressure (the transmural pressure) to maintain the lung near the chest wall. Barrett-Connor E, Khaw K. The six-minute walk test predicts peak oxygen uptake and survival in patients with advanced heart failure. 1993;73:787–796. 1998;114:827–833. 1954;6:506. It results in air and blood escaping from the lung into the pleural space and often into the environment. As such, COPD often is a term given to individuals who have a combination of diseases identified as emphysema, chronic bronchitis, and bronchoconstriction or asthma. In addition, a sedentary elderly person beginning regular exercise can improve maximum oxygen consumption by 5% to 25% and can regain the exercise capability that was present as much as 5 to 10 years earlier.11 Table 5-3 Comparison of obstructive and restrictive types of pulmonary diseases Characteristic Anatomy affec ted Obstructive disease Airways Restrictive disease Lung parenc hyma, thorac ic pump Breathing phase diffic ulty Expiration Inspiration Pathophysiology Inc reased airway resistanc e Dec reased lung or thorac ic c omplianc e Useful measurements Flow rates Volumes or c apac ities Pulmonary Causes of Restrictive Lung Dysfunction Interstitial Causes Idiopathic Pulmonary Fibrosis Idiopathic pulmonary fibrosis (IPF) is a chronic, progressive, irreversible, and usually lethal lung disease. Table 22-8 Functional tasks related to gait speed From Studenski SA, Duncan PW, Richards L: Performance measures in the clinical setting, J Am Ger Soc 51:1–10, 2003. An inflatable cuff is attached to a pressure monitoring device. The following are step-by-step instructions for turning an intensive care patient onto the left side. 1988;61(4):371–375. They result in tissue ischemia–reperfusion injury and infarction that affect nearly all organs, particularly the spleen, kidneys, CNS, bones, liver, lungs, and heart, leading to progressive systemic vasculopathy and chronic organ failure. Johnson B. Mitral valve prolapse, panic disorder, and chest pain. Table 8-6 The 12-minute walk/run test, which identifies fitness category for the distance covered in 12 minutes M = Male; F = Female. Monitoring cardiopulmonary parameters before, during, and after activity allows the therapist to provide the safest and most effective treatment intervention. Downs A.M. Physical therapy in lung transplantation. Curr Opin Pulm Med. Wood P.D. Physical activity, diet, and health: Independent and interactive effects. All chapters have been revised as well as supplemented with many figures and tables and some videos to help the learner visualize the written information. Rib fractures are extremely painful because of their profound nerve supply. Baltimore: Lippincott Williams & Wilkins; 2006:212–213 210. 2007;25:3391–4008. Clot formation occurs through a series of complex interactions involving platelets, tissue thromboplastin, clotting factors, prothrombin, fibrinogen, and fibrin. This response is exaggerated in the infant and causes severe pulmonary hypertension, increased ventilation–perfusion mismatching, and decreased gas exchange. 269. Yang K.L, Tobin M.J. A prospective study of indexes predicting the outcome of trials of weaning from mechanical ventilation. 2003;348:683–693. The greater the first-pass effect, the less is the bioavailability of the drug. ■ Dyspnea is probably the most common finding associated with CHF. Insufflation and exsufflation pressures are almost always from +35 to +60 cm H2O to −35 to −60 cm H2O. Warfarin interferes with the vitamin K–dependent activation of clotting factors II, VII, IX, and X. It is advisable to use a draw sheet to avoid shearing forces on the patient’s skin. The bony thorax provides a skeletal framework for the attachment of the muscles of ventilation. 2005;165(10):1173–1178. Changes in these symptoms (e.g., worsening of symptoms vs. Transverse plane: cross-sectional view at Level 1a depicts the proximal ascending aorta (Ao), main pulmonary artery (MPA), and left and right pulmonary arteries (LPA and RPA, respectively). Hammon W.E, Martin R.J. Chest physical therapy for acute atelectasis. Heart rhythm (the presence or absence of rhythm disturbances) can also be evaluated if palpated continuously for at least 1 minute, but is more accurately recorded via the ECG. Beneficial effects of combined colestipol-niacin therapy on coronary atherosclerosis and coronary venous bypass grafts [published erratum appears in JAMA 259(18): 2698, 1988]. Extracorporeal membrane oxygenation for ARDS in adults. Both splitting sounds are considered normal and are indicative of slight timing differences between closure of the left heart valves and the right heart valves. In addition, the collection of physiologic measures, such as blood pressure, heart rate, respiratory rate, oxygen saturation, ankle–brachial index, lung and heart sounds, and rate of perceived exertion (RPE/Borg scale), is essential to providing safe and appropriate interventions and quantifying outcomes. 1987;75(Suppl IV):93. Management of bone loss after organ transplantation. Furthermore, this response should be distinguished from that found in an individual who is hypertensive at rest yet exhibits a normally increasing systolic blood pressure during increasing levels of exertion.30 Although the mechanism for the hypertensive blood pressure response is not fully understood, it may be related to the following: an increased plasma concentration of catecholamines, an increased resistance to blood flow arising from peripheral vascular occlusive disease, or an abnormal centrally mediated resting vasomotor tone. 17-10). 304. If the patient is able to perform this effectively, the progression of this technique is to reduce the number of sniffs from three down to one at an increasingly slower pace. Individuals with restrictive defects will demonstrate small lung volumes and possibly reduced FVC because of the lack of muscle strength (as in a patient with pneumonia or severe pulmonary fibrosis). The living with asthma questionnaire. Medical testing consisting of ventilation/perfusion scan or computed tomography (CT) pulmonary angiogram can be used for medical diagnosis of a PE. F is a 65-year-old referred for gait training. The right bundle branch (RBB) is thin, with relatively fewer branches proceeding inferiorly to the apex of the right ventricle. However, when the left atrial pressure rises above 30 mm Hg, these protective mechanisms are overcome.32 The interstitial edema fluid disrupts the tight alveolar epithelium, floods the alveolar spaces, and moves through the visceral pleura, causing pleural effusions. Kerse N, Falloon K, Moyes S, et al. Coronary heart disease in type 2 diabetic patients: Common and different risk factors in men and women. Defining and setting national goals for cardiovascular health promotion and disease reduction: the American Heart Association’s strategic Impact Goal through 2020 and beyond. Compliance describes the distensibility of lung tissue. This AP is found in sinoatrial and atrioventricular nodal cells. Kelley G.A, Kelley K.S. Vu Tran Z. Thromboemboli travel through the right side of the heart to reach the lungs. ■ A cerebrovascular event is defined as a TIA if symptoms resolve completely within 24 hours, and as a stroke if deficit results after 24 hours. Individuals who experience vasospasm often develop resting chest pain, making the classic definition of angina inappropriate.38 In the case of variant angina, an individual is more likely to have discomfort that is due to emotional upset or inspiration of cold air. Only amiodarone and dofetilide have been shown to not adversely affect survival. It is important to remember that the suction catheter can reach only to the level of the mainstem bronchi. Campbell J.H, Campbell G.R. Cell biology of atherosclerosis. 163. Cardiac involvement, which is also more variable and unrelated to the extent of the musculoskeletal disease, is often more severe than in DMD.245,277,280 Dilated cardiomyopathy, bundle branch block, complete heart block, or tachyarrhythmias may develop.280,281 About 30% of patients develop dilated cardiomyopathy and CHF, and some patients have received heart transplants.281,282 Respiratory impairment develops similar to DMD, although its onset is later and its course is more slowly progressive. The reader is referred to standard radiology texts for more detailed information. Cottrell G.P, Surkin H.B. Pharmacology for Respiratory Care Practitioners. Supportive therapy consisting of rest during the acute phase, with proper positioning, pain relief, good nutrition, and ventilatory support, as needed, appropriate. Two of the bronchial epithelial cells are mucus secreting: the mucous cells and serous cells.15 Mucous cells, formerly called goblet cells, are normally more numerous in the trachea and large airways, becoming less numerous with distal progression, until they are infrequently found in the bronchioles. A network of elastin and collagen fibers within the alveolar wall and surrounding bronchi and pulmonary capillaries provides for the elastic properties of the lung. Clinical Medical Surgical Nursing. Nonetheless, studies evaluating the specificity and sensitivity of stress testing have suggested that in appropriately chosen populations, it can be very helpful in identifying coronary disease and defining its severity.125 Sensitivity is the measure of the reliability of stress testing in identifying the presence of disease. New Era of Reperfusion. These patients are often positioned in side-lying for respiratory and integumentary considerations. A wireless ICD called the S-ICD is available. Pedersen B.K, Saltin B. It lies obliquely (diagonally) in the mediastinum, with two-thirds lying left of the midsagittal plane. A patient with poor strength will find it difficult to exercise with the head of the bed elevated; a supine position will prevent the abdominal contents from pushing up on the diaphragm and limiting its excursion. Direct evidence that reverse cholesterol transport is mediated by high-density lipoprotein in rabbit. Wise R.A, Brown C.D. Minimal clinically important differences in the six-minute walk test and the incremental shuttle walking test. Thromb Res. One recent study looked at evaluating low-risk patients admitted to the emergency department with chest pain to see if cardiac CT scans could rule out coronary ischemia and reduce the length of stay and hospital charges.81 Individuals who were admitted with chest pain who were identified as low risk and who had negative cardiac CT scans were discharged earlier and with reduced hospital charges, indicating that CT scans might prove beneficial for some patients admitted with chest pain.81 Single-Photon Emission Computed Tomography Single-photon emission computed tomography is a method to detect and quantify myocardial perfusion defects and contractility defects and is used in conjunction with radioactive isotopes.82 It uses newer gated tomographic techniques and can be performed with the use of sestamibi (a radioactive perfusion agent) to improve the view of a myocardial perfusion study. GJC2 missense mutations cause human lymphedema. 1995;11:591–611. Cardiovascular and Pulmonary Physical Therapy: An Evidenced-Based Approach. Although antiarrhythmic agents can reverse lethal rhythms, it is unclear that these drugs promote longevity. Because the alveoli are not well ventilated, the patient is prone to atelectasis, particularly in the dependent lung regions, which could lead to recurrent pulmonary infections. Therefore the chest wall goes up and down, but there is no outward expansion. New instrument for transvenous cardiac biopsy. The large majority of abdominal aortic aneurysms (AAAs) arise below the renal arteries and are known as infrarenal aneurysms. An alteration in the conduction pathway subsequently alters the mechanical activity of the heart and reduces cardiac output. D, Capillary wedge pressure waveform. It is used in the management of heart failure, not for its diuretic effect, but for its secondary effect of suppression of aldosterone. 1989;76(5):374–383. The Captopril-Digoxin Multicenter Research Group. 2006;2:CD004002. Etiology of sarcoidosis: Does infection play a role? . Visfatin, an adipocytokine with proinflammatory and immunomodulating properties. with a distinc t tapping 4 S ounds bec ome muffled Diastolic pressure in c hildren younger than 13 years of age and in adults who are exerc ising, pregnant, or have hyperthyroidism (see phase 5). Neurology. 1990;16(3

indication of decreased circulation to these areas because of cold, vasospasm, peripheral vascular disease, or decreased cardiac output. Decreased BUN values may indicate starvation, dehydration, or even other organ dysfunction such as liver disease. When the patient arrives the next day, she complains of chest discomfort. Clin Sports Med. The goal of IMT is to increase the ventilatory capacity and decrease dyspnea. 1988;259(4):539–544. Extracorporeal membrane oxygenation as a first-line treatment strategy for ARDS. The Bruce protocol (Table 8-9) is probably most widely used in the clinical setting of hospitals because it provides normative data in the form of a nomogram to calculate functional aerobic impairment (Fig. Intensity should be monitored via level of dyspnea or perc eived exertion. Patients may also take on a forward-leaning posture to improve exhalation (Fig. dietary protein, weight loss, and weight maintenance. Patient is independent with home exercise program. For example, dyspnea and angina are associated with both impaired physical and psychological functioning.4 In patients undergoing percutaneous coronary intervention, quality of life was found to be decreased 3 months following the intervention.5 Koch and associates evaluated 6305 patients who underwent coronary artery bypass graft and found a significant association between poor postoperative HRQL during recovery from cardiac surgery and reduced long-term survival.6 Azevedo and colleagues evaluated 424 adults with heart failure and found that quality-of-life scores significantly lowered as heart failure stages progressed.7 Depression and anxiety are not only linked to cardiac surgery and coronary artery disease,8–10 but also predict less compliance during phase II cardiac rehabilitation.11,12 Finally, depression and anxiety were found to predict HRQL in individuals with COPD.13 Rehabilitation and exercise, however, have been linked with improvements in exercise capacity, physiologic response to exercise, quality of life, and decreased symptoms of anxiety and depression among patients with various forms of cardiovascular or pulmonary dysfunction. Much controversy has surfaced regarding the efficacy of IMT since its introduction into clinical practice. Reduction in preload may also decrease myocardial oxygen demand by decreasing ventricular volume, thus improving the length–tension relationship of the myocardial fibers. 1964;188:1132–1140. Although an extended explanation for each of these measures is beyond the scope of this chapter, references for these functional outcomes measures can be found in Table 22-4. Sternocleidomastoid Muscle The sternocleidomastoid arises by two heads (sternal and clavicular from the medial part of the clavicle), which unite to extend obliquely upward and laterally across the neck to the mastoid process. Morrow G, Chiarello R, Derogatis L. Morillas P, Cordero A, Bertomeu V, et al. Current information now lists the high-density lipoprotein (HDL) and low-density lipoprotein (LDL) levels, as well as the ratio of total cholesterol to HDL cholesterol. They can be roughly divided into agonists that stimulate a receptor and enhance a physiologic effect or antagonists that inhibit a receptor and decrease a physiologic effect. Moreover, at least 11 different criteria can be found in the literature to define obstruction.24,25 In addition to determining the pathophysiological effects of lung disease, pre- and postbronchodilator spirometry findings can assist the physical therapist in monitoring and instruction of exercise in patients with reversibility of obstruction. Atrial abnormalities are present in all patients with X-linked scapuloperoneal myopathy (Emery–Dreifuss dystrophy) and result in sinus arrest, atrial arrhythmias, varying atrioventricular block, and permanent atrial paralysis with junctional bradycardia. Clin Pharm Ther. After ambulating 150 feet, she complains of moderate discomfort in her right calf, which quickly subsides during rest. pneumoniae is more common in the elderly; in alcoholics; and in those with asplenia, multiple myeloma, congestive heart failure (CHF), or chronic obstructive lung disease. Impairment in cilia in the airways to assist in secretion removal occurs due to cigarette smoke, and alveolar macrophages within the lung parenchyma can be permanently destroyed, increasing the risk of infection. A controlled trial of digoxin in congestive heart failure. 2008;94:290–295. The first rib does not usually fracture, as it is protected posteroinferiorly by the clavicle. Gosselink R, Dal Corso S. The walls of veins are thinner and less rigid with a larger lumen diameter than arteries. Corticosteroid use and deconditioning associated with prolonged bed rest74,75 can cause electrical inexcitability of nerves and muscles with reversible muscle weakness. The normal value for adult males is approximately 160 to 180 L/min; it is slightly lower in adult females. Just posterior to the cardiac impression is the hilus, where the structures forming the root of the lung enter and exit the parenchyma. Examples of activities that could be performed in the hospital are bed mobility, standing, transfers, ambulation, stairs, balance exercises, stationary bike, pedal exerciser, recumbent bike, upper body ergometer, and treadmill. The leads that demonstrate the presence of T-wave inversion, ST-segment changes, or Q waves identify the location of the ischemia, injury, or infarction. Dolovich M, Rossman C, Chambers C, et al. If the individual is well trained (participates regularly in an aerobic exercise activity), the rate of heart rate rise is much more blunted (Fig. The vast majority of patients with ischemic stroke also have CVD, particularly HTN and CAD, although most patients are asymptomatic and not diagnosed; CVD is responsible for the majority of deaths following TIAs, stroke, and carotid endarterectomy.255–258 There is also some evidence that both hemorrhagic and ischemic strokes are associated with nonischemic cardiac damage, most likely related to stress-induced release of catecholamines and possibly corticosteroids.259,260 The usual lack of clinical symptoms in hemiplegic patients is probably due to their low level of physical exertion; however, strenuous exertion or PT activities may elicit dyspnea and other signs of exercise intolerance, especially when lying flat. Because the isoenzymes PDE3 and PDE4 are found in airway smooth muscle and inflammatory cells, selective inhibitors of these isoenzymes may add to the therapy of chronic airflow obstruction with fewer adverse reactions. Lederer D.J, Kawut S.M, Wickersham N, et al. In: Hurst J.W, Alexander R.W, Schlant R.C, eds. A recent Cochrane Review reported that people in supervised exercise programs improved their distance of walking significantly more (up to 180 meters) than those in unsupervised exercise programs.284 Box 3-7 provides additional exercise recommendations. 2-3).10 The initial abrupt increase in ventilation is a result of sensory input conveyed from receptors within peripheral joints and muscles, whereas the secondary gradual increase in ventilation is a result of changes in pH within the blood caused by increased lactic acid production. 1999;31:S547– S552. Treatment It is becoming better recognized that obesity is a very complex disorder. While the patient is still in the supine position, move the patient to the right side of the bed. Early reports link this approach to better survival and reduced incidence of rejection and primary graft dysfunction.164 The use of cadaveric organ transplants continues to be studied. J Gerontol A Biol Sci Med Sci. 2009;11:329–336. Prognosis seems to be better if the onset of pulmonary symptoms is acute. The test–retest reliability is traditionally measured with the intraclass correlation coefficient (ICC) and the κ statistic. The onset is slow, with progressive muscle weakness, general fatigue, and possibly muscle atrophy and joint pain. Antitussives Cough is a common symptom of respiratory problems; thus there are a number of prescription drugs available for the treatment of coughs.55 Cough can be divided into a productive cough, which removes mucus from the airway and increases airflow, and an unproductive cough, which is not useful and causes discomfort to the patient. Echocardiographic abnormalities in chronic alcoholics with and without overt congestive heart failure. H’Doubler Jr. P.B, H’Doubler W.Z, Bien R.C, Jansen D.A. A novel technique for intraaortic balloon pump placement via the left axillary artery in patients awaiting cardiac transplantation. 2006;36:239–262. Noninvasive mechanical ventilation for cystic fibrosis patients with end stage disease. Janson-Bjerklie S. In addition, social isolation and depression are associated with a poor prognosis after MI. 2013;58(1):98–122. 47. Multiple sclerosis is the most common neurologic disease affecting young adults. This same monitoring system can be used with an arterial catheter for continuous-pressure monitoring and blood sampling. J Hypertens. • As the patient is rolled to the prone position, the person at the head is responsible for the integrity of the artificial airway and ventilator tubing, if applicable. Table 8-4 Normal lipid values LDL, low-density lipoprotein; HDL, high-density lipoprotein; VLDL, very-low-density lipoprotein. 131. Psychoneuroendocrinology. R.L, Zolty R, et al. Proc Staff Meet Mayo Clinic. Patients with cardiovascular and pulmonary dysfunction are at high risk for decreased exercise capacity, impaired physiologic response to exercise, poorer quality of life, and higher rates of anxiety and depression. It can cause some nausea, drowsiness, palpitations, and in rare cases CHF. Kinlay S, Ganz P. After the entire assessment is performed, documentation of the findings should be made of all components that were examined. Neuroimmunomodulation. Milrinone, however, has also been used intravenously in outpatient settings for Class IV CHF patients refractory to oral medications and as a bridge to transplantation.36 Vasodilators Both arterial and venous vasodilators are used in the management of heart failure as afterload and preload reducers, respectively. 2012;60(24):e44–164. To find the FAI, identify age (in years) in the left column and identify duration of time on the Bruce treadmill protocol in the right column. The Kansas City Cardiomyopathy Questionnaire Background and Administration The Kansas City Cardiomyopathy Questionnaire (KCCQ) is a self-response questionnaire made up of 23 items that quantify specific areas of quality of life related to heart failure. Testing CRP levels in the blood may be an additional way to assess cardiovascular disease risk. More easily provoked dyspnea and fatigue, often accompanied by angina 7. Clinical tip The use of EBCT to identify individuals at risk for future MI or stroke is still very controversial, and the evidence is not conclusive regarding the sensitivity of this test for identifying CAD in any population. Expiratory sounds flow directly from inspiratory sounds, without a break in the sounds. The most notable complications are presented here. Chapter 14 provides detailed information on medications. 8-6) starts at a speed of 3.3 miles per hour—this is often too fast for a deconditioned patient or an older individual. Dantzker D.R. Respiratory muscle function. For example, a cardiologist could hear what is going on with the heart during activity without being present while the patient was performing activities. 2011;92:309–315. Joint ESC/ACCF/AHA/WHF task force for the redefinition of myocardial infarction. The physical therapist may choose to supplement intensity information with use of an RPE scale. 14-4). J La State Med Soc. This class of organisms is intermediate between bacteria and viruses. Effect of aerobic exercise training on serum levels of high-density lipoprotein cholesterol. Jako P. Scand J Rehabil Med. No ST changes noted. 1986;17:1098– 1101. Marliss E.B, Vranic M. The chest radiographs provide a general static assessment of pathologic conditions of the lungs and chest wall, including changes in functional lung space, pleural space, chest wall configuration, presence of fluid, heart size, and vascularization of the lungs. 1991;99:430–435. 1988:19–26. Tubular breath sounds and consolidation 12. The screw is attached to a Luer-Lok, which is connected to a transducer and oscilloscope for continuous monitoring. Courneya K.S, Segal R.J, Mackey J.R, et al. Liver problems can slow biotransformation, and kidney malfunction can reduce excretion—both leading to potential drug overdose effects unless the doses have been adjusted accordingly. (From Chestnut DH: Ob stetric Anesthesia, ed 4, St. Louis, 2009, Mosby.) Nutritional and Metabolic Causes Obesity Obesity is defined as a condition in which the body weight is 20% or more over the ideal body weight.53 Etiology Obesity is the result of an imbalance between the calories ingested and the calories expended. The “6 Clicks” Basic Mobility Short Form assesses basic bed mobility, transfers, and ambulation. J Nutr Educ. The neurotoxin binds to the ganglioside membranes of the nerve synapses and blocks release of the inhibitory transmitter. J Physiol. In addition, the vascular bed and heart contain dopaminergic receptors. Each answer has a numeric “score” that is then tallied up for an overall health score between 0 and 40. Latent autoimmune diabetes of adulthood (LADA): An often misdiagnosed type of diabetes mellitus. 287. The opposite is true during exhalation; the therapist uses shoulder extension, adduction, and internal rotation with downward eye gaze. Current survival rates in the United States are depicted in Table 12-15. When preparing to teach a patient or caregiver, the physical therapist must assess the learner to determine areas of knowledge mastered and areas where further education is needed. Although the immediate utility of ABGs for the physical therapist may have been supplanted by the pulse oximeter, a systematic approach to a more detailed and complete interpretation of acid–base, ventilatory, or oxygenation status should not be overlooked, particularly with respect to patients receiving mechanical and noninvasive mechanical ventilation. The diaphragm is made up of all three types of muscle fibers, including slow-twitch oxidative (SO), fast-twitch oxidative glycolytic (FOG), and fast-twitch glycolytic (FG).36–38 The adult diaphragm is approximately 55% slow-twitch fibers, compared with about 10% in the infant.39 Fatigue is related to the SO fibers, whereas weakness is attributed to the FG fibers. 1997;82:1084–1090. Treatment Treatment is usually cardioversion. Philadelphia: Lippincott; 1989. Haley S.M, Coster W.F, Andres P.L, et al. In both cases, the thrombosis obstructs blood flow in the affected area.286 Major risk factors for the development of VTE are thought to arise from one or more of three main categories described as Virchow’s triad; hypercoagulability, venous stasis, and endothelial injury.288 A hypercoagulable state encompasses any situation where there is an increased propensity of developing blood clots, such as with cancer, hormonal replacement, and inherited clotting disorders such as factor V Leiden mutation.289 Venous stasis is a condition in which blood flow is slowed or congested such as what happens with prolonged bed rest, travel, and paralysis. 17 Interventions for acute cardiopulmonary conditions Alexandra Sciaky, Amy Pawlik, Morgan Johanson, and Meghan Lahart CHAPTER OUTLINE Airway Clearance Techniques 540 Postural Drainage 541 Percussion 543 Vibration 544 Cough Techniques and Assists 544 Active Cycle of Breathing 545 Mechanical Aids for Coughing 546 Manual Hyperinflation and Airway Suctioning 546 Breathing Strategies, Positioning, and Facilitation 547 Therapeutic Positioning Techniques and Ventilatory Movement Strategies 547 Positioning for Dyspnea Relief 549 Breathing Exercises 549 Pursed-Lip Breathing 549 Paced Breathing 550 Inspiratory Hold Technique 550 Stacked Breathing 550 Diaphragmatic Controlled Breathing 550 Lateral Costal Breathing 551 Upper Chest Inhibiting Technique 551 Thoracic Mobilization Techniques 552 Counterrotation 552 Butterfly 552 Inspiratory Muscle Training 552 Special Considerations for Mechanically Ventilated Patients 554 Weaning Criteria 554 Methods of Weaning 555 Assessing Consciousness and Delirium in the Intensive Care Unit 555 Intervention Considerations 555 Exercise 557 Components of Exercise: Intensity, Duration, Frequency, and Modes 558 Functional Mobility Training 559 Injury Prevention and Equipment Provision 560 Patient Education 561 Discharge Planning 562 Pediatric Considerations 562 Case study 17-1 564 Summary 565 References 565 In the United States more than 5 million patients survive an episode of critical illness in an acute care hospital each year.1 Some of these patients return to their former level of function relatively quickly. The waves represent motion (“M”) of heart boundaries transected by stationary ultrasonic beam. 2013;32(10):965–978. Although calcium-channel blockers and nitrates may have secondary effects because of coronary vasodilation, and calcium-channel blockers can decrease coronary artery spasm, no direct pharmacologic way exists to increase coronary blood flow in the presence of ischemic heart disease. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Rehab Med. Metabolic equivalent: one size does not fit all. 1985;27(3):565–573. Doppler velocimetry is particularly useful in identifying individuals with asymptomatic arterial disease or those whose pulses are severely obliterated.25 Mediate Percussion Mediate percussion is the final component of the chest examination and is performed to further evaluate any abnormal findings, especially changes in lung density. 52. The statistics of clinical change are as follows180: 1. If an item does apply to you, then c irc le the number rating of how muc h it prevented you from living as you wanted. 1986;315:1046– 1051. 2009;276(1–2):14–17. The common pathway for both the intrinsic and extrinsic pathways meets at factor Xa. 3a. Brownstein, MD. 2006;8(8):841–850. Guyton A.C, Hall J.E. Textbook of Medical Physiology. 2006;169:708–718. ↑ PaCO2 10. A mean pulmonary artery pressure greater than 25 mm Hg is the definition of pulmonary hypertension and appears to be associated with a variety of pathophysiologic phenomena (hypoxia, cardiac arrhythmias, and pulmonary abnormalities).60,121 Table 4-8 Pitting edema scale Edema Characteristics Barely perc eptible depression (pit) Easily identified depression (EID) (skin rebounds to its original c ontour within 15 sec) EID (skin rebounds to its original c ontour within 15 to 30 sec) EID (rebound >30 sec) Score 1+ 2+ 3+ 4+ FIGURE 4-18 Evaluation of venous pressure. J Am Acad Nurs Pract. Comparison of upper limb volume measurement techniques and arm symptoms between healthy volunteers and individuals with known lymphedema. 2006;45:4–7. Lumb A. Heart Fail. Adequate plasma concentrations of a drug can be influenced by administration and absorption of the agent. Disease c harac teristic s: ac ute vs. Available: www.ishlt.org. In addition, socioeconomic factors will play a role. With this type of injury, the expiratory muscles are paralyzed or very weak, leading to an inability to cough. ■ As the cell becomes positive on the interior, the myocardial cells are stimulated to contract (called excitation coupling). For a patient with “fair or reduced” diaphragmatic strength (tidal volume less than 500 mL), active breathing exercises are indicated without resistance. 1-11).14 Trachea. With a T-piece wean, the patient breathes spontaneously on supplemental O2 for progressively longer periods. Surg Forum. b Especially amlodipine. J Rehabil Res Development. The steps involved in the formation of blood clots are very complex. ■ When a normal amount of LL exceeds the TC of the lymphatic system, a mechanical insufficiency results that may lead to a protein-rich edema called lymphedema. Pretransplant six-minute walk test predicts peri- and post-operative outcomes after pediatric lung transplantation. Signs and symptoms of a PE are shortness of breath, decreased SpO2, pleuritic chest pain, cough, and tachycardia. Beuther D.A. Obesity and asthma. Ellestad identified a population with more serious prognosis of disease when the magnitude of ST-segment depression was considered.125 In addition, a subset of persons at high risk for progression of angina, MI, or death was identified by Ellestad. Blood is transferred back to the heart through muscle pump activity, which causes a milking effect on the veins. Gulve E.A. Exercise and glycemic control in diabetes: benefits, challenges, and adjustments to pharmacotherapy. Patients may be receiving enteral (providing food through tube in nose, stomach, or intestine) or parenteral (intravenously; bypassing eating and digestion) feedings or simply by mouth. Pleural rub Another abnormal sound that should be checked by auscultation in the lower lateral chest areas (both right and left) is a pleural (friction) rub, which may be an indication of pleural inflammation. Griepp R.B, Stinson E.B, Dong E.J, et al. Because changes in oxygen saturation are prompted by changes in the PaO2, and because venous saturation is decreased only when oxygen supply fails to meet the demand, the SvO2 can be a sensitive indicator of oxygen supply or demand status. The nose is a conglomerate of bone and hyaline cartilage. If the shift is due to a pneumothorax, a chest tube is usually inserted immediately. 1995;88:243–250. The St. Georges Respiratory Questionnaire was also correlated with the SF-36, a very prominent qualityof-life assessment tool, with a correlation between the two tools of a moderate to high −0.75. The patient should be able to breathe comfortably and without accessory muscles for 15 minutes; if the amount of weight is excessive, the pattern of inspiration will become uncoordinated.44 Several authors suggest that strength training in this manner should include two or three sets of 10 repetitions once or twice a day.9 However, with either the manual or the weights method, the quality of the contraction needs to be monitored. Acute management of new-onset paroxysmal supraventricular tachycardia (PSVT) is often treated with adenosine, a naturally occurring endogenous purine nucleoside. The external jugular vein lies medial to the external jugular artery, and with an individual in a 45-degree semirecumbent position, it can be readily measured for signs of distension. These are minor and usually occur at the site of deposition. 2002;87(1):163–164. ■ If the problem is obstructive in nature, determine its reversibility. The 30-second chair stand test is a measure of the number of times that a person can perform a sit-to-stand transfer, without assistance, over the period of 30 seconds. 2 Physiology of the cardiovascular and pulmonary systems Konrad J. Plasma triglycerides and three lipoprotein cholesterol fractions are independent predictors of the extent of coronary atherosclerosis. ■ A significant Q wave is 1 mm wide or one-third the size of the QRS complex. These various medications can be administered intravenously, subcutaneously, orally, or via inhalation.62 Vascular Disease Veins do not form atherosclerosis. 1a. Mortality and morbidity reduction with candesartan in patients with chronic heart failure and left ventricular systolic dysfunction: results of the CHARM low-left ventricular ejection fraction trials. HDL increases the availability of apolipoprotein C II (apo C-II) for chylomicrons and VLDL degradation. Mitchell M.J, Baz M.A, Fulton M.N, et al. 2001;7(2):183–193. Respiratory failure can also result from chronic respiratory muscle weakness, altered central control of breathing, and pneumonia. If this cross-sectional area is decreased by more than 50%, then the pressure needed to maintain pulmonary blood flow rises and pulmonary hypertension results.32 This also increases the work of the right ventricle and can lead to right ventricular failure. Physiologically, these systems must work collaboratively to provide oxygen required for energy production and assist in removing carbon dioxide manufactured as a waste product. 239. Int J Obes (Lond). You should pivot briskly around the cones and continue back the other way without hesitation. Cambridge: Cambridge University Press; 2013. ed 9. This tumor rarely cavitates, but commonly produces hormones that can lead to a wide variety of symptoms in many different body systems not involved in direct metastasis. Normal diastolic pressure to enable filling ranges from 0 to 8 mm Hg and is clinically referred to as the central venous pressure. The elderly are more susceptible to arrhythmias. Increased CV mortality results from CHF and ischemic heart disease and associated arrhythmias. They are used short term, are parenterally administered, and have severe side effects that may result in increased mortality compared with similarly acting agents. Outcomes Defined The Guide to Physical Therapist Practice defines outcomes as “a systematic examination of patient outcomes in relation to selected patient variables (e.g., age, sex, diagnosis, interventions performed).” Therefore when measuring outcomes, the therapist must consider the dynamic nature of the evaluation and treatment of the individual patient, as well as the multiple options for outcomes assessment. King P.J. The hypothalamus and obesity. Risk factor control and perceptions of risk factors in patients with coronary heart disease. Oxygenation levels (PaO2) become decreased as disease severity progresses, and CO2 levels vary according to either the type or stage of disease. Philadelphia: Churchill Livingstone; 2009. Respiratory muscle training. 1994;14(5):323. ■ Do you restrict sodium in your diet? Reich L, Heiss G, Boland L, et al. Beat to beat electrocardiographic morphology variation in healed myocardial infarction. 155. Kannel W.B, Castelli W.P, Gordon T, et al. The aorta exhibits three dilations above the attached margins of the cusps of the aortic valve at the root of the aorta—the aortic sinuses (of Valsalva). 1981;138:319–323. The following points should be kept in mind when interpreting PFTs: ■ Determine whether or not the results are normal. Respiratory rate (RR) = 18. Williams G.H, Braunwald E. Dean E, Perlstein M.F, Mathews M. Summary In acute care settings, physical therapy interventions for patients at any age with primary or secondary cardiopulmonary dysfunction are aimed at optimizing the patient’s oxygen transport system. During diastole, the elasticity of the vessel promotes recoil of the artery and maintains blood pressure within the vessel. An MRA can assess for aneurysms, dissection, or stenosis of blood vessels. d Especially nifedipine and nicardipine. Therefore elevations in troponin are not specific to the cause of the injury; however, the more elevated the level is postoperatively, the greater the damage and the more grave the prognosis.7 Because troponin levels are being tested more frequently, cardiac injury has been identified more often, but the causative factors are not always known. 17-2, B) can enable patients to treat themselves independently as their medical condition improves. The blood is then returned to the body. Annu Rev Biochem. These individuals have a high risk of sudden death. 2007;115(21):2761–2788. Often drugs are used in combinations in an attempt to reduce or augment certain hemodynamic responses, which further emphasizes the importance of medical observation. A patient may also demonstrate deconditioning as a result of the primary medical condition, prolonged bed rest, or a combination of both. MacLeod S, Radde I. Prospective evaluation of health-related quality of life in patients with deep venous thrombosis. Continuing education is a vital component of lifelong learning so I would also encourage all of my readers to continue their lifelong learning in cardiopulmonary physical therapy by utilizing always updated webinars from www.ptcardiopulmonaryeducators.com. This information should be correlated with arterial blood gas analysis or hemoglobin saturation data to determine whether the patient is adequately oxygenated before beginning any therapy. The therapist assists the patient with bringing his or her arms up into a butterfly position. Young J.D, Dyar O, Xiong L, Howell S. ■ Lymphotomes are separated by watersheds that have relatively few lymph collectors. 1988;115:240–242. 1997;51(Suppl 2):430–439. These interventions include airway clearance techniques, breathing strategies, and monitored exercise progression. Eschbach J.W, Egrie J.C, Downing M.R, et al. Klem M.L, Wing R.R, McGuire M.T, et al. One pair of alveoli is shown without surfactant (A) and the other is shown with surfactant (B). 2004;20:175–185. 1973;39(5):596–600. A recommended sequence of drug use begins with loop diuretics, followed by initial low-dose ACE inhibitors, and then addition of a β-blocker when the patient is stable on ACE inhibitors.22 As the hemodynamic compromise progresses and the clinical picture declines, medical management broadens and may include oxygen, sedation (to decrease anxiety and metabolic energy), and eventually parenteral medications. Perera S, Mody S.H, Woodman R.C, Studenski S.A. Meaningful change and responsiveness in common physical performance measures in older adults. Amyotrophic Lateral Sclerosis Amyotrophic lateral sclerosis (or Lou Gehrig disease) is the most common motor neuron disease in the United States and is characterized by progressive neurologic deterioration without remission due to loss and degeneration of both upper and lower motor neurons. This patient is breathing primarily with the diaphragm. Gait speed has been shown to be an accepted outcome measure to predict need for subacute rehabilitation before discharge home.99 Pediatric Considerations Whether a physical therapist is providing direct cardiopulmonary care to acutely ill pediatric (neonates, infants, and children) patients or incorporating cardiopulmonary techniques into developmental therapy, a knowledge of cardiopulmonary development and congenital pathology is essential. Begin P, Mathieu J, Almirall J, et al. Cardiovascular complications also occur in many patients with HIV and are fatal in some patients.305 The most common CV problem seen in HIV, particularly in children with AIDS, is pericardial effusion, which may be induced by opportunistic infection or malignancy, but more often, no definitive cause can be identified. Delaware and West Virginia had the highest asbestosis mortality rates during 19901999. Br J Clin Pharmacol. Signs of right ventricular hypertrophy are noted by changes found in lead V1 that include a large R wave and an S wave smaller than the R wave. Am J Nurs. It has been shown that physical training can improve functional exercise capacity, shortness of breath, and quality of life in patients with interstitial lung disease. The predicted values (derived from a variety of nomograms) are those normally anticipated on the basis of the patient’s age (volumes decrease with age), gender (males have larger volumes than females), height (tall individuals have larger volumes than short individuals), weight, and race (American Indians, blacks, and Asians have as much as 12% to 14% lower volumes than whites).30–33 Children pose a unique challenge to prediction because their development is phasic; thus, specific nomograms are used for the pediatric population. 1991;52:1113–1121. Learning does not stop with this text. Stretch receptors: These receptors are located along the smooth muscles lining the airways and are sensitive to increasing size and volume within the lung.6 Hering and Breuer discovered that ventilatory rate and volume was reduced following distention of anesthetized animal lungs. Using a practical approach, expert author Ellen Hillegass also discusses pathophysiology, pharmacology, and interventions in the outpatient setting.Evidence-based content reflects the latest research in the field and incorporates the use of ICF.Materialuses best practices defined by the American Physical Therapy Association.Clinical tips provide real-world hints and suggestions from practicing clinicians.UPDATED! Content and references throughout present the most current and relevant information for todayâ€™s clinical practice.NEW! Two additional chapters on Management of Cardiovascular Disease in Women and Pulmonary Vascular Disease provide comprehensive coverage of these key topics.NEW! Enhanced ebookversion of the text â€• included with print purchase â€• offers access to all of the text, figures, and references from the book, as well as additional case studies and a glossary, on a variety of digital devices. Thus it may be necessary to coach the patient to achieve the maximum expiratory effort. Woolman L. Table 1-1 Topographic boundaries for the bronchopulmonary lung segments Lobe Upper Lobe Segment Anterior segment (right or left) Borders Upper border: c lavic le Lower border: a horizontal line at the level of the third interc ostal spac e (ICS), or fourth rib, anteriorly Apic al segment (R) or apic al aspec t, Anteroinferior border: c lavic le apic oposterior segment (L) Posteroinferior border: a horizontal line at the level of the upper lateral border of the spine of the sc apula Posterior segment (R) or posterior Upper border: a horizontal line at the level of the upper lateral border of the spine of the sc apula aspec t, apic oposterior segment (L) Lower border: a horizontal line at, or approximately 1 inc h below, the inferomedial aspec t of the spine of the sc apula Middle Lobe Upper border: a horizontal line at the level of the third ICS , or fourth rib, anteriorly (R) or Lower and lateral borders: the oblique fissure (a horizontal line at the level of the sixth rib anteriorly) Lingula (L) extending to the anterior axillary line; from the anterior axillary line, angling upward to approximately the fourth rib at the posterior axillary line The midc lavic ular line separates the medial and lateral segments of the right middle lobe A horizontal line at the level of the fifth rib, anteriorly, separates the superior and inferior lingular segments Lower Lobe S uperior (basal) segment (right or Upper border: a horizontal line at, or approximately 1 inc h below, the inferomedial aspec t of the spine of the left) sc apula Lower border: a horizontal line at, or approximately 1 inc h above, the inferior angle of the sc apula Posterior (basal) segment (right or Upper border: a horizontal line at, or approximately 1 inc h above, the inferior angle of the sc apula left) Lateral border: a “plumb line” bisec ting the inferior angle of the sc apula Lower border: a horizontal line at the level of the tenth ICS , posteriorly Lateral (basal) segment (right or Upper border: a horizontal line at, or approximately 1 inc h above, the inferior angle of the sc apula left) Medial border: a “plumb line” bisec ting the inferior angle of the sc apula Lateral border: the midaxillary line Lower border: a horizontal line at the level of the tenth ICS , posteriorly Anterior (basal) segment (R) or Upper border: the oblique fissure (a horizontal line at the level of the sixth rib anteriorly, extending to the anterior aspec t, anteromedial (basal) anterior axillary line; from the anterior axillary line, angling upward to approximately the fifth rib at the segment (L) midaxillary line Lateral border: the midaxillary line Upper Respiratory Tract Nose. 54. 2005;117:238–242. The S1 sound is normally louder and longer and lower pitched when auscultated at the apex or even in the tricuspid region. Unfortunately, no pure β2-specific sympathomimetic medications have yet been identified. ■ Forced expiratory volume in 1 second (FEV1) is the volume of air that is exhaled during the first second of the FVC and reflects the airflow in the large airways. Other potential therapeutic roles of NO include the treatment of endotoxic shock, adult respiratory distress syndrome, and hypertension in various disease states, such as atherosclerosis and chronic renal failure.76–78 Although the side effects of NO are incompletely understood, the marked oxidizing effects of nitrogen dioxide (NO2, the product of NO and oxygen) are known to:67 ■ Decrease alveolar permeability ■ Decrease PaO2 and the diffusing capacity of lung for carbon monoxide ■ Cause pulmonary edema ■ Cause loss of cilia and disintegration of bronchiolar epithelium ■ Decrease pulmonary function tests (i.e., forced expiratory volume in 1 second) The few studies investigating the toxic effects of NO have shown that at concentrations greater than 15 to 20 ppm, PaO2 decreased 7 to 8 mm Hg, and airway resistance increased.4,79,80 Clinical tip Herbal medications now appear to be playing a role in the treatment of acute and chronic pulmonary dysfunction. Angles between 70 and 120 degrees cause some respiratory dysfunction, and respiratory symptoms may increase with age as the angle increases and as the changes associated with aging affect the lung. Physical therapists wishing to conduct exercise tests on individuals older than 40 years or on persons who are at moderate to high risk of developing CAD should expect to obtain the required knowledge and skills in advanced training or in clinically supervised postprofessional education. 2004;164:1092–1097. FIGURE 16-30 Principles of reflectance spectrophotometry. • Devote a portion of your day to an activity you enjoy and find relaxing. Dlin R.A, Hanne N, Silverberg D.S, et al. C, A characteristic flow-volume loop in a patient with severe lung restriction from pulmonary fibrosis. Paz J.C. Acute Care Handbook for Physical Therapists. 1999;43(Suppl A):97–105. (From Boron W, Boulpaep EL: Textb ook of Medical Physiology, ed 2, St. Louis, 2009, Saunders.) FIGURE 10-14 A, The water-sealed bell spirometer. These ECG changes are important to mention because they assist in the diagnosis of the condition. Physical activity/exercise and type 2 diabetes. When the destruction of the respiratory epithelium is severe or widespread, it may be followed by a significant inflammatory response. Wasserman K, Beaver W.L, Whipp B.J. Gas exchange theory, and the lactic acidosis (anaerobic) threshold. Morrison R.J, Short H.D, Noon G.P, et al. The flow-volume loops of patients with minimal-to-mild small airway obstructive lung disease look essentially normal except for a slight “scooped out” appearance at the end of expiration. ■ The only way to determine whether a patient is responding to exercise appropriately is to assess his or her physiologic responses. 2007;167:999–1008. alcoholic, 252 cirrhosis, nonalcoholic vs. Relationship of depression to increased risk of mortality and rehospitalization in patient with congestive heart failure. 2008;9:20–29. In addition to electrical cardioversion of unstable rhythms, pharmacologic intervention is the mainstay of medical treatment. Res Q Exerc Sport. Aldrich T.K, Darpel J.P, Uhrlass R.M, et al. Quality of life and cardiorespiratory function in chronic heart failure: Effects of 12 months’ aerobic training. Inflammatory debris in the early phase will cause diffusion abnormalities, ventilation–perfusion mismatch, and reduced compliance. 1993;20:143–151. 2004;126(4):1026–1031. This method of organ procurement has raised ethical concerns and the development of stringent definitions of cardiac death and acceptable practices for the end-of-life care.162 Another technique, ex vivo lung perfusion (EVLP) is a means to provide prolonged lung preservation, assessment, and reconditioning of previously less-than-optimal-performing pulmonary grafts.163 Ex vivo lung perfusion is a short-term system (less than 24 hours) that consists of a perfusion circuit with tubing and a reservoir. An integrated approach by transthoracic and transesophageal echocardiography. The safety of intravenous diuretics alone versus diuretics plus parenteral vasoactive therapies in hospitalized patients with acutely decompensated heart failure: A propensity score and instrumental variable analysis using the Acutely Decompensated Heart Failure National Registry (ADHERE) database. 1999;29(Suppl 2):99–109. Aldrich et al demonstrated substantially lower mortality rates in the group weaned from mechanical ventilation.67 Mechanical advantage of the diaphragm muscle can be optimized by attention to positioning.68 Creating a more normal length–tension relationship may be useful and can be achieved with manual facilitation of the diaphragm. It has been suggested that BiPAP improves ventilation and vital signs more rapidly than CPAP in patients with acute pulmonary edema.21 Clinical tip Patients who use CPAP or BiPAP machines may experience headaches, skin irritation, and stomach bloating. Noncardiogenic pulmonary edema has a multitude of causes, including increased capillary permeability, lymphatic insufficiency, decreased intrapleural pressure, or decreased oncotic pressure. This slow “leak” of sodium causes these fibers to achieve a threshold at which more rapid depolarization occurs. A radionuclide study. 2000;162:1335–1341. ■ The maximal ability of the lymphatic system to transport lymph is called the transport capacity. Clinical tip By law in many states, oxygen is considered a drug that must be prescribed by a physician (or practitioner licensed to prescribe it). To prevent aspiration pneumonia, patients usually fast for 12 hours or longer before surgery. Some β-blocking medications may actually have a slight effect on β2 receptors, blocking β2 stimulation. A 2011 randomized control trial determined that the current medication regimen was worse than having no treatment.50 Since that time patients with IPF have been prescribed Pirfenidone internationally. Miller’s Anesthesia. nonsmokers Most oc c ur in individuals >60 years of age 5–10× higher inc idenc e in men than in women Women with aneurysm have a higher risk of rupture First-degree relative has an inc reased risk Data from Braverman A, Thompson R, Sanchez L: Diseases of the aorta. 2011;39:1–6. A lateral infarction demonstrates Q waves in leads I and aVL (Fig. These episodes may be precipitated by cold, dehydration, infection, stress, menses, or alcohol consumption, although the cause is frequently unknown. Becker ‘s muscular dystrophy is a milder variant of DMD with more variable clinical manifestations. Tachypnea of CHF often ensues.71 In addition, the degree of hypoxemia appears to be correlated to the degree of elevation of the pulmonary capillary wedge pressure.72 ■ Stage III (see Fig. The signs and symptoms of this disease may fluctuate over a period of hours or days. I am going to use this counter to keep track of the number of laps you complete. A meta-analysis of effects of psychoeducational interventions on length of post surgical hospital stay. Exercise Testing with Imaging Modalities Individuals may perform an exercise test to assess the myocardial oxygen supply and demand relationship (to determine whether ischemia occurs during physiologic stress) and undergo additional noninvasive imaging immediately following the performance of the exercise. Butler S.M. Phase one cardiac rehabilitation: The role of functional evaluation in patient progression. Ko D.S, Lerner R, Klose G, Cosimi A.B. Effective treatment of lymphedema of the extremities. Pulmonary and cardiovascular complications of obesity. Blankenhorn D.H, Nessim S.A, Johnson R.L, et al. Although individuals with marked CHF may demonstrate jugular venous distension in all positions (supine, semisupine, and erect), typically, jugular venous distension is measured when the head of the bed is elevated to 45 degrees.60,121 The degree of elevation should be noted, as well as the magnitude of distension (mild, moderate, severe). 150. 2003;23(3):208–217. Exercise has been found in some cases to be as beneficial as antidepressant medications in the treatment of anxiety symptoms and has been shown to provide physiologic changes in the blood that directly affect anxiety. Visualization of the tracheal shadow is particularly important if the patient is intubated (has an endotracheal tube in place), because proper positioning of the endotracheal tube is determined by the proximity of its distal end to the tracheal bifurcation. Skeletal muscle in idiopathic cardiomyopathy. 284. Their complaints may be of lightheadedness, weakness, fatigue, or an irregular pulse. Pediatric conditions are discussed in more detail in Chapter 20. A statement for healthcare professionals from the American Heart Association/American Stroke Association Council on Stroke. O’Rourke

glycosides, sympathomimetics, or bipyridines and afterload reduction with arteriodilators, calciumchannel blockers, ACE inhibitors, or ARBs. Physiology For a more complete review of cardiovascular physiology, please refer to Chapter 2. The techniques include postural drainage, percussion, vibration, cough techniques, manual hyperinflation, and airway suctioning. Cardiotoxicity after hematopoietic stem cell transplantation and bone marrow transplantation is usually related to previous chemotherapy or that used as part of the conditioning regimen.331,332 Acute toxicity is usually manifested by ECG abnormalities, such as arrhythmias and conduction disturbances, and pericardial effusion, which are usually asymptomatic but occasionally cause more serious problems. ■ Cardiomyopathies are classified from a functional standpoint, emphasizing three categories: dilated, hypertrophic, and restrictive. An example of paradoxical breathing is the individual with COPD and air entrapment who must actively contract the abdominal musculature during expiration to decrease the air trapped in the lungs. Tanaka K, Nakanishi T. Annu Rev Nutr. 1-20 depicts the major arterial tree within the human body. 2007;30(Suppl 1):S42–S47. Physiother Res Int. Because the body plethysmography method of functional residual capacity (FRC) determination actually measures the total amount of gas in the thorax, the values obtained may be larger than those from either helium dilution or nitrogen washout techniques (any difference between the measurements is an estimate of the volume of poorly ventilated regions of the lungs). If the arrhythmia is induced and unable to be treated successfully by the antiarrhythmic medication, the patient may be referred for an ablation procedure (cauterization of the area inducing the arrhythmia) or pacing techniques, or the patient may be provided an implantable cardiac defibrillator (ICD) for rhythm control. 2014;64(21):2281–2293. William Heberden the elder (1710–1801): aspects of his London practice. Sullivan M.J, Cobb F.R. The anaerobic threshold in chronic heart failure. B, Endothelial cell injury. Assessment of cardiac function. This in turn causes a concomitant reduction in the intrapulmonary pressure, or pressure within the lung (Fig. “In addition to deep breathing and coughing, it is important to learn a few simple exercises for your legs to help maintain muscle tone and prevent blood clots from forming.” Ankle pumps, quadriceps sets, and gluteal sets can then be taught. Some of the side effects can include exacerbation of myocardial ischemia if coronary occlusion exists,177 hypotension as a result of intense vasodilation, elevation in heart rate, and increase in atrial and ventricular tachyarrhythmias. Airway suctioning is indicated for patients with artificial airways who have excess pulmonary secretions and the inability to clear the secretions from the airway. Clinical Manifestation The clinical manifestation of a pulmonary embolus can be found in Table 5-18. Szuba A, Achalu R, Rockson S.G. Decongestive lymphatic therapy for patients with breast carcinoma-associated lymphedema. The radiologic reports that are routinely reviewed for patients with cardiopulmonary dysfunction include chest radiographs, computed tomography (CT) scan, magnetic resonance imaging (MRI), and scintigraphy. Janicki J.S, Weber K.T, Likoff M.J, et al. Oldridge N, Guyatt G, Jones N, et al. S ec ondary c auses: systemic disease proc esses. 248. However, an entry-level practitioner should be able to perform a competent systematic auscultation of the heart and be able to note normal heart sounds and blatantly abnormal heart sounds (e.g., loud murmurs and loud atrial or ventricular gallops). Baum G.L, Wolinsky E. 2008;32:1431–1437. There are four basic types of mucoactive agents: mucolytics, expectorants, wetting agents, and surface-active agents. A tympanic sound is loud, long, and hollow and may be heard over an empty stomach or a hyperinflated chest. 17-3). The retained fluid commonly accumulates bilaterally in the dependent extracellular spaces of the periphery.5 Dependent spaces, such as the ankles and pretibial areas, tend to accumulate the majority of fluid and can be measured by applying firm pressure to the pretibial area for 10 to 20 seconds, then measuring the resultant indentation in the skin (pitting edema). In addition to requiring continuous measurement of arterial blood pressure, critically ill patients often need frequent measurement of arterial blood gases to assist in the assessment of ventilatory efficacy. Boston: Little, Brown; 1964. Third, there is an increase in the alveolar dead space because a portion of the lung is being ventilated but no longer perfused. 1996;76(5):516. Home Environment and Family Situation A supportive family is important to the success of the rehabilitation of any patient. Reliability and Validity The Perme ICU Mobility Score was shown to be valid as a measure of mobility with an ICU patient population.107 Interrater reliability has been shown in one study.161 Each of the 15 items was found to have high intertester reliability with Cohen κ coefficients between 0.6 and 1.0. The results of the two studies show that this may be a valid and reliable test to use in the ICU population. Clinic ally signific ant differenc e (minimally c linic ally important Desc ribe MCID and how it was determined. 1978;76(Suppl IV):IV256. Their actions can be decreased by use of barbiturates and increased by cimetidine. It also has high test–retest reliability and moderate-to-high validity when compared with the 6MWT, Chronic Respiratory Disease Questionnaire, St. Georges Respiratory Questionnaire, SF-36, and the treadmill endurance test.115 BO X 22- 6 Pa t ie nt inst ruct ions for pe rform ing t he m odifie d shu le wa lk t e st “Walk at a steady pace, aiming to turn around when you hear the signal. 2014;10(1):41–49. Books4US. 2009;32(1):49–57. Airflow through the conducting airway is directly proportional to the pressure difference created between the ends of the airway and inversely proportional to the resistance within the airway. New York: Macmillan; 1985. Young D.R, Haskell W.L, Jatulis D.E, Fortmann S.P. Associations between changes in physical activity and risk factors for coronary heart disease in a communitybased sample of men and women: The Stanford Five-City Project. Can J Diabetes. Simple means of communication such as eye blinks or head nods for answering yes–no questions may be utilized, or available gestures and facial expressions can be a way for the patient to communicate needs. Remember to think about ONLY THE PAS T MONTH. Pneumonia is simply an inflammatory process of some part of the lung where gas exchange occurs that progresses beyond inflammation and develops into infection. It has since been found that the test is not valid for this diagnosis due to high levels of false positives and false negatives.27 Table 22-1 Template for articles reviewing outcome measures Topic 1. This is not a universal finding.32 However, it is well accepted that the median sternotomy incision is better tolerated and results in fewer pulmonary complications than the posterolateral thoracotomy.32 The surgical procedure itself can result in a permanent restrictive impairment when lung tissue is excised. Parkinson’s disease: an investigation of exercise capacity, respiratory function, and gait. 10-13). Home-training of patients with intermittent claudication. ■ Cardiomyopathy, congenital abnormalities, renal insufficiency, and aging are associated more commonly with chronic heart failure, whereas the other factors tend to cause acute CHF. CDC grand rounds: Preventing hospitalassociated venous thromboembolism. After hydrolysis of VLDL and chylomicrons, any excess phospholipids, apoproteins, or cholesterol is taken up by HDL. Bellamy R, Pitts F.W, Stauffer E.S. Respiratory complications in traumatic quadriplegia. The Impella is implanted into the left ventricle either directly into the left ventricle (Recover LD 5.0) or through the groin (Recover LP 5.0 LV). Lotshaw A, Coleman A, Luthye B, et al. To date nearly 300 instruments are available and have been reviewed.24 Psychometric Properties As physical therapists, it is important to know whether or not the chosen treatment interventions are providing the highest level of quality care for our patient. Elimination of pain, induction of sedation, and prevention of the complications of bed rest may also be addressed with drug therapy in the critical care setting. Coronary heart disease risk factors in men and women aged 60 years and older: Findings from the systolic hypertension in the elderly program. It targets those patients with advanced symptoms of heart failure.180 A patient is considered to have heart failure if the patient presents with an ejection fraction of less than 40% as well as other signs/symptoms of a heart failure exacerbation, such as orthopnea, dyspnea on exertion, edema in the lower extremities and/or abdomen, persistent cough, and feelings of extreme fatigue. Spectrum of cardiac involvement in Friedreich’s ataxia: Clinical, electrocardiographic and echocardiographic observations. It has been labeled the “silent killer.” Similarly, the absence of symptoms of poorly controlled hypertension and the numerous side effects of available drug agents result often in noncompliance with therapy. Bradley T.D, Holloway R.M, McLaughlin P.R, et al. Postural drainage, positioning, and breathing exercises. Advances in the detection of lipid abnormalities and the obesity epidemic in children have caused the medical and scientific communities to examine current drug therapy in these groups of children and adolescents.47 At this time, drug therapy is not recommended in the management of hyperlipidemia that results from obesity. For perspective on the size, consider that the actual transducer is smaller than the diameter of a U.S. quarter. This increases ventilation–perfusion mismatching and decreases pulmonary gas exchange. Sulemanjee N.Z, Merla R, Lick S.D, et al. Third, many patients are on multiple drugs, and the interaction of the various metabolites has not been well studied.25 Drug-induced interstitial lung disease probably results from a combination of mechanisms, including: ■ Toxic effects of the drug or its metabolites ■ Interference with the oxidant–antioxidant system30 ■ An indirect inflammatory reaction ■ Altered immunologic processes25 BO X 5- 3 Drugs ca pa ble of inducing int e rst it ia l lung dise a se • Oxygen • Antibiotics • Nitrofurantoin • Sulfasalazine • Anti-inflammatory drugs • Cardiovascular drugs • Chemotherapeutic drugs • Poisons • Anesthetics • Muscle relaxants • Illicit drugs Drugs capable of causing drug-induced interstitial lung disease are discussed here by drug category and found in Box 5-3. alcoholic, 252 hepatitis, 251 hepatopulmonary syndrome (HPS), 251–252 portopulmonary hypertension (POPH), 251–252 infiltrative diseases, 242t, 246–247 amyloidosis, 246 definition of, 246 hemochromatosis, 247 sarcoidosis, 246 metabolic syndrome (MetS), 225–227, 226f, 226t neuromuscular diseases/neurologic disorders, 242t–243t, 247–250 amyotrophic lateral sclerosis (ALS), 248 Duchenne muscular dystrophy (DMD), 249 Friedreich ataxia, 250 Guillain-Barré syndrome, 248–249 multiple sclerosis (MS), 249 muscular dystrophies, 250 See also Muscular dystrophies myasthenia gravis (MG), 249 myotonic dystrophy, 249–250 Parkinson disease, 248 postpolio syndrome (PPS), 250 obesity, 214–227 bariatric surgery, 223–224 body mass index (BMI) and, 214, 214b, 219, 219t combination treatments for, 223–224 complications, cardiometabolic, 219, 220t complications, cardiovascular, 220–222 complications, pulmonary, 220–222 definition of, 214 development factors of, 216–217, 216t energy balance and, 216–217, 217t epidemiology of, 215, 215f–216f exercise and, 224–225 See also Exercise health hazards of, 217–219, 218t hormone influences, 216–217, 217t National Health and Nutrition Examination Survey (NHANES) and, 215 National Heart, Lung, and Blood Institute (NBHLI) classification of, 219 peptide influences, 216–217, 217t pharmacologic therapies, 223–224, 223t–224t physical therapy clinical implications for, 225, 225b total daily energy expenditure (TDEE) and, 215, 215t treatments for, 223b, 222–225, 223t–224t overviews of, 214, 256–258 physical therapy clinical implications, 255–256, 256b resources for, 258 Cardiopulmonary physical therapy anatomy and physiology anatomy, 1–22 physiology, 23–41 assessments and interventions acute cardiopulmonary condition interventions, 539–567 cardiovascular disease (CVD) interventions, 568–604 evidence-based practice (EBP), 674–701 examination and assessment procedures, 506–538 lymphatic system, 650–673 outcome measures, 674–701 for pediatric patients, 626–649 prevention measures, 568–604 pulmonary rehabilitation, 605–625 diagnostic tests and procedures cardiovascular, 266–304 electrocardiography (ECG), 305–337 pulmonary, 338–363 pathophysiology cardiopulmonary implications of diseases, 214–265 chronic obstructive pulmonary disease (COPD), 187–213 dysfunction, cardiac muscle (CMD), 78–124 dysfunction, restrictive lung (RLD), 125–186 failure, cardiac muscle, 78–124 ischemic cardiovascular conditions, 42–77 vascular pathologies, 42–77 pharmacology cardiovascular medications, 445–488 pulmonary medications, 489–505 surgical interventions cardiac and thoracic, 364–385 life support, 419–444 monitoring measures, 419–444 organ transplantation, heart vs. Philadelphia: Saunders; 2004. Karpanen T, Wirzenius M, Mäkinen T, et al. 2001;15(1):79–87. A basic knowledge of how these images are produced and what they display can facilitate physician–therapist dialogue and enhance physical therapy treatment planning. J Cardiovasc Risk. 1988;78:1323. Positioning the patient requires the use of an adjustable bed, pillows or blanket rolls, and enough personnel to assist in moving the patient safely. 139. 1993;8(4):14–26. An additional chest tube may be required to accomplish this goal. The three most common pulmonary manifestations are respiratory muscle weakness, bulbar dysfunction, and abnormalities of respiratory control.242,271–273 Pulmonary dysfunction correlates with the severity of the disease, so that quadriplegic patients with bulbar involvement are at highest risk for developing respiratory failure. There exists no innervation to the visceral pleura and therefore no sensation.5 The phrenic nerve innervates the parietal pleura of the mediastinum and central diaphragm, whereas the intercostal nerves innervate the parietal pleura of the costal region and peripheral diaphragm. Vasodilators This group of antihypertensive drugs acts directly on vascular smooth muscle cells to reduce peripheral vascular resistance (arterial dilation) or venous return to the heart (venous dilation). Ventricular arrhythmias are common within the acute time frame following thrombolysis and are believed to be in response to tissue reperfusion and do not therefore require prolonged antiarrhythmic management. Like class 1 drugs, they prolong the refractory period and decrease pacemaker activity of depolarized cells. Conley C.L. Hemostasis. Philadelphia: JB Lippincott; 1998. When addicts inject these drugs intravenously, talc granulomatosis results. New York: Elsevier; 2013 1898–1906. In: Bone R.C, George R.B, Hudson L.D, eds. 2008;117(21):2820–2840. Chronic obstructive pulmonary disease presents with multiple pathologic features that restrict airflow. 7, St. Louis, 2007, Mosby.) The normal diastolic response is a maximum of 10 mm Hg increase or decrease from the resting value because of the adaptive dilation of the peripheral vascular bed that occurs with exercise. Electromyogram can be used to show decreased nerve conduction velocity and/or fibrillation potentials. Pharmacodynamics Pharmacodynamics describes the interaction of drugs with tissue receptors and the resulting pharmacologic effects. 2009;119:e21–181. Obialo C.I. Cardiorenal consideration as a risk factor for heart failure. Krzanowski J.J, Polson J.B. Mechanism of action of methylxanthines in asthma. The medial surface of each lung may be divided into vertebral and mediastinal aspects. Patients with disease processes involving the sites of β2-receptors, especially the bronchi (e.g., asthma), and to a lesser degree the peripheral circulation, pose a challenging problem in drug management when they require β-adrenergic blockade for management of their cardiovascular disease (CVD). ■ ST-segment depression that develops during exercise is an ischemic response to activity and following rest should return to the baseline. In: Irwin T, Tecklin J, eds. In Wilkins RL. Analysis of 20 years’ experience. 1-3. Contrast echocardiography has also been used with transesophageal or epicardial echocardiography (only in the operating room or in the cardiac catheterization laboratory) to assess the distribution of cardioplegia and the degree of valvular regurgitation, as well as the vascular supply of bypass grafts and bypass graft patency.67 The future of contrast agents with echocardiography may be in the performance of clot lysis and for targeted gene therapy.71 Studies comparing contrast echocardiography with thallium-201 SPECT imaging have demonstrated similar conclusions regarding the presence and amount of jeopardized myocardium, yet it may involve one half the cost of the SPECT and therefore be more cost effective than the SPECT imaging.66,72 Other Imaging Modalities In addition to contrast perfusion echocardiography, other imaging techniques are used in the diagnosis of cardiac dysfunction that may or may not utilize radioactive isotopes. These drugs are given by inhalation and not absorbed as well into the systemic circulation. The more elaborate drainage systems are used for precise measurement of fluid loss in patients after thoracic and cardiovascular surgery. Conn’s Current Therapy. Therefore the direct opposite ECG tracing of an anterior infarction in V1 and V2 should be the ECG tracing of the posterior infarction. In addition, diastolic murmurs, although uncommon, may occur. TLC, total lung capacity; RV, residual volume. Cecil Textbook of Medicine. In addition, the use of a cardiac monitor, pulmonary artery catheter, or intraaortic balloon pump indicates a more seriously ill patient who may have rhythm or hemodynamic disturbances (Fig. 2002;134:203–205. Exposure to carbon monoxide can be life threatening: many suicides are committed by overexposure to carbon monoxide. Identification of the risk factors and symptoms of arterial disease is a component of the history that assists in the assessment of arterial disease. Salvi S.S, Krishna M.T, Sampson A.P, et al. The thoracic erector spinae muscles extend the thoracic spine and raise the rib cage to allow greater expansion of the thorax. Angiotensin-Converting Enzyme Inhibitors and α-Receptor Blockers The combined use of ACE inhibitors, vasodilators, and venodilators has been demonstrated to be very effective in reducing symptoms and improving exercise tolerance.181 The primary mechanism of action of these inhibitors is probably via the reduction of angiotensin II, a hormone that causes vasoconstriction,174 but other less well-defined actions may be responsible for the therapeutic effects of ACE inhibitors in patients with CHF. Cardiac involvement is commonly manifested as diastolic dysfunction due to infiltration of rigid amyloid fibrils and sometimes systolic dysfunction. Symptoms Both cardiovascular and pulmonary symptoms need to be evaluated. James P, Oparil S, Carter B. Pharmacologic management at each phase of the continuum, from ischemia to infarction, is driven by the pathophysiologic conditions, patient’s hemodynamic stability, and patient comfort. The website was created through collaboration between the Center for Rehabilitation Outcomes Research (CROR) at the Rehabilitation Institute of Chicago and the Department of Medical Social Sciences Informatics at Northwestern University Feinberg School of Medicine. (From Leung CC, Tak Sun Yu I, Chen W: Silicosis, Lancet 379(9830):2008 - 2018, 2012.) Diagnostic Tests Diagnosis is made based on a history of substantial exposure to silica, exclusion of other competing diagnoses, and chest radiography (Fig. A comparison of cardiopulmonary exercise test and 6 minute walking test in determination of exercise capacity in chronic obstructive pulmonary disease. Blood Lipids Elevation in blood lipid levels (hyperlipidemia) is considered a major risk factor contributing to CAD.25 The concentrations of serum cholesterol and triglycerides are the blood lipids of concern. It inhibits the vasomotor center in the brain and reduces peripheral resistance and cardiac output. Profile of Mood States. In 2008 approximately 159,400 Americans died of lung cancer: 88,900 men and 70,500 women.29 In the same year, almost 219,000 new cases of lung cancer were diagnosed.32 FIGURE 5-13 Age-adjusted mortality rates for asbestosis in US residents aged 15 or older by state (1990-1999). Essen, Germany: Viavital; 2008. Int J Sports Med. Heart disease in myasthenia gravis. Snell G, Westall G. ■ Compression is applied using a pressure gradient (higher distally, lower proximally) that uses special short-stretch bandages in phase I and then garments (during the day) in phase II. Skin: 3+ edema bilateral ankles, pacer incision clean and dry. 1997;66:239–246. Quick action by the therapist may solve this unstable clinical situation. Inability to complete the five transfers indicates a failure of the test, and the therapist should not talk to the patient during the test. Molken established an α value of 0.70 as sufficient and measured the reliability of the CRQ to be 0.84 to 0.87 for the four portions of the questionnaire.181 Wijkstra found a low internal consistency of the dyspnea measure with α values equaling 0.51 and 0.53.182 Emotion, fatigue, and mastery, however, displayed high consistency with α ranges 0.71 to 0.88. However, Bittner and colleagues143 found patients unable to ambulate greater than 300 m had poorer long-term survival. Occup Med. The frequency of suctioning is determined by the amount of secretions produced in the airway. Ischemia within the coronary arteries can result in ACS or an MI; within cerebral arteries may result in a transient ischemic attack (TIA) or cerebrovascular accident (CVA); or within peripheral arteries, peripheral arterial disease (PAD) may result in claudication. The vestibule of the nasal cavity is lined with skin containing many coarse hairs and sebaceous and sweat glands. 2004;364:1343–1360. For details, refer to Chapter 17. 1-10 depicts examples of some selected types of mucosal coverings in the upper and lower respiratory tracts. Unfortunately, some of the more seriously ill patients can neither tolerate the sitting position at the time of initial visit nor perform adequate deep breaths for auscultation. Changes in vascular flow and caliber 2. The rib cage takes on a barrel shape, affecting the ribs’ ability to move in the normal bucket and pump handle motions. Philadelphia: Elsevier Saunders; 2005. Endocrine and nutritional disorders and heart disease. 1984;129:593. 1982;306(12):699–705. The hemothorax is usually not massive because the lung is perfused at low pressures, so the bleeding is not profuse. Laragh J.H. Atrial natriuretic hormone, the renin-aldosterone axis, and blood pressure-electrolyte homeostasis. Because the outcome of optimal health is not tied solely to any one of these variables, a comprehensive collection of information is necessary to guide and optimize appropriate care. This makes it easier to use the inhaler and helps ensure that more of the medication gets into the lungs instead of just into the mouth or the air. The ankle brachial index is associated with leg function and physical activity: The Walking and Leg Circulation Study. Diastolic dysfunction is an independent risk factor for death in patients with sickle cell disease. These alterations contribute to cardiopulmonary dysfunction. Carrieri-Kohlman V. Hirsch M.A, Toole T, Maitland C.G, et al. These ports are connected to pressure transducers. Cardiac involvement in myotonic muscular dystrophy (Steinert’s disease): A prospective study of 25 patients. The accessory muscles are the sternocleidomastoid, the levators, the scalenes, and the pectoralis major muscles. Katzung B.G. Basic and Clinical Pharmacology. If the patient is unable to cough effectively, the nasal and oropharyngeal areas can be suctioned while using supplemental oxygen to prevent desaturation. If the individual took nitroglycerin while at the office and the pain disappeared before the ECG was administered, abnormalities may be absent due to the resolution of the ischemic event. Steare S.E, Dubowitz V, Benatar A. Several studies have shown the association of future cardiovascular events with an elevated amount of coronary calcifications and reported that coronary calcium predicts cardiovascular events more accurately than does risk stratification using conventional risk factors.90–93 The determination of coronary calcifications allows the identification of patients with a high risk for future MI and CAD within an asymptomatic population. 2014;25(2):38–49. Immunologic testing detects antiacetylcholine receptor antibodies in the serum. Examples of the most prevalent expectorants are simple hydration (via aerosol, i.e., 3% saline or orally, iodinated glycerol, and glyceryl guaiacolate [guaifenesin]). Lund V.J. Nasal physiology: Neurochemical receptors, nasal cycle and ciliary action. Reliability scores above 0.70 are considered clinically appropriate.25 Responsiveness/Sensitivity to Change The sensitivity of a tool refers to its ability to statistically detect change over time in a given patient population, and the responsiveness refers to the detection of clinically relevant change.28 For example, if the patient has made improvements, are those improvements consistently and accurately quantified by the chosen outcome tool and does this change make a difference (i.e., is it clinically relevant)? 1989;247(3):1039–1045. The goal of dosing is to give the minimal amount of drug needed for the desired effect. Antitussives may be classified as topical anesthetics (e.g., benzonatate, Tessalon), nonnarcotics (e.g., dextromethorphan, Congespirin for Children, Mediquell, Pertussin), and narcotics (e.g., codeine, morphine). Outcomes evaluation in cardiac rehabilitation/secondary prevention programs. Family history of heart attack: A modifiable risk factor? Intensive lifestyle changes for reversal of coronary heart disease. In: American College of Sports Medicine, ed. Endocrinology. American Thoracic Society. In addition, the more disease specific the type of measure is, the more likely you are to identify quantifiable changes in that specific patient population. A disorder affecting the lungs has a direct effect on the heart and vice versa. The patient often experiences relief of the dyspnea in this position. 2005;25:352–364. 147. Jameson S. In the event the patient does not present with a medical record, the therapist must try and obtain similar information as best as possible. Examination and assessment procedures Elements of Patient Management Patient History Medical Chart Review Interview with the Patient and the Family Systems Review Physical Examination Evaluation Summary 17. Lung Transplantation Lung transplantation can be defined as the replacement of poorly functioning lung tissue in the recipient with better-functioning lung tissue (the lung tissue is never normal; there is always some preservation injury) from the donor.67 The many aspects of this surgical therapeutic intervention are discussed in Chapter 12. Distribution of blood supply within the heart is variable from one individual to another because of the presence of collateral circulation involving the formation of new blood vessels (angiogenesis) in areas of the heart that are partially occluded. The effects of balance training and highintensity resistance training on persons with idiopathic Parkinson’s disease. For example, pulmonary patients with infection who are being monitored for improvement can be followed by checking temperature and in some cases respirations and heart rate. 2007;44:1334–1342. Whellan D.J, O’Connor C.M, Lee K.L, et al. This gas has more than 200 times the affinity for hemoglobin compared with oxygen.12 This means that when carbon monoxide is taken into the lungs, it diffuses quickly into the pulmonary capillaries, enters the red blood cells, and binds with hemoglobin to form carboxyhemoglobin. Renal insuffic ienc y Causes fluid overload, whic h frequently progresses to CMD and CHF that may be reversed. General fatigue, achiness, and abdominal discomfort may accompany elevated lipid levels. In addition, the cuff around the catheter causes fibrin and collagen deposition under the skin that provides stability and provides a second internal barrier against infection. When only V1 and V2 are involved, these infarctions are often called septal infarctions because they primarily affect the interventricular septum. Low D.E, Trulock E.P, Kaiser L.R, et al. These are discussed in greater detail in Chapters 8 and 10. These patients are at high risk for excessive bleeding due to the inherent thrombolytic, fibrinolytic, antiplatelet, and anticoagulant properties of many of the agents used to reverse the blockage responsible for the initial coronary event (Table 14-5). CO2, carbon dioxide; DLCO, diffusing capacity of lung for carbon monoxide; FEV1, forced expiratory volume in 1 second; FVC, total amount of air exhaled during the FEV test; IPF, idiopathic pulmonary fibrosis; RV, residual volume; TLC, Total lung capacity. Watson T, Mock V. ■ Nonsteroidal antiinflammatory drugs often increase sodium retention, cause peripheral vasoconstriction,23 and impair the action of diuretics and ACE inhibitors. A wide range of treatment protocols are used to address the many underlying causes. Philadelphia: Mosby; 2004. In addition, instructing patients to increase the respiratory rate to a level that allows one to converse comfortably may be another method for prescribing exercise training in patients with CHF (“talk test”).202 Table 4-16 Exercise training guidelines for patients with CHF From Cahalin LP: Heart failure, Phys Ther 76(5):516, 1996. 2008;4:CD000990. Chronic kidney disease and the risks of death, cardiovascular events, and hospitalization. 2002;166(10):1338–1344. Aerobic exercise, lipids and lipoproteins in overweight and obese adults: a meta-analysis of randomized controlled trials. In addition to being highly predictive of CAD, hypertension, acute coronary syndrome, stroke, and overall mortality, low ABI values are associated with physiologic dysfunction such as elevated levels of hemostatic and inflammatory markers, impaired endothelial function, declines in functional mobility, and poorer quality of life.44–46 Still, lower extremity ischemia is often underdiagnosed and undertreated.47 In a study by Cacoub and associates, among 5679 adults age 55 years or older with cardiovascular risk factors, including symptoms of PAD, history of a cardiac event, or two or more cardiovascular risk factors (smoking, hypercholesterolemia, diabetes, and or hypertension), the prevalence of PAD was more than 26% and as high as 38% in some subgroups.48 Other programs have also successfully identified significant numbers of individuals with PAD. The ST-segment elevation with ventricular aneurysm never returns to the isoelectric line, and the configuration differs somewhat. Butler B.B. Physical therapy in heart and lung transplantation. In individuals with chronic bronchitis, this ratio may be as high as 8 to 10, whereas it normally is less than 3 to 10.27 Surface epithelial secretory cells are increased, and patchy areas of squamous metaplasia may replace normally ciliated epithelium. Starling E.H. On the absorption of fluids from the connective tissue spaces. Vitamins C and E, as well as various minerals, have shown some promise as important supplements to the diet of persons with CHF.160–163 Dietary changes are also important for persons with CHF and include decreasing sodium intake, fluid restrictions, and eating heart-healthy foods that are low in cholesterol and fat. The nasal cavity is a wedge-shaped passageway divided vertically into right and left halves by the nasal septum and compartmentalized by the paranasal sinuses (Fig. Blood Pressure Study 1979. The strongest diuretics are those that act at the Henle loop (loop diuretics); the milder diuretics are those that act on the proximal tubules and the collecting tubules and ducts. A randomized control trial of post thoracotomy pulmonary rehabilitation in patients with respectable lung cancer. 2005;20(1):102– 106. Dracup K, Baker D.W, Dunbar S.B, et al. 194. Rose B.D. Pathogenesis of essential hypertension. When the monitor sounds the alarm, the cause must be explored. Thus when renal function becomes impaired, the resultant metabolic disturbances affect virtually every other body system. Although restrictions on any activity might be unnecessary, patients with abnormal systolic blood pressure responses should be monitored closely during typical activities and especially during new exertional activities. To measure the regional distribution of ventilation in the lungs, the patient breathes xenon gas (133Xe). Çiftci F, Şen E. 2001;163:283. Acute pericarditis, defined as an inflammation of the pericardial sac, is often a complication following myocardial infarction and open heart surgery. Kramin S.S. Determination of the site of production of respiratory sounds by subtraction phonopneumography. Fukuta H, Goto T, Wakami K, Ohte N. Olson A.L, Zwillich C. Diabetic autonomic neuropathies. Chipkin S.R, Klugh S.A, Chasan-Taber L. Starling and colleagues115 demonstrated a significantly increased risk of death after MI when both ST-segment depression and angina were produced during low-level exercise testing in the early period after an MI. Richerson H.B. Lung defense mechanisms. A PE is a clot that reaches the lungs. Complete obstruction to flow will cause tissue necrosis and possibly loss of the limb (Fig. Maes H.H, Neale M.C, Eaves L.J. Genetic and environmental factors in relative body weight and human adiposity. Complete worldwide operative experience in laparoscopic diaphragm pacing: Results and differences in spinal cord injured patients and amyotrophic lateral sclerolsis patients. Interventions and prevention measures for individuals with cardiovascular disease, or risk of disease 19. Phys Ther. 1997;34:306–311. 1987;59:9G–17G. During inhalation, the therapist stretches the chest by pulling the pelvis back and down and the scapula up and away from the spine. Treatment At present, there is no effective standard treatment.23 However, based on research over the past 10 years and new understanding of the pathogenesis, the pharmacologic approach to the disease has changed. As previously mentioned, a greater transpulmonary pressure is required to achieve a normal VT. Criner G, Belt P, Sternberg A, et al. Most tests are symptom limited and, as such, are terminated at the request of the patient or on the identification of an abnormality in one or more of the parameters being measured. Although the heart rate provides an accurate measure of exercise intensity, it is helpful to use the ventilatory index, RPE scale, oxygen saturation (SpO2), and respiratory rate for additional information to guide ADLs and activity progression from bed mobility, to sitting up in a chair, and finally to ambulation. Amsterdam: Elsevier Science; 1985:189–230. Because of the pain, the tone in the muscles of the thorax and the abdominal wall increases, thereby decreasing chest wall compliance. Acta Med Scand Suppl. A normal sound is when normal lung tissue is percussed and normal resonance is produced. Circulation 119(14):1977–2016, 2009.) The major principles of diuretic use are as follows: ■ Higher doses are required to restore than to maintain optimal volume status. Chronic kidney disease: Effects on the cardiovascular system. ■ During weaning, the patient will be monitored for respiratory rate, depth and pattern, arterial blood gas (ABG) values, pulse oximetry, cardiac rate and rhythm, and mental status changes. (A Modified from Wilkins RL: Egan’s Fundamentals of Respiratory Care, ed 9. When the patient leans forward on supported hands, the intraabdominal pressure rises and thus pushes the diaphragm up in a lengthened position. Beta-Blockers In their review of multiple controlled studies regarding the efficacy of the use of β- blockers in patients with HF, the ACCF/AHA 2013 Practice Guidelines states that the “long-term treatment with beta blockers can lessen the symptoms of HF, improve the clinical status of patients, and enhance the patient’s overall sense of well-being. Computed tomography scan revealed a large parietal lobe infarct on the left. Pendse S, Singh A.K. Complications of chronic kidney disease: Anemia, mineral metabolism, and cardiovascular disease. 5-13).43-45 FIGURE 5-12 Primary lung cancer metastasizes to pleura, lymph, bone, brain, kidney, and liver. 2003;107(5):757–761. Transient splitting of the first or second sound may be noted during inspiration. ■ The preoperative rehabilitation program includes patient and family education, cardiovascular endurance training, musculoskeletal strength and flexibility training, and breathing retraining. Colberg S.R, Grieco C.R. Exercise in the treatment and prevention of diabetes. Libby P, Bonow R.O, Mann D.L, et al. Evidence that homocysteine is an independent risk factor for atherosclerosis in hyperlipidemic patients. Smooth muscle, located within the coronary arteries and peripheral vascular system, as well as within the sinoatrial and atrioventricular nodes of the heart, is more dependent on extracellular calcium; striated muscle, myocardium, and coronary veins have a primary affinity for intracellular calcium. 1999;57:31–47. A stationary bicycle and/or portable treadmill may be used to progress the patient’s cardiopulmonary endurance; this precludes the need to mobilize all of the patient’s medical equipment for exercise. The physician should determine a minimum acceptable saturation level that the therapist then uses to determine exercise or functional mobility training and provide titration guidelines, should the patient’s SpO2 level decrease with activity. cAMP is metabolized by phosphodiesterase. Adolesc Med. Experimental Biology of the Lymphatic Circulation. ■ The primary role of the acute care physical therapist is shifting from providing treatment to acting as a consultant, offering recommendations based on the patient’s functional status and rehabilitation potential, and assisting with determining discharge destination and equipment needs. There exists a primary difference between normal ventilation and mechanical ventilation. Recommendations for blood pressure measurement in humans and experimental animals: Part 1: Blood pressure measurement in humans: A statement for professionals from the Subcommittee of Professional and Public Education of the American Heart Association Council on High Blood Pressure Research. For example, a patient with chronic obstructive disease may have a hyperinflated chest, which increases the AP diameter (more barrellike). Effect of training on enzyme activity and fiber composition of human skeletal muscle. Jones P.W, Harding G, Berry P, et al. 1976;194:199–200. Fascioscapulohumeral dystrophy and the scapuloperoneal syndromes have also been associated with atrial paralysis. 2003;348:2059–2073. This technique should be used only after other techniques have been attempted. In addition, if the patient is hypotensive or in shock, fluid therapy and vasopressors may be needed. 1997;12(Suppl 1):134–145. The latter are more pronounced in geriatric patients. This distance is also used as a guideline as to when someone should be listed for lung transplantation.147 In pediatric and adult patients, pre–lung transplant trials of the 6MWT have been predictive of both the need for transplant and their posttransplant survival. Scientific and Standardization Committee Communications: On behalf of the Control of Anticoagulation Subcommittee of the Scientific and Standardization Committee of the International Society of Thrombosis and Haemostasis. Patients undergo periods of exacerbation and remission throughout the course of AS, with the severity of symptoms occurring in the first decade of diagnosis. A paradox. 279. This layer consists of simple squamous endothelium overlying a thin areolar tissue layer.18 The tissue of the endocardium forms the inner lining of the chambers of the heart and is continuous with the tissue of the valves and the endothelium of the blood vessel. Normal peak flows average 9 to 10 L/sec. This is conveyed to the brainstem by the chemoreceptors. 1987;9(4):849–857. Abnormal Diastolic Responses As stated previously, a normal diastolic blood pressure response is one in which a change is no greater than 10 mm Hg: an abnormal diastolic blood pressure response would be either an increase or decrease of more than 10 mm Hg (in an untrained or older population). Systemic Circulation Oxygenated blood ejected out of the heart flows through the aorta into systemic arteries. He is 67 inches tall and weighs 270 pounds, which is 50 pounds more than he weighed at the time of his bypass surgery. Peritoneal dialysis is commonly associated with pleural effusions and an elevated diaphragm. This physical state can result in a decrease in endurance and activity tolerance and may limit functional mobility. In addition, most cardiac drug activity has been studied in adults, and the paucity of controlled research on the immature patient causes further concern regarding optimal drug therapy in this population. 291. The H1 receptors, primarily located in vascular, respiratory, and gastrointestinal smooth muscle, are specifically targeted for blockade by antihistamines in the treatment of asthma.54 H1-antagonists decrease the mucosal congestion, irritation, and discharge caused by inhaled allergens. 83. Minimally Clinically Important Difference (MCID) The MCID refers to the amount of change you need to see in an outcome measurement to determine if true clinical change has been attained. Other subsets of patients have been identified who demonstrate certain signs and symptoms that suggest a greater risk for the subsequent development of a cardiac event. The most common decongestants are α-adrenergic sympathomimetics, specifically α1 agonists.52,53 These medications stimulate α receptors and cause vasoconstriction, reducing or preventing the underlying pathology. The restrictive impairments caused by pneumothorax and hemothorax described earlier are present, and in addition the damaged lung tissue is not participating in gas exchange.32 Diagnostic Tests Pneumothorax is often visualized on the chest radiograph, and blood gas analysis can be used to assist in indicating the level of pulmonary involvement. N Eng J Med. These include the vena caval opening for the inferior vena cava; the esophageal opening for the esophagus and gastric vessels; and the aortic opening containing the aorta, thoracic duct, and azygos veins. 157. During the exercise treadmill test, he exercised at 2.5 miles per hour with 12% grade but complained of dizziness at 4.5 minutes of the exercise test. Both resistance and treadmill exercise improve walking distance, walking speed, and lower extremity endothelial function and increase life expectancy in those with lower extremity PAD.52–54 Screening of lower extremity ischemia in those at risk for cardiovascular compromise has been found to decrease rates of amputation, decrease cardiovascular morbidity and mortality, reduce the severity of vascular illnesses, and improve quality of life.55–58 FIGURE 22-1 Sample form of cardiac rehabilitation patient assessment and treatment plan. Because of the increased pressure, more fluid is moved out of the pleural capillaries and less fluid is reabsorbed. Medicine (Baltimore). ■ The cardiac muscle has three properties: automaticity, rhythmicity, and conductivity. Compressing the surfactant molecules increases their density and builds up a film p

years.79 Drug therapy for pediatric patients parallels therapy for adults. 4-14, B). Primary c auses: pathologic proc esses in the heart musc le itself, whic h impair the heart’s ability to c ontrac t. Subclasses A, B, and C all significantly block the sodium channel of depolarized cells, but vary in the degree of sodium-channel block in normal cells. The Lung Fields Although the lobes of the lung cannot normally be distinguished, knowledge of lobar and segmental anatomy is crucial to an assessment of the lung fields. Killip classification as a significant, sustained, consistent predictor and independent of relevant covariables Data from Gallindo de Mello BH, et al. Results of a 1-year intervention from the Oslo Diet and Exercise Study. ■ The frequency of lymphangion contraction (lymphangiomotoricity) can be increased by appropriate manual techniques. 190. ■ Included in the cardiopulmonary examination (assessment) is a thorough chart review to identify past medical history, diagnostic studies, and current medical status. Hyperglycemic patients have an increased incidence of pulmonary infections and tuberculosis, which is manifested more frequently in the lower lobes.28 Diffuse alveolar hemorrhage has also been reported in diabetics and may be due to inflammation and necrosis of the pulmonary capillary endothelium. There is minimal evidence suggesting that it also might be useful in assessing pain.7 The BIS measures the muscular and cortical activity using a single, small, flexible sensor that is applied to the forehead and temporal region.8 The sensor provides rapid feedback for quick titration of medication and an objective score. The FDA has approved the use of carvedilol for mild to severe classes of HF based upon the results of the COPERNICUS study.26 Metoprolol succinate has FDA approval for mild-tomoderate HF on the results of the MERIT-HF trials.27 Because of the benefits of β-blockers in decreasing the risk of disease progression and clinical deterioration in patients with HFrEF, early use of β-blockers is recommended even when symptoms are mild or improved. Cushman W.C. The clinical significance of systolic hypertension. However, when breathing patterns deviate from the norm, patients cannot be assured of receiving the intended FiO2, fraction of inspired oxygen. Implications for Physical Therapy Intervention Because of the high prevalence of ASHD in patients with PAD, all patients should be monitored during physical therapy evaluation and initial treatment, including the monitoring of heart rate and blood pressure. Pfeffer M.A, Lamas G.A, Vaughan D.A, et al. Patients with long-standing CHF, however, are generally not tender to palpation, although hepatomegaly is frequently present. In the proliferative phase, fibroblasts and type II epithelial cells proliferate in conjunction with interstitial collagen deposition. Koehorst M.L, van Triiffel E, Lindeboom R. Ray J.F, Yost L, Moallem S, et al. Muscles: Testing and Function. It is considered a centrally located tumor and occurs in the peripheral lung only about 30% of the time. 2006;113:e463–e654. The most marked decreases in lung volumes are seen in the IRV and ERV. Examination • Tests: Cardiac catheterization showed 100% blockage of right coronary artery (RCA), 90% blockage of left main coronary artery, and ejection fraction = 7%. 1993;13(6 Pt 2):101S–109S discussion 143S–146S. Orthopnea 5. Dangerously high levels of potassium (greater than 5.0 mEq/L) can affect the contractility of the myocardium. In the patient with HFrEF, digitalis was previously a common first-line drug choice. 1997;7:85–92. Ex-vivo lung perfusion. However, there is a significant drive toward making access easier, and in many centers, MRI already has become a primary diagnostic tool.13 Clinical tip Magnetic resonance imaging may be indicated in individuals with abnormal chest radiographs that show a nodule or mass. Action of aminophylline on the strength of contraction of the diaphragm in patients with chronic obstructive respiratory insufficiency. 303. Boston: Blackwell Scientific Publishers; 1992. † Oxygenation may be improved by increasing FIO2 or PEEP. Predischarge initiation of carvedilol in patients hospitalized for decompensated heart failure: Results of the Initiation Management Predischarge: Process for Assessment of Carvedilol Therapy in Heart Failure (IMPACT-HF) trial. All of the patient’s activities, as well as any symptoms that may be felt during the 24 hours, are documented by the patient. Boris M, Weindorf S, Lasinski B, Boris G. A, The chest. These multiple peripheral pulmonary nodules have a pigmented ring of coal dust surrounding the lesion. The problem of post-breast cancer lymphedema: Impact and measurement issues. Doyle S.L, Donohoe C.L, Lysaght J, Reynolds J.V. Visceral obesity, metabolic syndrome, insulin resistance and cancer. With some drugs, symptoms may be delayed for months or years (e.g., cyclophosphamide). Pediatric cardiopulmonary physical therapy Respiratory System Development Cardiac Development Congenital Heart Defects Respiratory Conditions of Infancy Pediatric Conditions with Secondary Cardiopulmonary Issues Pediatric Conditions with Decreased Activity Levels and/or Altered Posture Physical Therapy Examination Physical Therapy Evaluation, Diagnosis, and Prognosis Physical Therapy Intervention Summary 21. This accounts for their therapeutic and adverse effects. Larson E.B, Bruce R.A. Health benefits of exercise in an aging society. Stein P.D, Matta F, Musani M.H, et al. Although these issues may occur in younger age groups, the elderly are especially susceptible to these problems. Some studies have identified a possible association between elevated WBC counts and increased risk of CAD.39 Decreased WBC count (leukopenia) is found with bone marrow depression, acute viral infection, alcohol ingestion, and agranulocytosis. 2001;33(1):2–8. Therefore each treatment session is, in essence, a monitored activity session, requiring constant reevaluation and assessment as to the significance of the clinical findings. Kaplan R, Atkins C, Timms R. These techniques facilitate inspiratory effort and assist in ventilation and perfusion matching. This may occur with use of sedatives, bed rest, lack of deep breathing, and when a patient has been under general anesthesia.1 Both resorptive and passive atelectasis are associated with postoperative or bedridden patients. A significant number of them, however, experience lifealtering changes in their physical, cognitive, and emotional functioning. Thromboplastin is also required; at the time of injury, injured tissue releases thromboplastin and therefore makes it available to interact with factor X (Fig. Rössner S, Hammarstrand M, Hemmingsson E, et al. Prophylaxis against pulmonary complications in patients undergoing gallbladder surgery: A comparison between early mobilization, physiotherapy with and without bronchodilation. The console also has extensive back-up and fault-management features (Fig. Palpitations usually indicate arrhythmias.43 Palpitations must be evaluated to determine the seriousness of any rhythm disturbances as well as the cause of any symptoms. Int J Cardiol. Other disease states such as kidney, liver, or nutritional deficiencies, which often accompany aging, can alter the effectiveness of cardiac drug therapy. 1. Pulmonary function levels as predictors of mortality in a national sample of IS adults. Pinsky M.R, Summer W.R. Cardiac augmentation by phasic high intrathoracic pressure support in man. • Musculoskeletal: No abnormalities found in ROM, strength 2/5 UEs, 2/5 LEs, all mobility skills required moderate to maximal assist. 1994;97(3A):18S–21S. The referral for cardiac rehabilitation was written on August 11, 2010, at which time the patient was assessed and complained of left scapular pain that increased with deep breathing (different from previous angina and altered with breathing pattern). However, lung dysfunction occurs in only 3% of the population with kyphoscoliosis (see Fig. Pieters M.N, Schouten D, Van Berkel T.J. In vitro and in vivo evidence for the role of HDL in reverse cholesterol transport. Without heart and breath there is no therapy! Acknowledgments “Change is good and change equals opportunity!” This statement explains how I have approached each edition, but most especially this edition! Hopefully you will gain knowledge and insight from all the changes as there are many excellent contributions from my colleagues, who are THE experts in cardiovascular and pulmonary physical therapy and who poured their passion into their chapters. Peric ardial effusion Injury to the peric ardium c an c ause ac ute peric arditis (inflammation of the peric ardial sac surrounding the heart) and progress to peric ardial effusion and c ardiac c ompression as fluid fills the peric ardial sac . Elevated blood pressure due to cyclosporine is usually well controlled by one or two agents, such as ACE inhibitors and β-blockers.88 Another CI, tacrolimus (Prograf), has been shown to be as effective as cyclosporine with less nephrotoxicity.85 A group of drugs also found to inhibit T- and B-lymphocyte proliferation and with similar action to CIs are the target of rapamycin inhibitors (mTOR inhibitors). A cervical injury also results in the loss of the sigh reflex, which increases the incidence of atelectasis and contributes to alveolar collapse. ■ Frequent complications of the transplant patient include rejection, infection, steroid myopathy, osteoporosis, and malignancy. 1994;15:661–674. Ciliated cells are found in all levels of the tracheobronchial tree down to the level of the respiratory bronchioles. Limper A.H. Chemotherapy-induced lung disease. Coronary atherosclerosis in diabetes mellitus. Typically, obstructive diseases are characterized by delayed and incomplete emptying of the lung during exhalation. (Redrawn from Scully R, Barnes ML: Physical Therapy, Philadelphia, 1989, J B Lippincott.) A hypotensive or blunted blood pressure response indicates that either the cardiac output is failing to meet the demands of the body or that the peripheral vascular resistance is rapidly decreasing. See the section on myocardial oxygen supply and Table 14-5. Once the patient is breathing (or being mechanically ventilated) effectively, additional interventions may be provided. Also, when choosing an appropriate outcome measure, it is necessary to gather certain information about the tools with regard to their psychometric properties as well as their ability to measure change. A normal FEV1/FVC ratio is considered to be greater than 75%,19 and the ratio’s value reflects the increased time it takes to expel air as an obstructive disease becomes more severe. For the rehabilitation staff, fewer days in the hospital means that the number of physical therapy visits is decreased and the goals must be accomplished more quickly than in the past. 2012;92(12):1536–1545. Anderssen S.A, Holme I, Urdal P, Hjermann I. Although the gold standard for measurement of functional exercise capacity is a measurement of volume of oxygen consumption (VO2max), many therapists will not have access to the equipment needed to make VO2 measurements in their day-to-day treatment environment. FIGURE 17-4 Cough assist machine (see also Fig. Venodilators Nitrates reduce preload via venodilation. Voltage is recorded on the vertical axis, and each small square is 1 mm. Ellestad described a subset of patients at double the risk of a subsequent coronary event when angina and ST-segment depression occurred together, compared with patients without angina but with ST-segment depression (silent ischemia).125 The incidence of sudden death is increased in the following subsets of patients: ■ Those unable to exceed a maximal systolic blood pressure of 130 mm Hg ■ Those with increased frequency and severity of arrhythmias during testing137 Calculating a probability score from the combination and weighing of clinical variables from the exercise test identifies the subsets of individuals at greater risk for coronary events. 1991;5(1):21–26. Hodis H.N, Mack W.J. Triglyceride-rich lipoproteins and progression of atherosclerosis. 1995;109:49–59. 2008;456:643–647. 10-2) and (2) a left lateral view (Fig. 1994;90:1866–1874. b Caused by decreased activity of the central nervous system. Phillips R.E, Feeney M.K. The Cardiac Rhythms: A Systematic Approach to Interpretation. Ribavirin is used in children to treat the respiratory syncytial virus. The distance of more than 1000 feet on the pretransplantation 6MWT leads to shorter intensive care unit (ICU) stays and fewer days of mechanical ventilation. 2010;5:202–210. Idiopathic kyphoscoliosis is usually divided into three groups by age at onset: infantile, juvenile, and adolescent (10 to 14 years of age), with most cases appearing in the adolescent group. Am J Hum Genet. Congestive heart failure and depression in older adults: Clinical course and health services use 6 months after hospitalization. Dechman G, Wilson C.R. Evidence underlying breathing retraining in people with stable chronic obstructive pulmonary disease. The RUL has three segments, including the apical, posterior, and anterior segments. The highest risk group for thrombophlebitis is orthopedic patients. Tiep B.L, Christopher K.L, Spofford B.T, Goodman J, Worley P.D, Macey S.L. Pulsed nasal and transtracheal oxygen delivery. The tip of a properly placed endotracheal tube should be approximately 2 inches above the carina when the patient’s head is in the neutral position. Psychophysical basis of perceived exertion. Stiller K, Phillips A, Lambert P. 1986;8:II187–II190. 167). Bacteria can be divided according to their in vitro staining as gram-negative or gram-positive bacteria. The primary adverse effect of nonnarcotic and narcotic antitussive agents is sedation. ■ The presence of an S3 heart sound indicates a noncompliant left ventricle and occurs as blood passively fills a poorly relaxing LV. IN Rector TS, Cohn JN: Assessment of patient outcome with the Minnesota Living with Heart Failure Questionnaire: Reliability and validity during a randomized, double-blind, placebo-controlled trial of pimobendan. 82. 1997;2:259–264. Thus although TLC may not change with age, RV increases and dynamic volumes therefore decrease.11,12 Closing volumes are increased, which results in early closure of the small airways, particularly in the dependent lung regions. 1990;35(4):332–341. On correction of these conditions, persistent cardiac rhythm disturbances that are hemodynamically significant require drug therapy. 2007;115(14):1948–1967. Sympathetic (catecholamine-driven) increases in heart rate, force of myocardial contraction, velocity, and extent of myocardial contraction, as well as systolic blood pressure, are prevented by β blockade.188,189 β Blockers interfere with the sustained activation of the nervous system and therefore block the adrenergic effects on the heart. Table 22-9 lists the benefits of both generic and disease-specific quality-of-life instruments. There were no studies found that specifically assessed the reliability and validity of people with cardiovascular and pulmonary diagnoses. Cardiovasc Clin. 1989;334(8653):44–45. A decrease in lung tissue density, as in the emphysematous lung, would cause decreased sound transmission. 3-18).309 Implications for Physical Therapy Although individuals with AAAs often have no symptoms, the most common signs/symptoms include: ■ Pulsating tumor or mass in abdominal area (although often not reliable) ■ Bruit heard over swollen area in abdomen ■ Abdominal, back, or flank pain ■ Leg pain/claudication pain ■ Numbness in the lower extremities ■ Excessive fatigue, especially with walking ■ Poor distal pulses, especially the dorsalis pedis ■ Low back pain with elevated pressure that may indicate renal artery aneurysm During the initial assessment, the therapist should identify risk factors for aneurysm, especially age (>60 years) and immediate family history (see Table 3-9). UpToDate. The hemodynamic significance of the disease depends on the location and number of lesions in an artery, the rapidity with which the atherosclerotic process progresses, and the presence and extent of any collateral arterial system. Cough-suppressive drugs, or antitussive agents, act either to block the overly active receptors or to increase the threshold of the cough center in the medulla portion of the brain. Tremendous advances have been made in surgical technique, medications, and the surveillance and management of complications. The use of continuous milrinone therapy as bridge to transplant is safe in patients with short waiting times. FIGURE 14-4 Determinants of action potential rate and diastolic interval, as seen in Purkinje fibers. 1993;88:2771–2779. Monitor oxygen saturation with a pulse oximeter. Wilson L, Felsenfeld A, Drezner M.K, et al. Acute pericarditis is a condition that causes ECG changes that differ from those caused by ischemia and infarction. 5-27). In: Lefcourt H, ed. Nesiritide (Natrecor) is a recombinant form of human BNP, and is a potent vasodilator. ∗ Six classic signs of RLD. All chapters were updated with new information, technology, and research. In: Eckel R.H, ed. Metastases to the liver and the adrenal glands are often clinically silent.9 Other clinical symptoms caused by tumor hormone production that are of particular interest to the physical therapist include abnormalities in the neurologic or musculoskeletal systems. Clinical and laboratory research continues in an attempt to identify agents that act on specific components of the immune system while leaving other parts of this system unaffected. When treating patients with a pulmonary arterial catheter, recognition of the “normalcy” of the potential waveforms is key to deciding whether or not it is advisable to perform physical therapy. Some studies have shown that a transverse abdominal incision results in better postoperative lung volumes and fewer postoperative pulmonary complications than the vertical midline abdominal incision. Cardiac and skeletal myopathy associated with cardiac dysrhythmias. The ECG may demonstrate ST-segment depression while the patient is at rest in the presence of chest pain or of suspected coronary ischemia. The chest radiograph shows bilateral patchy alveolar infiltrates, usually in the lower lobes, with nodular infiltrates and cavitation.32 Treatment always involves two drugs. Classical risk factors and emerging elements in the risk profile for coronary artery disease. Sheppard M. Role of physical exercise in children and adolescents with diabetes mellitus. This includes an antiproliferative agent, a calcineurin inhibitor, and a steroid. Testing the hemoglobin A1C (Hb A1c is normally 4.8% to 6.0%) measures a diabetic’s insulin control during the past 90 days, which is the life of the RBCs that carry the hemoglobin.22 See Chapter 7 for more information on diabetes. 2005;95(10):1192– 1198. 152. 1989;56:267–283. 1995;28:21–30. Safian R.D, Textor S.C. Renal-artery stenosis. 180. Research is also ongoing to address the immunologic factors present in transplantation using a different species, or xenotransplantation. Library of Congress Cataloging-in-Publication Data Names: Hillegass, Ellen A., editor. An MRI is primarily indicated for the evaluation of chest wall processes that may involve bone, muscle, fat, or pleura. Often, LMWH is used in both inpatient or outpatient settings, unless the individual has impaired kidney function, at which time he or she would be prescribed heparin. 12-10). Interventions for acute cardiopulmonary conditions Airway Clearance Techniques Breathing Strategies, Positioning, and Facilitation Breathing Exercises Special Considerations for Mechanically Ventilated Patients Exercise Injury Prevention and Equipment Provision Patient Education Discharge Planning Pediatric Considerations Summary 18. Quality of life is associated with physical activity and fitness in cystic fibrosis. The hydrogen nuclei tend to align themselves with the magnetic field and resonate at a frequency that is proportional to the strength of the magnetic field. Webber B.A. Evaluation and inflation in respiratory care. WHO definition of health. Verapamil (Isoptin, Calan), a calcium-channel blocker (class 4 antiarrhythmic), has been used in the management of SVT not requiring cardioversion. Augmenting cardiac contractility hastens myocardial edema resolution after cardiopulmonary bypass and cardioplegic arrest. The type I sensitivity reaction occurs immediately and is related to IgE antibody activity on mast cells, which in response release large amounts of histamine. Chaparro C, Maurer J.R, Chamberlain D, et al. Hoffmann C, Falzone E, Tourtier J.P, et al. Adapted from Rakel R: Conn’s Current Therapy, Philadelphia, 1999, WB Saunders. 2000;102:1014–1019. Lehmann K.G, Platt M.S. Improved accuracy and precision of thermodilution cardiac output measurement using a dual thermistor catheter system. Laboratory values showing liver involvement include abnormal aspartate aminotransferase (AST), bilirubin, and lactate dehydrogenase (LDH-5). Murmurs Murmurs can be very complex and difficult to understand for the entry-level practitioner. Patients may often develop musculoskeletal pain from bed rest and inactivity, which are frequently associated with diseases of the cardiopulmonary system. Precautions and relative contraindications for percussion and vibration are listed in Box 17-2. Unfortunately, it may cause significant toxicity and adverse drug interactions in critically ill patients. Therefore patients develop muscular fatigue faster because they are using muscle groups that are not as “trained” as the muscles used for walking. Clinical Implications for Physical Therapy As discussed, patients with CRF are often debilitated and have poor tolerance for activity. The CES-D scale: A self-report depression scale for research in the general population. Hematological-oncological disorders and heart disease. Clinical tip Range-of-motion activities are tailored to the patient’s level of participation. (From Kacmarek R, Stoller J, Heuer A: Egan’s Fundamentals of Respiratory Care, ed 10, St. Louis, 2013, Mosby.) As discussed in Chapter 2, a decrease in compliance of the lungs indicates that they are becoming stiffer and thus more difficult to expand. The most common psychological impairments seen in patients with pulmonary diseases, including COPD, are depression and anxiety.6–9 Prevalence of depression and anxiety in the pulmonary population are estimated to range from 10% to 80%.6 The wide variation in prevalence of depression and anxiety are due to differing instruments and methods used to screen and detect these conditions in individuals’ with COPD. Table 15-3 Ancillary pulmonary medications The adverse effects most often attributable to antihistamines include sedation, fatigue, dizziness, blurred vision, loss of coordination, and gastrointestinal distress. In order for actin and myosin to form cross-bridges, calcium must bind with troponin. Note the locations of the phrenic nerves and openings for the inferior vena cava, esophagus, and abdominal aorta. In addition, individuals with right-sided heart failure and bilateral peripheral edema demonstrate diminished pulses in the foot and ankle. Cannon G.W, Zimmerman G.A. The Lung in Rheumatic Diseases. Treatment is with tetracycline or chloramphenicol.10,30 Neoplastic Causes Bronchogenic Carcinoma Lung cancer, collectively called bronchogenic carcinoma, is a growth of abnormal epithelial cells in the tracheobronchial tree.32,43 As the tumor enlarges, irritation occurs in the airways and alveoli, causing swelling, fluid buildup in adjacent alveoli, mucus production, and eventual obstruction.43 This growth or tumor may spread by infiltrating surrounding tissues, such as the mediastinum, chest wall, ribs, or diaphragm, or by metastasizing to other body organs, or both (Fig. The LifeVest may provide protection as a bridge to an implantable defibrillator (ICD) or cardiac transplantation. Therapists must monitor for adverse responses in heart rate and provide supplemental oxygen as needed. 1971;60(4):341–346. 161. The Hila Formed by the root of the lungs (comprising the pulmonary blood vessels, the bronchi and a group of lymph nodes), the hila are at about the T4-T5 level and appear as poorly defined areas of variable density in the medial part of the central portion of the lung fields. Assessment of hemodynamic compromise, consequences, and symptom prevalence in an emergency or long-term-care setting is considered. Arch Phys Med Rehabil. Emphysema “In emphysema of the lungs, the size of the vesicles (alveoli) is much increased, and is less uniform. 1992;232:297. 1986;1:143–149. Baigrie R.S, Haq A, Morgan C.D, et al. 30. 9-46). 1989;44:634–639. Tobacco smoking and cardiovascular risk. The major signs and symptoms of lower extremity DVT include pain, tenderness, swelling, warmth, or redness/discoloration. Vital exhaustion, anger expression, and pituitary and adrenocortical hormones. B, A left bundle branch block. However, it should be noted that the test is still quite new and, therefore, more testing should be done to continue to ensure that this test is valid and reliable with different patient populations within the ICU. 16-13). The greater the amount of lung tissue that was removed, the smaller the amount of lung space that is available (one would expect) to actively diffuse oxygen and carbon dioxide and therefore the greater the impairment in performance of activities. monitoring, 419–427 See also Monitoring measures and equipment noninvasive ventilatory devices, 429–433, 429b bilevel positive airway pressure (BiPAP), 429, 429f, 429b comparisons of, 432t continuous positive airway pressure (CPAP), 429, 429b demand pulsing oxygen delivery devices, 431 manual resuscitators, 430, 430f masks, aerosol, 431, 431f, 432t masks, nonrebreather, 432, 432f, 432t, 432b masks, simple, 430f, 431, 432t masks, venturi, 431–432, 431f, 432t nasal cannula, 430–431 noninvasive positive-pressure ventilation (NPPV), 429–430 oxygen delivery devices, 430–432, 430f pediatric, 432–433 transtracheal oxygen, 431 overviews of, 419, 443 resources for, 443 ventilation terminology, 436t LifeVest defibrillators, 438, 439f Limbic influences, 24 Limb pressures, segmental, 295 Lipedema, 668–669 Lipids, blood, 270–271, 270t–271t Lipoproteins high-density (HDL), 47, 680 low-density (LDL), 43, 47, 680 Liver diseases, 251–252 cardiomyopathies, cirrhotic vs. The thebesian veins (venae cordis minimae) vary greatly in their number and size. 2-1).2–4 As mentioned earlier, the volume of air normally inhaled and exhaled with each breath during quiet breathing is called the tidal volume (TV or VT). In addition, the mean corpuscular volume (MCV) test measures red blood cells (RBCs) in terms of individual volume. Actuarial survival of heart-lung and bilateral sequential lung transplant recipients with obliterative bronchiolitis. Most healthy individuals excrete within a narrow range. 1-17) ensure one-way blood flow through the heart. A prolonged or complicated hospital course can affect an individual’s activity progression due to the effects of inactivity or bed rest. β Blockers are usually prescribed in conjunction with ACE inhibitors and in combination have demonstrated a reversal of the LV remodeling that occurs with injury and long-standing muscle dysfunction, improves symptoms, prevents rehospitalizations, and prolongs life. ■ Are your symptoms stable or are they getting worse? Adams J.H, Corsellis J.A.N, Duchen L.W. Greenfield’s Neuropathology. J Hum Hypertens. Deep breathing exercises are indicated for the patient with atelectasis, which is caused by hypoventilation and the collapse of alveoli in the lungs.18 The use of an incentive spirometer is an effective way to practice diaphragmatic breathing, prevent or reverse atelectasis, and stimulate a cough (Fig. However, there are reports of a lack of response to corticosteroids, even during the acute radiation pneumonitis phase.10 Corticosteroids offer no help in treating chronic radiation fibrosis and should not be used prophylactically because terminating corticosteroid therapy may actually precipitate radiation pneumonitis. Discussion This case study is an example of an 85-year-old patient who underwent bypass surgery after the following occurred: 1. Commonly used agents are heparin sodium (Heparin, Liquaemin Sodium), enoxaparin sodium (low-molecular-weight heparin [LMWH]; Clexane, Lovenox), and warfarin (Coumadin). Because certain medications may affect the patient’s responses to exercise, the physical therapist must become familiar with the broad categories of cardiac and pulmonary medications, understand the indications for their use, and know their general side effects. The autoimmune rheumatic diseases can affect all pulmonary structures (the respiratory muscles, the pleura, the small airways, the interstitium, and the pulmonary vessels), either separately or in combination, and all cardiac structures (endocardium, myocardium, conduction system, pericardium, and coronary arteries), as shown in Table 7-16, and this involvement is often responsible for increased morbidity and mortality.228–230 Not infrequently, pulmonary involvement precedes the musculoskeletal manifestations by several months to several years and appears as pleuritis, infection, pneumonitis, interstitial disease, and pulmonary vascular disease. By palpating the accessory muscles, in particular the scalenes and the trapezii, an assessment of the amount of work of breathing may be made (Fig. What are the goals of physical therapy treatment postoperatively? The electrolytes involved in maintaining cell membrane potential—Na+, K+, and CO2—are the most important electrolytes to monitor. A chest wall low in compliance limits thoracic expansion and, therefore lung inflation, even if the lung itself has normal compliance. When the pulmonary vascular hydrostatic pressure rises above 25 to 30 mm Hg, the oncotic pressure loses its holding force and fluid is allowed to spill into the interstitial space. For example, rejection may be noted in a lung transplant patient by a decrease in SpO2 and reduced exercise tolerance during a rehabilitation session. That is, troponin I: 0 to 0.1 ng/mL (onset: 4 to 6 hours, peak: 12 to 24 hours, return to normal: 4 to 7 days); troponin T: 0 to 0.2 ng/mL (onset: 3 to 4 hours, peak: 10 to 24 hours, return to normal: 10 to 14 days).11 Current research has demonstrated an increase in the cardiac troponins with heart failure and renal insufficiency; therefore the troponins alone may not indicate specificity of MI.12 Several studies have shown an increased short-term mortality rate (30 to 40 days) in individuals with elevations in cTnI and cTnT.13–17 Myoglobin is a heme protein found in all muscle tissue and has recently come under study as a potentially powerful diagnostic tool for acute MI. Cardellach F, Galofre J, Cusso R, et al. It ejects blood to the lungs via the pulmonic semilunar valve into the pulmonary artery. 5-14).46,47 Clinical Manifestation The clinical manifestation of bronchogenic carcinoma can be found in Table 5-13. Surgical intervention includes placement of Harrington distraction strut bars. Table 7-20 Pulmonary toxicity associated with cancer treatments Autoimmune Rheumatic Diseases The autoimmune rheumatic diseases are systemic diseases that are characterized by immune-mediated inflammatory abnormalities that affect the joints, muscles, and connective tissues. Gambassi G, Lapane K.I, Sgadari A, et al. The pressure settings of the BiPAP machines require constant supervision. Clinical risk factors for primary graft dysfunction after lung transplantation. ■ The classic signs of RLD include tachypnea, hypoxemia, decreased breath sounds, dry inspiratory rales, decreased lung volumes, decreased diffusing capacity, and cor pulmonale. Treatment for this type of chest pain includes medication to decrease the acid reflux into the esophagus, sublingual nitroglycerin, and calcium-channel blockers.42 Shortness of Breath Shortness of breath is one of the other common symptoms found in patients with cardiopulmonary dysfunction. 4-22 outlines these treatments, and a brief discussion of each reveals how the pathophysiology of CHF is affected with each of the following measures. It can cause any of the following side effects: exacerbation of arrhythmias, sinus bradycardia, photosensitivity, hepatotoxicity, hypothyroidism or hyperthyroidism, pulmonary fibrosis, skin pigmentation, corneal deposits, peripheral neuropathy, and general malaise.37 Patients on amiodarone should be monitored for increased weakness, fatigue, and shortness of breath, as this may indicate toxicity (pulmonary). Physiology and Pharmacology of the Respiratory System Symposium proceedings. Research shows that an individual diagnosed with a subendocardial infarction is at extremely high risk for another infarction (this time transmural) within 6 weeks.9 Other situations may precipitate ST-segment depression. The most common clinical condition for vascular diseases within the veins is venous thromboembolism (VTE). For this reason, the cardiac index, which is the CO per square meter of body surface area, is often reported. 1996;15:547–555. 1988;77:504–514. Chimowitz M.I, Mancini G.B. Asymptomatic coronary artery disease in patients with stroke. 1982;14:377–381. Specifically, it is a measure of the flow for 1 L of expired gas immediately following the first 200 mL of expired gas. Glueck C.J, Shaw P, Lang J.E, et al. Superiorly located within the sternum, the manubrium is the thickest component articulating with the clavicles and first and second ribs. These components include:266 BO X 4- 7 Ene rgy conse rva t ion t e chnique s for individua ls wit h he a rt fa ilure • Sit while working whenever possible. It is continuous with the loose connective tissue of the neck and extends inferiorly onto the diaphragm. Rutan G.H, Kuller L.H, Neaton J.D, et al. Indications for use of the Holter monitor include identifying symptoms possibly caused by arrhythmias (e.g., dizziness, syncope, palpitations, or shortness of breath at rest as well as with activity), describing the arrhythmias noted with activity (frequency and severity), and evaluating antiarrhythmic therapy and pacemaker functioning. Mol Pharmacol. Risk factors for exercise-related hypoglycemia include intensive insulin therapy and tight glycemic control (so smaller safety margin), inadequate food intake preceding exercise (e.g., when a meal is delayed or skipped), rapid absorption of depot insulin from an injection site near exercising muscle, exercising at the time of peak insulin effect, and prolonged moderate-intensity exercise. 1987;257(23):3233–3240. The fissures (or chasms) demarcate the lobes in each lung. The patient’s hands are positioned on his or her abdomen for proprioceptive feedback, and the patient is asked to sniff three times and then exhale slowly. Lung volumes are decreased, and the distribution of ventilation is altered, causing an increase in ventilation–perfusion mismatching. The purpose of palpation is to evaluate the mediastinum (for tracheal shift), chest motion, chest wall pain, fremitus, muscle activity of the chest wall and diaphragm, and circulatory status. Scherer S, Wilson C. To employ pursed-lip breathing, a patient is instructed to inhale through the nose for several seconds with the mouth closed and then exhale slowly over 4 to 6 seconds through lips held in a whistling or kissing position. Accessed February 2010. 2012;85(1):133–141. This breathing pattern is used because trunk extension coincides with inspiration, just as trunk flexion does with exhalation. Martín-Valero R, Zamora-Pascual N, Armenta-Peinado J.A. Training of respiratory muscles in patients with multiple sclerosis: A systematic review. 126. Pulmonary rehabilitation following lung transplantation. Facilitation of mucociliary/secretion clearance 3. Gardner A.W. Peripheral arterial disease. If the nitroglycerin does not “burn,” the effect of the drug may be substantially reduced. For example, patients with serious complications within the first 4 days of a myocardial infarction have a higher incidence of later serious complications or death. Schweickert W.D, Gehlbach B, Pohlman A.S, Hall J.B, Kress J.P. Daily interruption of sedative infusions and complications of critical illness in mechanically ventilated patients. The alveolar surface area and the alveolar parenchymal volume are decreased. The lungs on this circuit are ventilated, and medications can be given to correct unacceptable conditions such as contusion, atelectasis, aspiration, infection, or neurogenic edema formation. This abnormal process decreases the available hemoglobin-binding sites for oxygen and significantly decreases the oxygen-carrying capacity of the blood.10 The third cause of pulmonary dysfunction is the inhalation of noxious and toxic gases, the effects from which are dependent on the materials being burned. These muscles arise on the inner surfaces of the ribs and costal cartilages and insert on the upper borders of the adjacent ribs below (see Fig. The popularity of β-blockers as part of an antiischemic regimen cannot be disputed. According to the National Institute for Occupational Safety and Health, there has been a decrease in U.S. death rates due to silicosis, from about 1200 in 1968 to fewer than 100 per year in the early 2000s. However, 63% of patients were still prescribed steroids 1 year after transplant in the literature as recent as 2007.85 Calcineurin Inhibitors These medications inhibit calcineurin, a phosphatase enzyme important for the production of cytokines. Scalene Muscle The scalene muscles lie deep to the sternocleidomastoid, but may be palpated in the posterior triangle of the neck. Drugs administered through sublingual routes enter the circulation through the systemic veins that drain the highly vascular oral mucosa and do not pass through the GI system or portal circulation. A decrease in preload in a failing heart decreases myocardial oxygen demand and may improve contractility (refer to sections on diuretics and antihypertensive drugs). Implications for the mechanism of the training response. In addition, information on hemodynamic measurement (e.g., estimates of ejection fraction or systolic and diastolic pressures), as well as valvular function, can be obtained. Injection is one form of parenteral administration, a nongastrointestinal (i.e., nonenteral) route. Moinuddin I, Leehey D.J. A comparison of aerobic exercise and resistance training in patients with and without chronic kidney disease. The therapist can minimize stimulation to the infant by coordinating position changes for bronchial drainage with other patient care procedures. 16-15). Perrin C, Unterborn J.N, D’Ambrosio C, et al. Normal response to activity is for the O2 saturation to remain in the normal range. Therefore assessment of cholesterol abnormalities involves lipoprotein assessment. Healing and revascularization of the tracheal anastomosis following heart-lung transplantation. 1910;26:839– 844. www.joslin.org. Heterotopic heart transplantation in three patients at the Texas Heart Institute. Pulmonary rehabilitation 20. If this is not effective, attempt inspiratory facilitation with chest wall stretching or manual bagging. Coronary blood flow is the prime mechanism for supplying oxygenated blood to the myocardium. The lowermost lobe, the RLL, consists of four segments (anterior basal, superior basal, lateral basal, and posterior basal). Heart. Involvement of the heart can lead to secondary myocardial fibrosis, cardiomyopathy (either restrictive or dilated), and conduction disturbances or arrhythmias. Are peripheral lymphatics damaged by high pressure manual massage? 2007;131:1541–1549. † For patients with obstructive disease, ensure a short inspiratory time and long expiratory time to avoid air trapping and minimize auto-PEEP. (From Scully C: Medical Prob lems in Dentistry, ed 7, Edinburgh 2014, Churchill Livingstone.) Auscultation of the Lungs Auscultation is an evaluation technique used to confirm the findings of chart assessment and inspection, as well as to rule out other cardiopulmonary dysfunction. The volume of air that remains in the lungs after a forceful expiratory effort is called the residual volume (RV). The tool has scoring multiplication factors for each domain, which then give you a score per domain and a total score for the whole tool. Defining the MCV therefore assists in treatment of the cause of the anemia.43–45 Clinical tip Many facilities use a cutoff value for Hb of less than 8 g/100 mL as a red flag for out-ofbed activities. In some instances, once a medication schedule has been interrupted, such as a delay in taking pain medications, the prescribed dosage may be insufficient for patient comfort or desired action. There is evidence of respiratory muscle weakness contributing to restrictive lung dysfunction in patients with ESRD, which improves following renal transplantation. Deficient production of cyclic AMP. Although rarely recognized clinically, impaired ventilatory function occurs in 50% to 87% of patients and tends to be proportional to the severity of the skeletal muscle disease and improves with effective treatment.262–265 Erratic or chaotic breathing due to the rigidity and weakness of the respiratory muscles, as well as abnormal control of ventilation, is common and results in restrictive lung dysfunction, decreased maximal inspiratory and expiratory forces and peak expiratory flow rate, and reduced maximum voluntary ventilation on PFTs. Upper airway obstruction is found in 5% to 62% of patients, most likely due to involvement of the upper airway musculature.263,266 In addition, an obstructive pulmonary disease may be associated with PD. To maximize endogenous energy stores, a meal containing 200 to 350 g of carbohydrates along with fats and protein should be ingested about 3 to 6 hours before a sports competition. 16-19, C). 1996;53(2):589–594. The next offshoots from the lower lobe bronchus are the anterior basal segmental bronchus, which continues its descent anteriorly, and a very small trunk that almost immediately splits into the lateral basal segmental bronchus (distributed to the lower lateral area of the lower lobe) and the posterior basal segmental bronchus (distributed to the lower posterior area of the lower lobe). Three major muscles assist with movement of the bony framework of the nose. François M, Caprini A, Hosking B, et al. 2006;26:213–231. BO X 22- 7 De script ion of TUG 1. Strohle A, Feller C, Strasburger C, et al. Boccardo F, Casabona F, De Cian F, et al. Dev Dyn. Philadelphia: Saunders; 1988. Physical activity in patients with deep venous thrombosis: a systematic review. Thus a drug is now any chemical that the Food and Drug Administration (FDA) allows medical professionals to prescribe or use in order to diagnose, prevent, or treat diseases. 5-25, A).3,9 This bony abnormality occurs in 3% of the population. ■ If arterial reperfusion of the myocardium occurs within 20 minutes of myocardial ischemia, necrosis can be prevented. The trachea normally appears as a vertical translucent shadow superimposed on the mediastinal shadow in the midline, overlying the cervical vertebrae. The hemodynamic effects and potential consequences of the arrhythmia dictate subsequent patient management and program planning. Infusions by the intravenous (nitroglycerin given temporarily during the acute stages of myocardial ischemia, for example) or subcutaneous (insulin pumps) routes and use of patches on the skin are examples of continuous administration. ■ Bilevel positive airway pressure (BiPAP) ventilation: A noninvasive technique used to provide ventilatory support to a spontaneously, but insufficiently, breathing patient using a face mask or nasal mask. Normal ranges for these physiologic parameters are listed in Table 17-5. 2005;85(10):1034–1045.

Therapy, Duke University Health System, Durham, North Carolina Kate MacPhedran, PT, PhDc, CCS Instructor, Doctor of Physical Therapy, Gannon University, Erie, Pennsylvania Frailty Consultant, Consultants in Cardiovascular Diseases, Inc., Saint Vincent Hospital, Erie, Pennsylvania Susan Butler McNamara, MMSc, PT, CCS, Team Leader, Division of Rehabilitation Medicine, Maine Medical Center, Portland, Maine Harold Merriman, PT, PhD, CLT, Associate Professor, Department of Physical Therapy, University of Dayton, Dayton, Ohio Andrew Mills, PT, DPT, Assistant Professor, School of Physical Therapy, Touro University Nevada, Henderson, Nevada Amy Pawlik, PT, DPT, CCS, Program Coordinator, Cardiopulmonary Rehabilitation Therapy Services The University of Chicago Hospitals, Chicago, Illinois Christiane Perme, PT, CCS, Senior Physical Therapist, Department of Physical Therapy and Occupational Therapy, The Methodist Hospital, Houston, Texas Karlyn J. Fowler M.B, Laser J.A, Hopkins G.L, et al. Grady K.L, Jalowiec A, White-Williams C, et al. His goal is to return to his previously active lifestyle, so he was referred for an evaluation and exercise program. 2004;291(7):809–810. No matter the etiology, RLD effects a reduction in the ERV; this reduction is particularly pronounced if a decrease in lung compliance is the principal etiologic factor. 2003;21:463–466. Quantification of Impairment in Obstructive Lung Diseases Pulmonary Function Testing Spirometry tracings measure time–volume relationships in the lung (see Chapter 10). Boston: McGraw-Hill; 2009. The sickness impact profile—Development of an outcome measure of health care. A distinct cirrhotic cardiomyopathy that differs from alcoholic cardiomyopathy has been identified in patients with nonalcoholic cirrhosis, which is associated with hyperdynamic circulatory function, patchy myocardial fibrosis, subclinical diastolic and systolic dysfunction, an impaired myocardial response to an erect posture, and eventually high cardiac output failure.311 These individuals also exhibit autonomic dysfunction with enhanced SNS tone and vagal dysfunction, which is directly related to the severity of cirrhosis. 2012;71(1):181–189. Cardiovasc Res. ■ A physical therapy program should be designed according to the patient population and should assist the patient in functional recovery. In addition, frequently associated with CHF is a breathing pattern characterized by waxing and waning depths of respiration with recurring periods of apnea. Shumway-Cook A, Brauer S, Woollacott M. Sympathetic nervous activity during exercise in relation to age. Diaz-Collins M. Depression and anxiety predict healthrelated quality of life in chronic obstructive pulmonary disease: Systematic review and meta-analysis. These targeted therapies are still being assessed for impact on survival rate, but some initial studies are showing prolonged survival of patients with non–small cell lung cancer when added to chemotherapy.45 Surgical removal of the tumor remains the treatment of choice for all non–small cell lung carcinoma when the location of the tumor makes resection possible.32 The more defined and smaller the lesion, the better the surgical success rate. It has been well described in controlled clinical trials that carvedilol administered twice daily improves the left ventricular ejection fraction (LVEF) in patients with ischemic or nonischemic heart failure. The Cystic Fibrosis Quality of Life Scale Background and Administration The Cystic Fibrosis Quality of Life Scale (CFQoL) scale was developed to be a diseasespecific measure of HRQoL for people with CF. Among the protocols for low-level exercise testing, the modified Naughton (Table 8-7) and modified Sheffield–Bruce (Table 8-8) protocols appear to be most widely chosen. Lipid Disorders In 1985 a turning point occurred in the awareness and management of lipid disorders in the United States. Massery and Frownfelter11 recommend the following: FIGURE 17-2 A, Percussion is performed with “cupped” hands. Carbonic anhydrase III is a cytoplasmic protein that is present in skeletal muscle but not in cardiac muscle. 2014;29(3):475 e1–5. Birks E.J, Tansley P.D, Hardy J, et al. In addition, the route by which a particular medication is administered may significantly influence the extent of any adverse reactions.2,5,22 For example, inhaled sympathomimetic medications generate less profound deleterious side effects than when administered systemically. Angina stability was found to be correlated with the patient’s global assessment of change (r = 0.70 and p < 0.0001), and a correlation was also found between frequency of angina reported and 1-year nitroglycerin refills (r = 0.31, p = 0.0006, and p < 0.05). 1979;34(3):354–358. 2006;113:1424–1433. These guidelines represent a paradigm shift from treating cholesterol to a numerical “target” goal to recognizing high-risk groups and prescribing the appropriate high- or moderate-intensity statin therapy (Table 14-14).52 Specific lipid profile recommendations for any individual are strongly influenced by age, gender, and the amount of atherosclerotic risk factors present, as well as the medical conditions of diabetes, metabolic syndrome, and known atherosclerotic disease, such as peripheral vascular disease, abdominal aortic aneurysm, vessel inflammatory processes, and carotid stenosis.53 FIGURE 14-9 Lipid metabolism: Dietary fat is hydrolyzed by pancreatic lipase, absorbed by intestinal mucosal cells, and secreted as chylomicrons. PMH/PSH: Depression, deep-vein thrombosis (1 year ago), hypertension (diagnosed 1 year ago, has not taken β blocker, which was prescribed to treat HTN), moderate emphysema Medications: Procardia, Bumex, Lanoxin, Aspirin, K Lor SH/Mental Health Issues: Mr. Brown is a divorced autoworker who lives alone in a middle-class neighborhood. Digitalis’s effects on contractility are less potent than those of sympathomimetic parenteral inotropes, such as dobutamine (Dobutrex) or norepinephrine (Levophed), and therefore digitalis typically is not used for this purpose in critical care. Intermittent claudication. ■ Renal artery stenosis results from atherosclerosis of the renal artery and is associated with increased cardiovascular events and mortality. Pneumologie. Females generally demonstrate a greater percentage of false-negative results. The first year post-heart transplantation: use of immunosuppressive drugs and early complications. Exp Gerontol. Membrane stabilizers Class 1 drugs (membrane stabilizers) Class 1 drugs primarily block the fast sodium channels (acting like local anesthetics) and reduce the inflow of sodium ions. Byrne N.M, Hills A.P, Hunter G.R, Weinsier R.L, Schutz Y. Refer to the section on antihypertension drugs and see Fig. Nonexcretory functions of the kidney. As a result, medications to raise apo A-1 are currently in clinical trials for the primary purpose of decreasing the risk of CAD. 2001;120:375S. Other causes related to the cardiovascular system include pulmonary embolism, myocardial infarction, cardiac arrest, and myocarditis; however, due to improved pharmacologic treatments, the mortality in the SCI population does not differ greatly from the general population.43,44 Diagnostic Tests Diagnosis of SCI is often a result of medical history and physical examination. 1991;65(5):245–248. Each category is scored on a 0 to 4 scale with 0 meaning inability to perform the task and 4 meaning performing the task at the time level desired for that test. Other poorly understood mechanisms of such inhibitors include “nonspecific vasodilation with unloading of the ventricle, inhibition of excessive sympathetic drive and perhaps modulation of tissue receptor systems.”174 A great deal of interest has focused on the “prevention” hypothesis regarding the use of ACE inhibitors and the prevention of progressive CMD (dilation and CHF).182–185 Notably, captopril may prevent such progressive cardiac dilation.182,183 Recent studies have focused on the addition of β blockers to ACE inhibitors (and sometimes α-receptor blockers) and demonstrated a greater improvement in symptoms and reduction in the risk of death than when ACE inhibitors were used alone and the dosage was increased.186 α-Adrenergic Antagonists and Partial Agonists Perhaps one of the most confusing groups of medications used in treating CHF and CMD is the β-adrenergic blockers group. DeWitt D.E, Hirsch I.B. Outpatient insulin therapy in type 1 and type 2 diabetes mellitus. Primary viral pneumonia is a serious disease with diffuse infiltrates, extensive parenchymal injury, and severe hypoxemia. 142). Tecklin J.S. Pediatric Physical Therapy. Jonason T, Ringqvist I, Oman-Rydberg A. It is important for all therapists to recommend breathing, splinting, and coughing strategies for patients with rib fractures. A spacer device holds the medicine in a chamber after you squeeze the canister, allowing you to inhale slowly and deeply once or twice. Egophony is demonstrated when a patient is asked to say “E” aloud, but the sound that is auscultated over the chest is “A.” Bronchophony is demonstrated when a patient is asked to say “99,” and the words are auscultated clearly over the entire chest. (Redrawn from Oblouk DG: Hemodynamic Monitoring, Philadelphia, 1987, Saunders.) Evaluation of the Neck The activity of the neck musculature during breathing and the appearance of the jugular veins should be a part of the standard patient assessment. In well-compensated HF, there is minimal impact on daily function and it is usually easily managed by oral medications; conversely, poorly compensated HF is lifethreatening and often requires parenteral medications to maintain an adequate cardiac output and tissue perfusion. Awareness of the signs and symptoms of hypoglycemia and a quick and appropriate intervention are imperative. Decline in skeletal muscle mitochondrial respiration chain function with aging [letter]. 1992;102(5):1397–1401. 1982;33:236–238. The therapist slides the left hand to the patient’s right scapula and the left hand to the patient’s right iliac crest. Tests of the responsiveness of the COPD assessment test following acute exacerbation and pulmonary rehabilitation. This finding, although only recent, may prove to be more beneficial to emergency room monitoring of patients in the future than CPK and the troponins. FIGURE 16-16 Sudden reexpansion of collapsed peripheral airways. Dodd J.W, Hogg L, Nola J, et al. For example, Benno and colleagues evaluated 35 randomized controlled trials to evaluate exercise training on cardiac performance, exercise capacity, and quality of life and found exercise was related to significant improvements in blood pressure, enddiastolic volume, heart rate, cardiac output, peak oxygen uptake, anaerobic threshold, and the 6-minute walk test, in addition to improvements in the Minnesota Living with Heart Failure Questionnaire (a measure of HRQL).23 For these reasons, it is important for physical therapists to choose methods of quantifying outcomes that address success or achievements in the areas mentioned earlier. Frequently, obesity is confused with lipedema but there are several key differences. Capillaries can distend and accommodate to the volume of blood being delivered to the lung. 1999;99:1138–1140. Assessment of percussion, vibratory-shaking, and breathing exercises in chest physiotherapy. The course is set with two cones that are 0.5 meters from the end of the 10-meter course, allowing room for the patient to turn within the 10 meters (Fig. 2007;115:114–126. 2011;142:755–761. 2007;4:436–443. A number of deaths have been attributed to pulmonary involvement after crack cocaine use.30 Heroin An overdose of methadone hydrochloride, propoxyphene hydrochloride, or heroin can lead to a noncardiac pulmonary edema with interstitial pneumonitis. 2013;46:1–11. Baratz D.M, Westbrooke P.R, Shah P.K, et al. Although drugs such as β-adrenergic agonists, prostaglandins, corticosteroids, and methylxanthines are not considered bronchodilators, they may be utilized to promote bronchodilation through increased cAMP. Clustering of leukocytes along the capillary endothelial cells at the site of injury (margination) 5. However, preoperatively, anxiety levels may be high, which could be a barrier to learning. 2009;36:407–415. 2013;5(5):11– 19. Clapping on bony prominences such as the spinous processes of the vertebrae and the clavicles, as well as surgical incisions and medical appliances, should be avoided while performing percussion. 2003;31:278–283. Pathogenesis of atherosclerosis UpToDate. An MDI is a device that delivers a specific amount of medication to the lungs in the form of a short burst of aerosolized drug that is inhaled by the patient. The techniques are indicated for patients who have weakness of the diaphragm, are unable to correctly use the diaphragm for efficient inspiration, or who have inhibition of the diaphragm muscle due to pain. Venous thromboembolism: Reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients admitted to hospital. O’Sullivan F, Al-Haddad M. B from Kersten LD: Comprehensive Respiratory Nursing: A Decision-Making Approach, Philadelphia, 1989, Saunders.) Conditions such as an arteriovenous (AV) fistula, anoxia, and Paget disease may ultimately decrease the PVR and increase CO by increasing venous return to the heart. The KCCQ is much more sensitive to clinical change than the MLHFQ and has a greater sensitivity to clinical change than does the SF-36.85 The KCCQ is also highly responsive. Postural drainage may be used exclusively or in combination with other airway clearance techniques. BO X 13- 7 Possible com plica t ions of t he PA ca t he t e r Complications of insertion and dislodgement of the PA catheter include:13 • Malignant arrhythmias • Pulmonary artery rupture • Pulmonary valve tear • Infection For these reasons it is recommended that mobilization, if essential, only be undertaken by an experienced clinician after it has been determined that the patient is hemodynamically stable. Elderly patients often demonstrate difficulty with full compliance with drug prescriptions. The prognosis in ARDS is always guarded; mortality can be as high as 50% to 70%, especially if this syndrome is associated with failure in other organ systems or is complicated by serious or repeated infections.9,32 Table 5-16 Clinical manifestation of adult respiratory distress syndrome COPD, chronic obstructive pulmonary disease; DLCO, diffusing capacity of the lungs for carbon monoxide; FRC, functional residual capacity; Paco2, arterial partial pressure of CO2; PaO2, arterial partial pressure of O2; RR, respiratory rate; VC, vital capacity; VT, tidal volume. Fagard R, Staessen J, Thijs L, Amery A. The same six sections exist: Anatomy and Physiology; Pathophysiology; Diagnostic Tests and Procedures; Surgical Interventions, Monitoring and Support; Pharmacology; and Cardiopulmonary Assessment and Intervention. Each part will have increased or decreased priority according to the needs and medical condition of the patient. It may also be elevated with renal failure. 2009;57(14):1–134. 1992;101:8–11. In: Kaski J.C, Libby P, Waltham M.A, eds. 1978;73:399. Hayes Jr. D, Diaz-Guzman E, Davenport D.L. Lung transplantation in patients with coal workers pneumoconiosis. When squamous cell cancer does metastasize, it most often involves the liver, adrenal gland, central nervous system, and pancreas.32 Table 5-12 Descriptions of types of Bronchogenic Carcinoma Adenocarcinoma includes acinar adenocarcinoma, papillary adenocarcinoma, and bronchoalveolar carcinoma and accounts for 40% to 50% of all lung cancer.10 This is now the most common type of lung cancer in the United States.30,45 The majority of these tumors are located in the periphery of the lung and may not be spatially related to the bronchial tree. It is introduced via a central venous access point (e.g., internal jugular or subclavian vein), passing from the vena cava into the right atrium, through the right atrioventricular (tricuspid) valve into the right ventricle, through the pulmonary valve, and into the pulmonary artery (Fig. Inflammation is a main factor that results in bronchospasm in many respiratory disorders.12–14 Mediator substances released during inflammation may develop from plasma, adjacent cells, or the affected tissue, and are associated with eight cellular actions12,15,16: 1. 265. Cass M.H, Brock R. 2013;128:e240–e327. Differential distribution may occur as a result of one of the following situations: drug binding to proteins (especially plasma protein), difficulty of drugs crossing the blood-brain barrier of the central nervous system (CNS), or storage of drugs within body tissues (particularly adipose and muscle tissues). 16-17). As an example of accessory pathway–mediated tachycardia, the circuit would be antegrade unidirectional block in the accessory pathway with slow antegrade conduction over the AV node to the ventricle and return to the atrium due to retrograde conduction over the accessory pathway. Barlow C.W, Qayyum M.S, Davey P.P, et al. Refer to the text for details. Goodman C, Fuller K, Boissonnault W. The animal’s antilymphocytic globulin can then be injected into the transplant recipient, which ultimately causes cytotoxic destruction of the recipient’s lymphocytes. Clinical tip Inform the patient that a brand name drug and its equivalent generic drug contain the same medication and should work the same in spite of the fact that they may look different in shape and color and are less expensive. This action causes severe muscle spasticity with superimposed tonic convulsions. 1993;46(Suppl 2):6–32. This disease-specific questionnaire is a selfadministered questionnaire that requires approximately 4 to 6 minutes for the patient to complete. Cardiovascular Complications Chronic kidney disease increases the risk of major CV events, which appears even with relatively minor renal abnormalities, such as slightly reduced GFR or microalbuminuria occurring within the normal range, and intensifies in proportion to the severity of the disease, as shown in Table 7-15. When the tetracyclines were first introduced, they were effective against many grampositive and gram-negative bacteria, as well as organisms such as Chlamydia, Rickettsia, and Spirochaeta. Rhythm: irregular. (Part A from Hemmings: Foundations of anesthesia, ed 2. When exercise thallium imaging is performed, a patient is exercised to maximal exercise potential and injected with the thallium-201 1 minute before the end of the exercise. The firing of these receptors causes the patient to breathe in a shallow, tachypneic pattern. Saito T, Nanri S, Saito I, et al. 1986;146(3):489–493. Table 4-12 Outline of treatment of chronic congestive heart failure Treatment/P rescription Proper presc ription of physic al ac tivity Dec rease or disc ontinue exhaustive ac tivities Dec rease or disc ontinue full-time work or equivalent ac tivity, introduc ing rest periods during the day Gradual progressive exerc ise training that fluc tuates frequently from day to day Exerc ise intensity determined by level of dyspnea or adverse physiologic effort (i.e., angina or dec rease in systolic blood pressure) Restric tion of sodium intake Institute a low-sodium diet Digitalis glyc oside and other Dopamine inotropic agents Dobutamine Amrinone Diuretic s Moderate diuretic (thiazide) Loop diuretic (furosemide) Loop diuretic plus distal tubular (potassium-sparing) diuretic Loop diuretic plus thiazide and distal tubular diuretic Aldosterone antagonists S pironolac tone Vasodilators or venodilators Captopril, enalapril, or c ombination of hydralazine plus isosorbide dinitrate Intensific ation of oral vasodilator regimen Intravenous nitroprusside Angiotensin-c onverting enzyme β Bloc kers S pec ial measures Captopril—may prevent c ardiac dilation Enalapril maleate Lisinopril Metoprolol Buc indolol Xamoterol Dialysis and ultrafiltration Assisted c irc ulation (intraaortic balloon, left ventric ular assist devic e, artific ial heart) Cardiac transplantation Common Factors in Decompensated Heart Failure Not partic ipating in rehabilitation Not c hanging diet Toxic ity c an c ause arrhythmia Not watc hing water intake, weighing daily Nonc omplianc e with medic ations c an c ause unc ontrolled hypertension Nonc omplianc e with medic ations c an c ause unc ontrolled hypertension Nonc omplianc e with medic ations c an c ause unc ontrolled hypertension Nonc omplianc e with medic ations c an c ause unc ontrolled arrhythmias BO X 4- 5 C om m on pre cipit a t ing fa ct ors in de com pe nsa t e d he a rt fa ilure • Medicine and dietary noncompliance • Cardiac causes • Ischemia • Arrhythmia • Uncontrolled hypertension • Noncardiac causes • Infection (pneumonia with or without hypoxia) • Exacerbation of comorbidity (chronic obstructive pulmonary disease) • Pulmonary embolus • Toxins (nonsteroidal antiinflammatory drugs) • Volume overload The specific medications discussed here are used for the pharmacologic treatment of CHF, including diuretics, digitalis and other positive inotropic agents, dopamine, dobutamine, amrinone, vasodilator therapy, venodilators, ACE inhibitors, and βadrenergic blockers. Low CVP may be indicative of hypovolemia and dehydration. Also, blunting of the lateral costophrenic angle denotes pleural effusion (crossed arrow). Some physicians prefer to wait up to 2 weeks after the cardiac event before administering the low-level exercise test. The value is calculated from a blood sample drawn from the right ventricle through the pulmonary artery port of the Swan–Ganz catheter. FIGURE 13-1 ECG monitor. As a result of this ongoing assessment, a crucial responsibility of the therapist is to communicate these updated recommendations to other members of the health care team. Accessed July 17, 2009. In 2006 the Evaluation Database to Guide Effectiveness (EDGE) task force, created by the American Physical Therapy Association’s (APTA’s) Section on Research, identified a core set of measures for each practice area. Baltimore: Lippincott Williams & Wilkins; 2005. If the flow of air is impeded, the defect is obstructive. The effects of exercise training in addition to energy restriction on functional capacities and body composition in obese adults during weight loss: A systematic review. Quality of life among 5025 patients with left ventricular dysfunction randomized between placebo and enalapril: The study of left ventricular dysfunction. Conversely, in decompensated HF congestion is present with some degree of edema and biomarkers are increased. 218. When shortness of breath does develop during the assessment, these mechanisms need to be evaluated to determine the cause and to make appropriate clinical decisions regarding progression of activity. Clinical tip Cardiogenic shock is a condition in which the blood supply to the body tissues is insufficient because of inadequate CO. These patients may show purulent blood-streaked sputum, hemoptysis, cyanosis, and hypotension. Therefore physical therapists should be attentive to relevant symptoms, such as sleep disturbances, morning headache, excessive daytime somnolence, impaired concentration, and loss of appetite, and alert the patient’s physician if they are noted. Aspirin and angiotensinconverting enzyme (ACE) inhibitors may increase the patient’s susceptibility to hypoglycemia. 1998;81:13B–17B. Repositioning the patient may give a false-positive pharmacologic stress test result because of different degrees of attenuation of myocardial tissue imaging with changes in the breast positions as seen in women. The slower rate of rise aspect of the response is similar to that exhibited by highly trained individuals who also demonstrate a very gradual rate of rise in heart rate with increased work. Thorax. Benefit of exercise conditioning for patients with peripheral arterial disease. 1994;15:693–703. 1993;22(4 Suppl A):185A–191A. jhtml?identifier=183. Wells C.L. Physical therapist management of patients with ventricular assist devices: key considerations for the acute care physical therapist. Other Laboratory Values Other laboratory values may be abnormal but not usually indicative of cardiac dysfunction and instead may be related to other comorbidities. Abstaining from alcohol consumption early in the course of alcoholic CM may halt the progression of or even reverse LV systolic dysfunction. Most cases of chronic anemia are asymptomatic other than vague fatigue until the hemoglobin concentration falls below 50% of normal, whereupon more notable symptoms appear, including fatigue and weakness, exertional dyspnea and diminished exercise tolerance, palpitations, pallor, and sometimes tachycardia. Rib angles and intercostal spaces should be observed for abnormalities that might suggest the presence of chronic disease. Priority should be given to treating the most affected lung segments first, and the patient should be encouraged to take deep breaths in the PD position and cough (or be suctioned) between positions as secretions mobilize. ↑ Urine specific gravity 4. There is a shift from type I to type II skeletal muscle fibers, a reduction in mitochondrial density per fiber bundle, and a reduction in capillary density—all of which correlate to a reduction in aerobic metabolism and poor muscle endurance.3 These individuals also show higher levels of C-reactive protein and proinflammatory cytokines (interleukin-6 and -8, tumor necrosis factor [TNF])—inhibiting muscle contractility and mitochondrial biogenesis, as well as promoting muscle wasting.3 The decreases in strength of both the skeletal and respiratory musculature are “independently associated with poorer exercise capacity and lower extremity functioning across the spectrum of chronic obstructive pulmonary disease severity. In the early 1990s, the initial evaluation process was performed on an inpatient basis and took 5 to 7 days. BO X 22- 5 Pa t ie nt inst ruct ions for pe rform ing t he 6 - m inut e wa lk t e st pe r t he Am e rica n Thora cic Socie t y “The object of this test is to walk as far as possible for 6 minutes. Expired gas analysis is the reference standard for diagnosing and differentiating between cardiac and pulmonary causes of dyspnea as well as research outcome measures. 2009;32(Suppl 2):S184–S188. If the patient presents to a facility that does not perform PCIs or cannot be transferred to a facility and have the procedure performed within 120 minutes, then the use of thrombolytics is warranted (“door to needle”). Methodist Debakey Cardiovasc J. Clinical Manifestation The clinical manifestation of scleroderma can be found in Table 5-31. A clue to the natural history of atherosclerosis in the young. In heterotopic homologous cardiac transplantation, the recipient’s heart is left intact and the donor heart is placed in parallel, with anastomoses between the two right atria, pulmonary arteries, left atria, and aorta. Exerc ise training Assess: Func tional c apac ity (maximal or submaximal); physiologic responses to exerc ise. Compelling indications are those benefits that have been identified from outcome studies or clinical guideline recommendations for hypertensive therapies.46 FIGURE 14-7 Renal handling of Na+ along the nephron. With continuous monitoring of the patient’s rhythm, it can detect a lifethreatening arrhythmia and deliver a shock after checking the patient’s response to an alarm. 1991;67:1084–1089. The nonarticular part of the tubercle provides attachment for the ligament of the tubercle. Advances in the management of acute coronary syndromes have facilitated the growth of specialized critical care units. 2002;287:2081–2089. Takasaki Y, Orr D, Popkin J, et al. There may be outward bulging of a lobar fissure as a result of edema, and 25% to 50% of these patients have lung abscesses.35 Complications include empyema, lung abscess, pneumothorax, chronic pneumonia, pericarditis, meningitis, and anemia. Go A, Mozaffarian D, Roger V, on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee, , et al. Centers that provide these services should therefore be documenting both short-term and long-term (morbidity and mortality rates) outcomes for possible inclusion in medical insurance reimbursement plans in the future. A treatment strategy called lung protective ventilation is utilized where the goal is to achieve adequate gas exchange with the lowest possible TVs (4 to 8 mL/kg of ideal body weight), airway pressures (goal plateau pressures 30 cm H2O or less), and oxygen concentrations.52 This has been shown to reduce further damage due to mechanical ventilation.52 Positive end expiratory pressure of approximately 5 to 15 cm H2O is often utilized. One such questionnaire was designed by Rector and associates and is titled the Minnesota Living with Heart Failure Questionnaire.145 This questionnaire (Table 4-11) consists of 21 questions that the patient answers to the best of the patient’s ability. The three conduction pathways that exist between the SA and AV node include an anterior tract of Bachman, a middle tract of Wenckebach, and a posterior tract of Thorel.8 FIGURE 1-18 Conduction system of the heart. Inflammatory processes such as pneumonia, tuberculosis, or pulmonary emboli with infarction can begin in the lung but extend into the visceral pleura, causing disruption of the normal pleural permeability. Long and medium term results of a prospective, randomised trial. 2009;137:37. JM has just started an exercise class to help motivate her to lose weight. The tool has also shown high reliability. It should be noted, however, that there were no studies found that used the PSFS with cardiac or pulmonary patients specifically. The larger left anterior ventricular branches vary in number from two to nine, with the first being designated the diagonal artery. Cardiopulmonary Assessment and Intervention 16. When the diaphragm and external intercostals contract they increase the volume of the thoracic cavity and lung. 1905;10:1101–1102. (From Marchiori D: Clinical Imaging, ed 2, St Louis, 2005, Mosby.) Tests of Lung Volume and Capacity Tests of basic lung volumes and capacities are described in Figs. They are (1) compliance of both the lung and the chest wall; (2) lung volumes and capacities; and (3) the work of breathing. 2009;30:467–478. Gwynne J.T. High-density lipoprotein cholesterol levels as a marker of reverse cholesterol transport. However, depending on the oxygen concentration and its duration of administration, oxygen toxicity can occur. 1995;75(2):132–136. In states of inc reased rate of blood flow, it may be >10 mm Hg below phase 4. Patients with incompetent valves in their veins develop varicosities in their lower extremities. FIGURE 16-6 Invasive hemodynamic monitoring system. Lung volumes are significantly reduced, lung compliance is decreased, and the alveolar–capillary surface area available for gas exchange is cut by more than 50%.2,5,32 Hemothorax Hemothorax is the presence of blood in the pleural space. Obesity, identified as an important risk factor for both men and women, appears to interact with or amplify the effects of other risk factors, although the mechanisms are unknown. In addition, patients should abstain from smoking for a minimum of 6 weeks before surgery. 1981;64(6):1079–1088. Platelet and blood transfusions sometimes cause pulmonary edema. When an increased number of pauses is palpated, it might appear to the therapist palpating the pulse that the heart rate actually decreased with exercise, when in reality the number of arrhythmias increased. Ventricular assist devices A ventricular assist device (VAD) is a mechanical device that augments the pumping capability of the heart, providing the circulatory support necessary to sustain life. Egophony, bronchophony, and whispering pectoriloquy are three techniques to further evaluate the abnormal transmission of sound. Younger persons and trained athletes may demonstrate a progressive decrease in diastolic pressure during exercise as a result of the increased peripheral vasodilation. These drugs are divided according to their introduction into medicine as different generation drugs. 89. Secular trend in sedentary lifestyle among US adults with and without diabetes 1997–2004. In emergencies, either drug is delivered as a bolus injection that is followed by a subsequent continuous intravenous infusion. Length of time to the maximal level of impairment has not been shown to correlate with outcomes; however, the quicker recovery begins to occur, the less likely long-term disability will occur.53 Table 5-23 Clinical manifestation of Guillain–Barré syndrome ERV, expiratory reserve volume; IRV, inspiratory reserve volume; Paco2, arterial partial pressure of CO2; PaO2, arterial partial pressure of O2; RR, respiratory rate; TLC, total lung capacity; VC, vital capacity; VT, tidal volume. Utilize available pain medication and support your incision site with a pillow.” Effective technique for coughing can be demonstrated, followed by having the patient demonstrate the technique (Fig. 2007;49:403–414. In: Messerli F.H, ed. Important information can be obtained from the echocardiogram, including the size of the ventricular cavity, the thickness and integrity of the interatrial and intraventricular septa, the functioning of the valves, and the motions of individual segments of the ventricular wall. Cannon C.P. Expanding the treatment paradigm for acute myocardial infarction with GP IIb/IIIa inhibitors. Heat may be used to decrease muscular pain. Elevated hematocrit levels are often seen in individuals with chronic obstructive pulmonary disease (a response to chronic low PO2). The patient should be afebrile and must demonstrate an improving or stable chest x-ray, and respiratory secretions should be manageable. He has a 12th-grade education. 1996;45:185–188. Nudel D.B, Gootman N, Nussbaum M.P, et al. To become even a minimally competent clinician, you will have to practice physical therapy under the tutelage of an experienced clinician. St. Louis: Mosby-Year Book; 1995:380. Hlatky M, Boineau R, Higgenbotham M, et al. In Garson, A, Bricker JT, Fisher DJ, Neish SR, editors: The science and practice of pediatric cardiology, Baltimore, 1997, Williams & Wilkins, p 789, with permission.) The transducer at the end of the probe is positioned in the esophagus directly behind the heart. 2008;129:309–317. Adapted from Watchie J: Pharmacology: cardiovascular and pulmonary physical therapy a clinical manual, ed 2, St. Louis, 2010, Saunders. β-Blockers, used in patients with heart failure, also improve outcomes in this population due to their antiarrhythmic properties.40 Of note, β-blockers are prescribed cautiously due to their negative inotropic activity. Finally, the pulmonary system helps to filter and metabolize toxic substances, as it is the only orgran that receives all blood coming from the heart. 1993;37:181–188. 12-11 for examples of transplant recipients returning to high-level community activities. 1998;49:299–305. Bassuk S.S, Manson J.E. Epidemiological evidence for the role of physical activity in reducing risk of type 2 diabetes and cardiovascular disease. The outward movement is also facilitated by the external intercostal muscles. ■ Manual lymph drainage is a gentle manual treatment technique based on a comprehensive knowledge of the anatomy and physiology of the lymphatic system and can result in increased lymph flow into desired areas and around blockages. Hurst’s The Heart, Arteries and Veins. 2007;2:127–133. 2003;16:447–452. 34. The medications necessary after transplantation often produce significant adverse effects, as seen in Table 12-9. Arterial blood gases (ABGs) are frequently used to monitor the condition of patients in the critical care setting and to help modify respiratory interventions. 1985;5(Suppl 6):141B. Amrinone/inamrinone is relatively specific for myocardial and vascular smooth muscle because its vasodilatory effects are balanced between preload and afterload. Unstable angina may wake an individual up in the middle of the night. If the patient has a central intravenous line, a peripheral intravenous line directly over a joint surface, or an intraaortic balloon pump, then extreme ROM positions are to be avoided in the joint beneath the catheters. Treatment was initiated with low-level skills and progressed as JJ was able to tolerate higher-level skills and increases in intensity and duration. The necessity for the coordination of physical therapy and respiratory treatments to optimize rehabilitation should be readily apparent. Gloviczki P, Solti F, Szlavy L, Jellinek H. Specificity refers to training the muscles for the function they are to perform, for example, resistance applied to inspiratory versus expiratory muscles. 166. Bronchodilation and/or mitigation of bronchoconstriction 2. 1972;15(3):303–320. Antibiotic therapy should be pathogen specific if the pathogen can be determined; if not, an empiric regimen of multiple antibiotics may be needed. Table 16-1 Two-level DVT Wells score Wells PS, Anderson DR, Rodger M, et al: Evaluation of D-dimer in the diagnosis of suspected deep-vein thrombosis, N Engl J Med 349(13):1227–1235, 2003. Pleural effusions and ascites will compound pulmonary dysfunction as a result of restriction of ventilation, resulting in tachypnea and dyspnea. Values are approximate. 1994;3:111–119. lipolymphedema, 669 vs. Severely elevated creatinine levels greater than 4.0 mg/dL indicate severe renal insufficiency or failure. Földi E. When any of these alterations in the action potential occur, slow, fast, or escape rhythms may become manifest. In addition to that primary role, specific calcium-channel blockers are now used for: ■ Arrhythmia control, particularly supraventricular tachycardia ■ Blood pressure control ■ Reducing the incidence of reinfarction in patients with non–Q-wave infarcts Table 14-6 Calcium-channel blockers Generic (trade) Amlodipine (Lotrel, Norvasc) Diltiazem (Cardizem) Felodipine (Plendil) Common usage a Blood pressure c ontrol Isc hemic heart disease Blood pressure c ontrol Side effects common to all Cough reflexb Constipationc Pharyngitis Ankle edema Isradipine (Dyna-Circ) S imilar to nifedipine but may have less reflex tac hyc ardia Dizziness Nic ardipine (Cardene) Blood pressure c ontrol Headac he Nifedipine (Proc ardia, Adalat) Blood pressure Control Orthostatic hypotensiond Nimodipine (Nimotop) GI upset Nisoldipine (S ultar, S olar) Blood pressure c ontrol Peripheral edema Verapamil (Isoptin, Calan) S upraventric ular arrhythmias Flushing a Prevention of coronary spasm is common to all. Sinus tachycardia 14. If the change falls within the error measurement of the tool as calculated considering the standard deviation of the measurement, then true clinical change has not been achieved. The pulmonary involvement that occurs with this disease mirrors the involvement that occurs with polymyositis described earlier. The law of Laplace states that the pressure created within the alveolus is directly proportional to the surface tension and inversely proportional to the radius of the alveolus. Pleural Diseases Pleural Effusion The pleural space is the cavity between the visceral and parietal pleura; this cavity normally contains between 10 and 25 mL of fluid. ■ Consider the history and physical examination along with serial PFTs (if available) to determine disease progression. 2007;115:1481–1501. Ettinger N.A, Trulock E.P. Pulmonary considerations of organ transplantation (part I). Mortality is often calculated with 80% accuracy by using a combination of proteinuria, elevated erythrocyte sedimentation rate (ESR), and low carbon monoxide–diffusing capacity. 1997;10:139–145. (From Damjanov I: Pathology for the Health Professions, ed 3, St. Louis, 2006, Saunders.) Diagnostic Tests Diagnosis begins with obtaining a clinical history and doing a physical examination, followed by chest radiography and analysis of pleural fluid in appropriate instances. World J Gastroenterol. Atelectasis of premature infants, which is caused by a deficiency of pulmonary surfactant, is not shown. ■ The lordotic view is used to visualize the apical or middle (right middle lobe or left lingular segments) region of the lungs, or specifically to screen for pulmonary tuberculosis, which typically manifests itself in the apical regions. Ischemia is the clinical condition that results when atherosclerosis interrupts blood flow to its end organ. 277. However, these two branches remain within the LUL because there is no left middle lobe. J Trauma. The patient wears the Holter monitor for 24 hours (there are 30-day monitors available as well) while performing normal activities (except bathing). Correlates of exercise compliance in physical therapy. Manual for the State—Trait Anxiety Inventory. Kannel W.B, Belanger A.J. Epidemiology of heart failure. (From Khanna N: Illustrated Synopsis of Dermatology and Sexually Transmitted Diseases, New Delhi, 2005, Peepee Publishers and Distributors.) The effective contraction of the pectinate muscles of the atria accounts for approximately 15% to 20% of cardiac output—the atrial kick.19 In patients with abnormal electrical conduction causing a quivering of the atria (atrial fibrillation), the mechanical contractile ability of the pectinate muscles is reduced, resulting in a low atrial kick and compromised cardiac output.1,5 Right Ventricle The right ventricle is shaped like a crescent or triangle, enabling it to eject large volumes of blood through a small valve into a low-pressure pulmonary system. C, At high flow rates, when a great deal of turbulence is created, the resistance to airflow is proportional to the square of the flow rate. Other airway clearance techniques may help as well. Angioscopic evaluation of atherosclerotic plaques: Validation by histomorphologic analysis and association with stable and unstable coronary syndromes. 1987;75(Suppl 1):1149. The most important function of the pulmonary system is to exchange oxygen and carbon dioxide between the environment, blood, and tissue. The degree of normal thickening of a portion of the myocardium can be assessed and is an indirect assessment of ischemia because ischemic cardiac muscle does not thicken. See Table 14-1 for examples of drug routes. These signs include the following: ■ Elevation of the shoulder girdle ■ Horizontal ribs ■ Barrel-shaped thorax (increased anteroposterior diameter) ■ Low, flattened diaphragms Clinical tip Chest x-ray findings such as those shown in Fig. Health-related quality of life is a measure of how biologic and physiologic processes affect perception of symptoms, which then influences function, general health perception, and quality of life (anxiety, depression, perceived disease burden, general health perception).2 Thus HRQL encompasses physical, mental, social, and role functioning, and is a method for assessing the impact of the disease on the life of the patient..3 Patients with cardiovascular and pulmonary dysfunction are at high risk for decreased exercise capacity, impaired physiologic response to exercise, poorer quality of life, and higher rates of anxiety and depression. 2009;52:2270–2276. When the causative agent is bacterial, the first response to infection is an outpouring of edema fluid. Universal definition of myocardial infarction. Pulmonary Function Tests A pulmonary function test (PFT) is an essential component of the assessment process because abnormal PFTs indicate the effects of the pathologic condition and may provide clues regarding the patient’s motivation.

admission to the time results are available from the sec ond set of c ardiac enzymes: patient asymptomatic , lessening c hest pain symptoms, or persistent atypic al symptoms Absenc e of isc hemic c hest pain at the time of exerc ise testing Contraindications New or evolving ECG abnormalities on the rest trac ing Abnormal c ardiac enzymes Inability to perform exerc ise Worsening or persistent isc hemic c hest pain symptoms from admission to the time of exerc ise testing Clinic al risk profiling indic ating imminent c oronary angiography is likely Institutions vary in the choice of an exercise testing protocol for low-level testing. The larynx controls airflow and closes to increase intrathoracic pressure to generate an effective cough. (From Koeppen B, Stanton B: Berne and Levy Physiology, ed 6, Philadelphia, 2010, Mosby.) Hila and Roots The point at which the nerves, vessels, and primary bronchi penetrate the parenchyma of each lung is called the hilus. The symptoms of cardiopulmonary dysfunction are often nonspecific, such as shortness of breath, fatigue and weakness, and lightheadedness, and many patients are unaware of symptoms of activity intolerance despite significant dysfunction because they are unwittingly avoiding activities that cause discomfort. Insulin. 2009;158(5):768.e1–768.e7. EFNS guideline on diagnosis and management of post-poli syndrome. 1997;350:725–730. Endocrinol Metab Clin North Am. 2007;36(4):937. Deaths: final data for 2006. Likewise, elevated BNP (or NT-proBNP) levels predict higher risk of heart failure and other events after myocardial infarction, whereas marked elevation in BNP levels during hospitalization for heart failure may predict rehospitalization and death. Facial muscle weakness makes spirometric measures unreliable. 2005;150:707– 715. Murphy R.L.H. Discontinuous adventitious lung sounds. Pathophysiology Bacteria and other microbes commonly enter the lower respiratory tract. ■ Depolarization of the cell membrane allows the influx of sodium ions into the cell and the efflux of potassium ions. 2009;13:60–69. DiBianco R, Shabetai R, Kostuk W, et al. 10-10. Level I cardiac rehabilitation remains in the 1 to 4 MET range.78 The failure of the SBP to rise (when individuals are not on β-blockers) is a sign of a severe pathologic condition, such as aortic stenosis or poor left ventricular function.9,80 Patients with recent coronary artery bypass surgery may also show an abnormal blood pressure response to activity.80 Diastolic BP should not change significantly with activity.78 Table 17-5 Normal adult ranges for cardiopulmonary values at rest Value Heart rate S ystolic blood pressure Diastolic blood pressure Normal Range 60 to 100 beats per minute 85 to 140 mm Hg 40 to 90 mm Hg Mean arterial pressure Respiratory rate Oxygen saturation 70 to 110 mm Hg 12 to 20 breaths per minute >95% on FiO 2 Respiratory rate should be measured at rest and during activity. In fact, diaphragmatic dysfunction has been demonstrated in some abdominal surgery patients. These need to be addressed. Supportive interventions include supplemental oxygen to support the arterial partial pressure of oxygen (PaO2), antibiotic therapy to fight secondary pulmonary infection, measures to promote adequate ventilation and prevent the accumulation of pulmonary secretions, and good nutritional support. Unfractionated heparin: Thrombin and Xa inhibitor 5. 2003;348(7):583–592. The balloon catheter is usually inserted into one of the femoral arteries and advanced until its tip is in the thoracic aorta just distal to the left subclavian artery (Fig. 1992;11(7):618–624. Continuous arteriovenous hemofiltration (CAVH) uses the femoral artery and vein as common sites for vascular access. 10-9. Systems for such low gas flow rates are generally prescribed on the assumption that the patient is breathing at a relatively constant rate and depth, or minute ventilation. ∗ β2-Selective agents provide greatest benefit with minimal side effects. The course is aggressively progressive following the onset of neurologic symptoms. This loss of elastic recoil leads to chronic lung hyperinflation, which in turn leads to changes within the thorax. The anxiety and effort of dyspnea associated with severe HF appear to improve with the administration of morphine. However, respiratory failure and infection are the causes of death in 75% of these patients, which occurs usually by age 20.9,53,61 Prognosis varies depending on the type of muscular dystrophy. Pericarditis is the most common cardiac manifestation, appearing as pericardial effusion or pericardial thickening. Jugular venous distension 10. Generally, agonists cause vasoconstriction and antagonists cause vasodilatation, with decrease in blood pressure and reduced venous return. The second most common cause of thoracic crush injuries is falls, which usually occur in the home.32 Pathophysiology Rib Fractures Rib fractures most commonly involve the fifth through the ninth ribs because they are anchored anteriorly and posteriorly and are less protected than ribs 1 through 4 from the kinetic energy of a traumatic blow.32 Even nondisplaced rib fractures can be very painful, and it is the pain on any movement of the chest wall that causes the restrictive impairment. Impairment in any of these may result in ineffective drug therapy or drug therapy that requires more vigilance. 1981;51(2):499–508. See Chapter 9 for heart rate measurement on ECG and arrhythmia definitions. London Handicap Scale 5. For example, a patient who has undergone a left partial or whole lung removal may have precautions against lying on the left side. 2007;154(2):267–277. Clinical determinants of mortality in patients with angiographically diagnosed ischemic or nonischemic cardiomyopathy. Pulmonary Artery The pulmonary trunk runs upward and backward (first in front of and then to the left of the ascending aorta) from the base of the right ventricle; it is approximately 2 inches in length. 160. A number of these agents, with variable routes of administration (inhaled, oral, subcutaneous), are in research trials and have demonstrated improvement in functional status.41,61,62 Prostacyclin (PGI2; epoprostenol; Flolan) is administered via central line into a continuous ambulatory infusion system; NO (INOmax) is inhaled. Administered by inhalation, acetylcysteine (Mucomyst) was the principal mucolytic drug used previously. Hypertension and aortic stenosis. The Toronto Lung Transplantation Group. A multicenter prospective study. This syndrome has been known and discussed under a variety of names, including bronchiolitis, bronchiolitis obliterans with organizing pneumonia (BOOP), bronchiolitis fibrosa obliterans, follicular bronchiolitis, and bronchiolitis obliterans with diffuse interstitial pneumonia.25 Etiology Bronchiolitis obliterans was first recognized in children, usually those under the age of 2 years. Nawa R.K, Lettvin C, Winkelman C, Evora P.R, Perme C. The third classic sign of RLD is decreased breath sounds with dry inspiratory crackles, which are thought to be caused by atelectatic alveoli opening at end inspiration, and are most often heard at the bases of the lungs. 261. Mechanical ventilation is a means of ensuring adequate gas exchange in a patient who is unable to do so without external support.50 Acutely ill ventilated patients are typically seen with volume-cycled, positive-pressure ventilators, although pressure-cycled ventilators may be used for patients at risk for barotrauma. Mol Med. They keep me young with their ideas and assistance; they constantly have a “joie de vivre”; To my two dogs: Sparky and Bear who kept my feet warm while I sat for hours at the computer working on this edition but demanded daily play, and provided a wonderful mental break from writing; To my brother-in-law George, who was an inspiration to everyone he knew and met with his positive attitude and fighting spirit that he had up until the day he died from pancreatic cancer. It is recommended that no more than 200 mL of fluid per hour be removed and no more than 1500 mL of pleural fluid be removed during dialysis.159,199 FIGURE 4-23 The intraaortic balloon pump. The clinician may assess depth and pattern of breathing during manual vibration. Acute surgical conditions. apo C-II is an important factor for lipoprotein lipase (LPL). Springerling.com. FIGURE 16-17 Areas to auscultate for sounds generated from the aortic, pulmonary (pulmonic), tricuspid, and mitral valves. Heparin does not lyse existing clots, but it prevents formation and propagation of further clots.28 To maintain adequate tissue oxygenation, mechanical ventilation with supplemental oxygen may be required. A β-adrenergic blocker medication, for example, suppresses the expected heart rate increase with exercise (see Chapters 14 and 15 on medications). Results can be compared to previous results of the same test to assess whether the patient’s COPD is affecting his or her health more or less over time or after an intervention. The atherosclerotic plaque associated with coronary artery disease reduces the lumen size and therefore reduces blood flow. Diastolic dysfunction, most likely due to relative systemic HTN, has been noted in 18% of patients and increases the mortality risk, especially when combined with pulmonary HTN.301 Congestive heart failure is a late occurrence. B, Abnormal: rib angles greater than 90 degrees and attaching to the vertebrae with angles greater than 45 degrees in the hyperinflated chest. The hands essentially “fall” on the chest in an even, steady rhythm between 100 and 480 times per minute. The recommended β2 agonists are considered either long acting or short acting. MMWR Morb Mortal Wkly Rep. Current medical problem of CVA with hemiparesis and functional limitations implies increased work required to perform activities and possible ventilatory limitation due to restrictive lung dysfunction, which increases the risk of atelectasis and pneumonia. In addition, due to improved knowledge and research, the etiology and pathophysiology of obstructive pulmonary disease is increasingly understood by health care providers. Pulmonary embolism usually originates in the deep veins of the legs, most commonly the calf veins. Sometimes corrective measures are possible. Because of their long-acting features, LABAs are considered maintenance drugs. Again this information is available in the literature. 301. Now investigators are examining the feasibility of using these support systems as longterm destination devices. Manual vibration frequency has been reported to be 12 to 20 Hz.15 This sequence is repeated until secretions are mobilized. The border of the left ventricle extends downward to the diaphragm, forming the fourth curve. Moon J.C, De Arenaza D.P, Elkington A.G, et al. 2010;123(5):426. The effect of physical conditioning suggests adaptation in procoagulant and fibrinolytic potential. It typically presents with dyspnea, chest pain, fever, tachypnea, hypoxemia, leukocytosis, pulmonary infiltrates on chest radiography, and airflow limitation on PFTs, but sometimes it is insidious, with nonspecific signs and symptoms.296–298 It progresses to acute respiratory failure in 13% of patients and has a mortality rate of 4.3% to 23%. Interventions and prevention measures for individuals with cardiovascular disease, or risk of disease Primary Prevention Rehabilitation of Patients with Documented Cardiovascular Disease Management and Evaluation of Patients during the Acute Phase Postacute Phase Rehabilitation Candidacy Home-Based Cardiac Rehabilitation Rehabilitation/Secondary Prevention in the Outpatient Setting Secondary Prevention: Management of Risk Factors Administrative Considerations Summary 19. Regardless of its etiology, arterial hypoxemia, partial pressure of oxygen in arterial blood [PaO2] less than 60 mm Hg, is the most common indication for oxygen therapy. Prakash U.B.S, King Jr. T.E. Neurologic diseases. The primary side effects associated with high-dose and longterm steroid therapy include immunosuppression with increased risk of infections, gastrointestinal disturbance, emotional lability (vacillation between euphoria and depression), insomnia, osteoporosis, retardation of growth, muscle weakness and atrophy (particularly of pelvic and shoulder girdle musculature), hyperglycemia, sodium and water retention, increased incidence of glaucoma and cataracts, and shift of body fats to face (“moon” face) and back (“buffalo hump”).5,22,32 Mast Cell Stabilizers (Cromones) Cromones work to stabilize mast cells and prevent the release of histamine and other inflammatory mediators. In addition, SCI above the T1 level is associated with reductions in both preload and afterload, which leads to atrophy of the LV and reduced systolic efficiency.250 Moreover, limited physical activity promoting a sedentary lifestyle and exercise intolerance increases the risk of CV morbidity and mortality. Hepatic Function The fluid overload associated with CHF affects practically all organs and body systems, including liver function. Interestingly, adding invasive data did not improve the prediction. Philadelphia: Saunders; 2012. Williams M.A. Cardiovascular risk-factor reduction in elderly patients with cardiac disease. Heart-lung transplantation: Better use of resources. ■ Cardiac muscle dysfunction from a pulmonary embolus is the result of elevated pulmonary artery pressures, which dramatically increase right ventricular work. Of note, although statin use has shown benefits related to CAV, a consequent drug–drug interaction of rhabdomyolysis has been documented. Aspartate aminotransferase is an important enzyme in amino acid metabolism. The intercostal spaces are normally broader posteriorly than anteriorly, but chronic hyperinflation causes the rib angles to increase and the intercostal spaces to become broader anteriorly. The quick, shallow breathing of tachypnea may assist the pumping action of the lymphatic vessels, thus minimizing or delaying the increase in interstitial liquid.71 A clinical finding observed in many patients with CMD is extreme dyspnea after a change in position, most frequently from sitting to standing. Treatment Pulmonary involvement is treated with corticosteroids, with good results if started early during the inflammatory phase.35 Dermatomyositis Dermatomyositis is a systemic connective tissue disease characterized primarily by inflammatory and degenerative changes in the skin. Hunt S.A, Baker D.W, Chin M.H, et al. Case study 15-1 MK is a 76-year-old white male who presents with complaints of shortness of breath, productive cough, and nausea. Treatment Patients diagnosed with Guillain–Barré often undergo plasmapheresis and high-dose immunoglobulin therapy, both of which have been shown to be effective and safe. (Accessed October 27, 2015). This positioning will decrease the work of breathing and facilitate an efficient breathing pattern. Bleomycin has the highest incidence of pulmonary toxicity (up to 20% of patients), which is sometimes severe and can be fatal.325 Acute bleomycin-induced hypersensitivity pneumonitis occurs in a small number of patients even with very low doses. 294 Aissaoui N, Martins E, Mouly S, et al. New York: Churchill Livingstone; 1996. Effects of fatigue, fiber length, and aminophylline on human diaphragm contractility. Obliterative bronchiolitis is often accompanied by bronchiectasis and recurrent respiratory infections. A decade of lung transplantation. Surgical incisions invariably cause pain, particularly abdominal incisions and posterolateral thoracotomies. 1959;27:375–388. 2011;124:2020–2045. Peripheral edema can also accumulate in the sacral area (the shape of which resembles the popular fanny packs) or in the abdominal area (ascites). The purpose of this tool is to track patient outcomes and quality of services. Okamoto K, Hamaguchi M, Kukita I, et al. Matching the heart donor and heart transplant recipient: Clues for successful expansion of the donor pool—A multivariable, multi-institutional report. Despite a greater range of movement of the diaphragm, lung volumes are low as a consequence of the elevated position of the abdominal organs within the thoracic cavity. Acute pneumonia generally appears with sudden onset over a few hours to several days.1 Chronic is more insidious, often with gradually worsening of symptoms over days, weeks, or even months.1 Streptococcus pneumonia, also called pneumococcus, has been found to be the most common cause of community-acquired pneumonia, accounting for 20% to 70% of cases. (From Leonard PC: Building a Medical Vocab ulary: With Spanish Translations, ed 7, St. Louis, 2009, Saunders.) The AV node is located at the inferior aspect of the right atrium, near the opening of the coronary sinus and above the tricuspid valve. On completion of the auscultatory assessment, the therapist can interpret the sounds with regard to what they may indicate (Table 16-8 describes adventitious breath sounds). Treatment The treatment of choice is with cyclophosphamide. New York: Elsevier Health Sciences; 2014:458–470. There is also a diminution of heart rate and an increase in urine output.”201 In addition, intraaortic balloon counterpulsation produces a reduction in myocardial oxygen consumption “and decreased myocardial ischemia and anaerobic metabolism,”201 all of which are very important in the management of CHF and CMD. Ergeb Physiol. The ultrasonic signal comes from a pacemakerlike box implanted in the chest above the ribs. Interventions for acute cardiopulmonary conditions 18. Troponin, when not bound to calcium, inhibits coupling of actin and myosin. 1997;20:651–655. Adenosine is given intravenously and slows conduction in the reentry pathway through the atrioventricular node; it is used to treat SVT. FIGURE 1-5 The external intercostal muscles lift the inferior ribs and enlarge the thoracic cavity. b Cephalosporins generally serve as alternatives to penicillins if they prove ineffective or are poorly tolerated by the patient. The acute exacerbations include low-grade fever, worsening dyspnea and cough, worsening gas exchange, and appearance of new opacities on radiology.20 Idiopathic pulmonary fibrosis is associated with a median survival rate of 2 to 3 years after initial diagnosis.21 Diagnostic Tests Diagnosis of IPF requires a detailed review of the patient’s clinical history, as well as the exclusion of other known causes of interstitial lung disease (drug toxicity, occupational environmental exposures).17 Testing by high-resolution computerized tomography (HRCT) of the chest is also indicated, and if this is not definitive, surgical lung biopsy may be needed (Fig. Summary ■ Four cell types exist in the myocardium: working or mechanical cells, nodal cells, transitional cells, and Purkinje cells. Forced expiratory technique: The patient performs one to two huffs at mid to low lung volumes. Treatment Immunosuppressive regimens used after transplant often include calcineurin inhibitors (tacrolimus or cyclosporine), glucocorticoids, and purine synthesis inhibitors (azathioprine or mycophenolate mofetil).63 A recent study showed patients treated with tacrolimus rather than cyclosporine had no difference in survival rate but did show a lower incidence of OB.63 Optimal maintenance of the immunosuppressive drug regimen, prompt diagnosis and treatment of infections and episodes of acute rejection, and careful cytomegalovirus matching may all contribute to the prevention of OB.67 Once diagnosed, OB was treated with high-dose methylprednisolone followed by a tapering course of oral corticosteroids. Results are given in the form of a composite score for the entire epicardial coronary system. Pectus Carinatum Pectus carinatum (pigeon breast) is a structural abnormality characterized by the sternum protruding anteriorly (Fig. The oxygen uptake-oxygen delivery relationship during ICU interventions. Two atrioventricular valves exist between the atria and the ventricle, including the tricuspid valve on the right and the mitral or bicuspid valve on the left between the left atrium and ventricle. Vital Signs Daily recordings of vital signs are often kept in the graphics section of the chart. 1997;21:941–947. Increased tidal volume, improved lung compliance, and a significantly higher arterial oxygen tension have been shown in the prone position as opposed to supine positioning.104,105 In children, unlike adults, gas exchange improves in side-lying with the good lung uppermost.106,107 Small handheld percussors and vibrators are also available. Muscarinic drugs usually have a better-defined mode of action, whereas nicotinic drugs affect both systems via their autonomic ganglionic action. Stacked Breathing Stacked breathing is a series of deep breaths that build on top of the previous breath without expiration until a maximal volume tolerated by the patient is reached. Owe J.F, Gilhus N.E. Myasthenia gravis and the heart. 2006;18:135–140. Therefore because ST-segment elevation or depression is diagnostic for acute infarction, the presence of a significant Q wave (Fig. Diuretics As a first-line drug for the management of HF, diuretics decrease circulating blood volume, thereby decreasing preload. In RLD, the DLCO has been measured at less than 50% of predicted.7 The sixth classic sign usually apparent with RLD is cor pulmonale. Kidney transplantation has been used successfully in cases of renal failure. Treatment Rib Fractures Pain control is the primary treatment and can be accomplished by oral analgesics, intercostal nerve block, or epidural anesthesia, depending on the extent of the injury.32 The goal is to allow the patient to reestablish a normal breathing pattern. Other Agents Oxygen is considered a drug when inhaled concentrations are higher than those found in atmospheric air. Vita J.A, Treasure C.B, Nabel E.G, et al. alcoholic, 252 hepatitis, 251 hepatopulmonary syndrome (HPS), 251–252 portopulmonary hypertension (POPH), 251–252 function, 94–95, 94b Hepatitis, 251 Hepatopulmonary syndrome (HPS), 251–252 Hering-Breuer reflex, 26 Herpes simplex, 138 HFJV, See High-frequency jet ventilation (HFJV) High-density lipoprotein (HDL), 47, 680 High-frequency jet ventilation (HFJV), 435–443 Highly active antiretroviral therapy (HAART), 251 Hila, 9 HIV, See Human immunodeficiency virus (HIV) HLHS, See Hypoplastic left-heart syndrome (HLHS) Hold technique, inspiratory, 550 Holter monitoring, 274–275, 274f Hopkins Symptom Checklist-Revised (SCL-90-R), 684t–687t Hormone influences, 216–217, 217t Horse chestnut, 660 Hospital-acquired pneumonias (HAPs), 140–145, 141t–142t See also Pneumonias Hostility Inventory, 684t–687t HPS, See Hepatopulmonary syndrome (HPS) HRR, See Heart rate recover (HRR) HRV, See Heart rate variability (HRV) HTN, See Hypertension (HTN) Human Activity 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Illness Effects Questionnaire (IEQ) Illness Effects Questionnaire (IEQ), 684t–687t Imaging modalities, 277–278 computed tomography (CT), 277–278 exercise testing with, 286–287 magnetic resonance imaging (MRI), 278 multigated acquisition imaging, 278 positron emission tomography (PET), 277 radioactive nuclide perfusion imaging, 287–288 Imatinib (Gleevec), 244t, 253–256, 254t Immunosuppressive agents, 402–403, 404t Impella device, 440 Implantable cardioverter defibrillators (ICDs), 108, 381–382, 381b Impulse-conduction rates, 305 IMT, See Inspiratory muscle training (IMT) Induction agents, 402–403, 404t Induction therapy, 402–403 Infarctions, 329, 331f–334f Infection, pulmonary, 205, 205b Infiltrative diseases, 242t, 246–247 amyloidosis, 246 definition of, 246 hemochromatosis, 247 sarcoidosis, 246 Inflammatory myopathies, 246 Inherited connective tissue disease (CTDs), 246 See also Connective tissue diseases (CTDs) Inhibiting technique, upper chest, 551–552 Injury prevention, 560–561 Innervation, lung, 15 Inotropic agents, positive, 104–107, 105t, 113t Inspiration, 26, 27f Inspiratory capacity (IC), 23–24, 683 Inspiratory hold technique, 550 Inspiratory muscle training (IMT), 115–116, 552–554 Inspiratory reserve volume (IRV), 23–24 Insufficiency renal, 80 venous, 65, 66f venous, chronic, 65 Insulin, 228, 232t, 234t Intensive Care Unit (ICU) Mobility Score, 684t–687t, 691 Interface, air-fluid, 28–29 Interferon-alpha, 244t, 253–256, 254t Interleukin-2 (IL-2), 244t, 253–256, 254t Intermittent positive-pressure ventilation (IPPV), 546 Internal intercostal muscles, 6f, 7 See also Muscles International Study of Asthma and Allergies in Childhood (ISAAC) survey, 206–207 Interventions and assessments acute cardiopulmonary condition interventions, 539–567 cardiothoracic, 368–375 cardiovascular disease (CVD) interventions and prevention measures, 568–604 evidence-based practice (EBP), 674–701 examination and assessment procedures, 506–538 lymphatic system, 650–673 outcome measures, 674–701 for pediatric patients, 626–649 prevention measures, 568–604 pulmonary rehabilitation, 605–625 See Surgical interventions thoracic and cardiovascular, 364–385 Intraaortic balloon counter pulsation (IABC), 439–440, 440f Intracoronary radiation (brachytherapy), 375 Intracranial pressure monitoring (ICP), 427–429, 428t, 429b Intrapleural pressure, 27 See also Pressure Intrapulmonary pressure, 26 See also Pressure Intravascular ultrasonography (IVUS), 292, 293f Invasive cardiac devices, 438–441 Invasive monitoring, 423–427 Invasive ventilatory devices, 433–443 Ions, bicarbonate, 33 Iphosphamide (Ifex), 244t, 253–256, 254t IPPV, See Intermittent positive-pressure ventilation (IPPV) Irritant receptors, 26 See also Receptors IRV, See Inspiratory reserve volume (IRV) ISAAC survey, See International Study of Asthma and Allergies in Childhood (ISAAC) survey Ischemic conditions, 42–77 American Heart Association (AHA), ideal cardiovascular health metrics, 47–48, 47b blood pressure, 48 body weight, 47 cholesterol, 48 cigarette smoking, 47 diet, 47–48 fasting blood glucose, 48 physical activity, 47 aortic aneurysms, 67t, 68 abdominal (AAAs), 67t, 68 infrasternal, 68 physical therapy interventions, 68 suprarenal, 68 atherosclerosis, 44–57, 45f, 52f–53f acute coronary syndrome, 50–57, 54f–55f, 55t acute myocardia infarction (AMI), STEMI vs. Troponin can remain elevated for 10 days after the injury.8 Prolonged elevation makes diagnosing cardiac injury in a patient who does not seek treatment for more than 24 hours easier because other cardiac biomarkers, such as CPK-MB, may be normal in these patients. A value is produced every 15 seconds that ranges from 0 (no cortical electrical activity and full suppression) to 100 (awake, aware, no suppression).9 In the ICU, protocols have been developed for titrating sedatives to maintain a BIS value within set parameters (usually 60 to 70) that correspond with the manufacturer ‘s guidelines for light-to-moderate sedation.10 Table 13-3 Pulse and respiratory rates by age Age Newborn 1 Year Presc hool 10 Years Adult Athlete P ulse (beats per minute) 90 to 170 80 to 160 80 to 120 70 to 110 60 to 100 ≅50 Respiratory rate (breaths per minute) 35 to 45 to 70 with exc itement 25 to 35 20 to 25 15 to 20 12 to 20 12 to 20 From Wilkins RL: Clinical Assessment in Respiratory Care, ed 6, St. Louis, 2010, Mosby. 1993;71(8 Suppl):S129–S133. Responsiveness and predictability of gait speed and other disability measures in acute stroke. Intubation with mechanical ventilation may also be necessary.28 Bronchial hygiene treatments may be used to assist with clearance of secretions. Relevant Social History Self-abusive social habits, such as excessive drinking of alcohol, smoking, and use of illicit drugs, can affect the cardiopulmonary system and could affect rehabilitation. ■ Therapeutic interventions in the pediatric population with acute cardiopulmonary dysfunction are directed at problems that arise from developmental abnormalities, prematurity, infection, immunologic deficiencies, trauma, and diseases associated with childhood. Prognostic factors in acute pulmonary edema. For example, generalized outcomes measures, such as the SF-12 or SF-36, have been found to be reliable and valid across the spectrum of health disorders and chronic diseases, but may not directly, nor in the most sensitive way, measure change in quality of life related to the symptoms of angina, as could be measured with the Seattle Angina Questionnaire (SAQ). In most cases, tracheal deviation from the midline position suggests that the patient is rotated. 1998;104:23S–26S. As a result, airway obstruction occurs due to hypersecretion of mucus, mucus plugging, edema of mucosal lining, increased reactivity of airways, and eventual bronchial fibrosis and destruction of terminal airways. The role of interleukin-6 in insulin resistance, body fat distribution, and energy balance. If the patient has not experienced a myocardial infarction but has some sort of cardiovascular or pulmonary dysfunction, this assessment is made as soon as the patient is considered stable. Hydralazine (Apresoline), minoxidil (Loniten), and diazoxide (Hyperstat IV) are examples of arterial dilators. Dyspnea occurs when the minute ventilation (VE) divided by the MVV is greater than 50% (otherwise known as the dyspnea index). Eur J Prev Cardiol. Other similar questionnaires have been developed, but none have been used as extensively as the Minnesota Living with Heart Failure Questionnaire. Once the recorder is removed from the patient, the flash memory device is processed by reproducing the recording on computer or paper for visual inspection. 2013 ACC/AHA Guidelines for the Management of Heart Failure Executive Summary: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Russo M.J, Jeevanandam V, Stepney J, et al. 1988;26:724–735. Gordon D.J, Probstfield J.L, Garrison R.J, et al. 2007;43:15–23. Braz J Phys Ther. Disablement and rehabilitation in end-stage renal disease. Digital clubbing and cyanosis are seen in many patients. Cardioembolism from valvular vegetations or left heart thrombi causes ischemic stroke in 10% to 20% of patients. The rate of change in the surface tension resulting from compression of the surfactant molecules as the alveolus gets smaller is faster than the rate of change of the decreasing alveolar radius, so that a point is rapidly reached in which the pressure in the small alveolus equals the pressure in the big alveolus. Voluntary muscle involvement in hypertrophic cardiomyopathy: A study of 11 patients. This intrapleural pressure is normally lower than the intrapulmonary pressure developed during both inspiration and expiration. 1998;19(Suppl A):A53– A61. 2004;110(2):227–239. This outward force is provided by the elastic properties of the lung and through the action of the inspiratory muscles. As a result of the improvement in CT imaging of the chest, angiography with CT is now considered the gold standard for diagnosis of PE.8 Box 10-2 compares the advantages and disadvantages of CT versus chest radiograph. In anatomic terms, emphysema is defined as a condition of the lung characterized by destruction of alveolar walls and enlargement of the air spaces distal to the terminal bronchioles, including the respiratory bronchioles, alveolar ducts, and alveoli.24 The key role inflammatory cells play in activating potentially destructive mechanisms within the lung has been clearly recognized (see the section on the pathophysiology of COPD). For details of cardiac dysrhythmia, see Chapter 9. Respiratory muscle weakness occurs in about 10% of patients, and ventilatory failure may necessitate prolonged ventilatory assistance.239 The risk of ventilatory insufficiency is increased by surgery, acute infection, and the administration of corticosteroids or antimicrobial drugs. Stiller K, Phillips A.C, Lambert P. 6-7).27 FIGURE 6-7 Chronic bronchitis may lead to the formation of misshapen or large alveolar sacs with reduced space for oxygen and carbon dioxide exchange. Ischemic-related symptoms may also be present in other vasculature of the body, and they, too, should be assessed (for example, claudication discomfort in lower extremities indicates peripheral arterial disease). Table 10-3 Typical effect of obstructive and restrictive disease on spirometric and airflow volume measurements Measurement Tidal volume (TV) Inspiratory c apac ity (IC) Expiratory reserve volume (ERV) Vital c apac ity (VC) Forc ed vital c apac ity (FVC) Residual volume (RV) Func tional residual c apac ity (FRC) Total lung c apac ity (TLC) Forc ed expiratory volume in 1 s (FEV 1) Forc ed expiratory flow rate between 200 and 1200 mL (FEF200–1200) Forc ed expiratory flow rate between 25% and 75% FVC (FEF25–75) Maximum voluntary ventilation (MVV) Peak expiratory flow (PEF) Obstructive N or ↑ N or ↓ N or ↓ N or ↓ N or ↓ N or ↑ N or ↑ N or ↑ ↓ ↓ ↓ ↓ N or ↓ Restrictive N or ↓ N or ↓ N or ↓ ↓ ↓ N or ↓ N or ↓ ↓ N N or ↓ N or ↓ N or ↓ N or ↓ N, normal; ↑, higher than normal; ↓, lower than normal. Atherogenic lipoprotein changes in the absence of hyperlipidemia in patients with chronic renal failure treated by hemodialysis. The numbered boxes indicate the absolute amount of Na+—as well as the fraction of the filtered load—that various nephron segments reabsorb. Immunologic basis of antigen-induced airway hyperresponsiveness. In either case, a spirogram of the lung volumes is typically produced to facilitate interpretation of the measurements (Fig. As new research and experience broaden our understanding, changes in research methods, professional practices, or medical treatment may become necessary. The articular part of the tubercle (the more medial and inferior of the two) has a facet for articulation with the transverse process of the inferior-most vertebra to which the head is connected. These adverse side effects include ST changes (50%), chest pain (31%), palpitations (29%), and significant supraventricular or ventricular arrhythmias (8% to 10%). Crit Care Nurs Clin North Am. 1989;1:707–721. Lymphedema reduction by noninvasive complex lymphedema therapy. Muscle composition is also affected in individuals with COPD. Early breast cancer therapy and cardiovascular injury. Pharmacol Toxicol. 1992;65:388–393. A, Finishing a 5K race 6 months after lung transplant. Injection of an animal (e.g., horse, rabbit) with human lymphocytes provokes the animal’s immune mechanism to form antibodies to human lymphocytes. Milrinone has a prolonged half-life, and its physiologic half-life may be excessive in individuals with renal dysfunction. Physic al ac tivity Assess: Current (past 7 days) physic al ac tivity behavior—inc lude leisure and usual ac tivities (oc c upational, domestic , etc .). Then, the therapist can facilitate more complete exhalation, compressing the rib cage manually at the end of exhalation by pulling the shoulder back and down and the hip up and forward. Patients should be instructed in diaphragmatic breathing in all positions, as there is not necessarily carryover from one position to the next.30 It is often easiest for patients to achieve a diaphragmatic breathing pattern while in the supine position. International Day for the evaluation of abdominal obesity (IDEA): A study of waist circumference, cardiovascular disease, and diabetes mellitus in 168,000 primary care patients in 63 countries. 1987;42:773–778. Determinants of blood pressure are cardiac output, determined by heart rate and stroke volume. The central tendon then becomes a fixed point against which the muscular fibers of the diaphragm contract to elevate the lower ribs and thereby push the sternum and upper ribs forward. As in atrial fibrillation, multiple ectopic foci fire, creating asynchrony. The risk of atelectasis and pneumonia is compounded by the patient’s marked limitation of physical activity. Although there are a number of potential benefits to blocking all three receptors (β1, β2, and α), most of the deleterious effects of sympathetic activation are mediated by the β1-adrenergic receptor. Connexin 47 mutations increase risk for secondary lymphedema following breast cancer treatment. Mitral regurgitation may also develop. deoxygenate blood and, 21 veins, 21f, 22 Systemic lupus erythematosus (SLE), 245 Systemic sclerosis (SSc), 245–246 T Tachycardia atrial, 318–319, 319f sinus, 100 TandemHeart pVAD, 440, 441f TAPVR, See Total anomalous pulmonary venous return (TAPVR) Target-of-rapamycin (TOR) inhibitors, 402–403 TAVR, See Transcatheter aortic valve replacement (TAVR) Taxotere, See Docetaxel (Taxotere) TDEE, See Total daily energy expenditure (TDEE) TECAB, See Totally endoscopic coronary artery bypass (TECAB) Telangiectasis, 65, 66f Temperature monitoring, 427, 427b TENS, See Transcutaneous neuromuscular electrical stimulation (TENS) Terminal respiratory units, 14–15, 15f Tests and procedures See also Diagnostic tests and procedures cardiovascular, 266–304 electrocardiography (ECG), 305–337 pulmonary, 338–363 Tetralogy of Fallot, 630f, 631 Thalidomide (Thalomid), 244t, 253–256, 254t Therapeutic positioning techniques, 547–549, 549f Therapy, cardiopulmonary anatomy and physiology anatomy, 1–22 physiology, 23–41 assessments and interventions acute cardiopulmonary condition interventions, 539–567 cardiovascular disease (CVD) interventions, 568–604 evidence-based practice (EBP), 674–701 examination and assessment procedures, 506–538 lymphatic system, 650–673 outcome measures, 674–701 for pediatric patients, 626–649 prevention measures, 568–604 pulmonary rehabilitation, 605–625 diagnostic tests and procedures cardiovascular, 266–304 electrocardiography (ECG), 305–337 pulmonary, 338–363 pathophysiology cardiopulmonary implications of diseases, 214–265 chronic obstructive pulmonary disease (COPD), 187–213 dysfunction, cardiac muscle (CMD), 78–124 dysfunction, restrictive lung (RLD), 125–186 failure, cardiac muscle, 78–124 ischemic cardiovascular conditions, 42–77 pharmacology cardiovascular medications, 445–488 pulmonary medications, 489–505 surgical interventions cardiac and thoracic, 364–385 life support, 419–444 monitoring measures, 419–444 organ transplantation, heart vs. Congestive heart failure usually develops in the preterminal stage of the disease. Amiodarone may adversely affect a variety of bodily systems, making patient compliance challenging. F, Gadolinium enhancement of lesions of the spine seen on magnetic resonance image of a sarcoidosis patient. The stages of ventricular dysfunction failure can range from patients being asymptomatic with relatively normal activity tolerance to those who are severely symptomatic and unable to tolerate any level of exertion. These murmurs are heard immediately following the S2 and diminish in intensity quickly. Conflicting epidemiological and experimental evidence. Immunosuppressive therapy in older cardiac transplant patients. RadioGraph. Most patients are anemic but asymptomatic except during painful episodes. (From Frownfelter D, Dean E: Cardiovascular and Pulmonary Physical Therapy: evidence and practice, ed 4, St. Louis, 2006, Mosby.) Manual Hyperinflation and Airway Suctioning Airway suctioning is performed routinely for intubated patients to facilitate the removal of secretions and to stimulate the cough reflex. In addition, other receptors (e.g., histamine, prostaglandin, angiotensin) and electrolytes (e.g., sodium, calcium) affect blood vessel dynamics. Hemodialysis This process is a treatment that replaces the function of the kidneys. Fabrini E, Klein S. Squamous pneumocytes (type I) cells are flat and thin and cover approximately 93% of the alveolar surface. J Cell Physiol. 2011;57(1):14–26. The short forms and computerized adaptive testing showed very high correlations to the original AM-PAC (r values 0.95 to 0.98). 222. Metabolism. The use of an expiratory aid provides a negative pressure (vacuum) to the airway via the nose and mouth during the patient’s attempt to cough, along with a manual thrust to the abdomen to further increase cough flows. Penicillins are a mainstay in the treatment of respiratory infections. In addition, an assessment should be made of whether the equipment is being used correctly by the patient. Patients in classes II and III are characterized by slight limitation and marked limitation in physical activities, respectively (see Table 4-7). Creager M.A, Dzau V, Loscalzo J. M-mode echo and two-dimensional echo (Fig. Gary R.A, Brunn K. Her past medical history is significant for HTN for 30 years, treated with hydrochlorothiazide 75 mg once a day and captopril 50 mg once a day. Aneurysms are usually described in terms of their location

failure due to systolic dysfunction complicating acute myocardial infarction. Progressive exercise for anabolism in kidney disease (PEAK): A randomized, controlled trial of resistance training during hemodialysis. However, due to their variable release and clearing rate, their absence does not rule out the possibility of injury. They tend to be younger and are free of cardiovascular occlusive disease. Drugs Acting on the Sympathetic Nervous System Blood pressure is influenced by sympathetic nervous system regulation of cardiac output and peripheral vascular resistance. 2004;43(9):1534–1541. At autopsy, 75% to 80% of scleroderma victims show evidence of interstitial pulmonary fibrosis.31 Pleuritis and pleural effusions are unusual, unlike in the other collagen diseases that have pulmonary involvement.23 Carcinoma of the lung also has been reported in association with scleroderma.35 Prognosis is largely dependent on early diagnosis, as well as the type of scleroderma, secondary to the different rates of involvement of visceral organs. Collins S.M, Cahalin L.P, Semigran M.J, et al. 2014;383(9920):880–888. Normally, pleural fluid formation and pleural fluid resorption are balanced so fluid does not accumulate in the pleural space. Effective drug elimination is dependent on adequate hepatic and renal function. Auscultation should be performed over the entire lung space, with at least one breath auscultated in each bronchopulmonary segment. A recent study by Nimura et al looked at PFTs and computed tomography (CT) scans of the chest in people with chronic obstructive pulmonary disease (COPD).61 The study found that PFTs could be used in conjunction with CT scans of the chest to clearly define COPD severity. Catenoidal shape of the interventricular septum in idiopathic hypertrophic subaortic stenosis: Twodimensional echocardiographic confirmation. Imle P.C. Physical therapy for patients with cardiac, thoracic, or abdominal conditions following surgery or trauma. Clin Cardiol. Can the six-minute walk test predict peak oxygen update in men with heart transplant? Maximum left ventricular filling rate in healthy individuals measured by gated blood pool scans: Effect of age. Med Sci in Sports Exerc. Clin Exp Pharmacol Physiol. The residual blood becomes organized into nonelastic fibrous tissue, which can form a restrictive pleural rind. Individuals with heart failure demonstrate early onset anaerobic metabolism as a result of abnormalities in the skeletal muscle. This easily palpated structure is in level with the second costal cartilage anteriorly and thoracic vertebrae T4 and T5 posteriorly. 1978;71(2):169–172. Pulmonary rehabilitation Choosing Goals and Outcomes in Pulmonary Rehabilitation Structure of the Pulmonary Rehabilitation Program Physical Therapy Management Patient Evaluation Procedures Treatment Intervention Physical Conditioning Summary 20. The SAQ is designed to specifically assess the impact of chest pain or angina within the previous 4 weeks on a patient's quality of life. Orchard T.J. The impact of gender and general risk factors on the occurrence of atherosclerotic vascular disease in non-insulin-dependent diabetes mellitus. North American Association for the Study of Obesity (NAASO), National Heart, Lung, and Blood Institute (NHLBI). The anesthesia has a dehydrating effect, making the mucus thicker and harder to clear. The right side of the heart receives deoxygenated venous blood (returning from the body), and the left side of the heart receives oxygenated blood (returning from the lungs). The prosthetic left ventricle is the pump that is implanted within the abdominal wall or in the peritoneal cavity. Effects of lung volume reduction surgery on gas exchange and breathing pattern during maximum exercise. Clinical Manifestations and Assessment of Respiratory Disease. Table 16-3 Respiratory rates for infants through adults Age Respiratory rates (breaths/minute) Infant: birth to 1 year 30 to 60 Toddler 1 to 3 years 24 to 40 Presc hooler 3 to 6 years 22 to 34 Elementary sc hool age 6 to 12 years 18 to 30 Adolesc ent 12 to 18 years 12 to 16 Adult 18+ years 12 to 20 Table 16-4 Breathing patterns commonly encountered in the assessment of patients with respiratory problems P attern of breathing Apnea Fish-mouth Eupnea Bradypnea Tac hypnea Hyperpnea Cheyne–S tokes (periodic) Biot's Apneustic Prolonged expiration Orthopnea Hyperventilation Psyc hogenic dyspnea Dyspnea Doorstop Description Absenc e of ventilation Apnea with c onc omitant mouth opening and c losing; assoc iated with nec k extension and bradypnea Normal rate, normal depth, regular rhythm S low rate, shallow or normal depth, regular rhythm; assoc iated with drug overdose Fast rate, shallow depth, regular rhythm; assoc iated with restric tive lung disease Normal rate, inc reased depth, regular rhythm Inc reasing then dec reasing depth, period of apnea interspersed; somewhat regular rhythm; assoc iated with c ritic ally ill patients S low rate, shallow depth, apneic periods, irregular rhythm; assoc iated with c entral nervous system disorders like meningitis S low rate, deep inspiration followed by apnea, irregular rhythm; assoc iated with brainstem disorders Fast inspiration, slow and prolonged expiration yet normal rate, depth, and regular rhythm; assoc iated with obstruc tive lung disease Diffic ulty breathing in postures other than erec t Fast rate, inc reased depth, regular rhythm; results in dec reased arterial c arbon dioxide, tension; c alled Kussma ul brea thing in metabolic ac idosis; also assoc iated with c entral nervous system disorders like enc ephalitis Normal rate, regular intervals of sighing; assoc iated with anxiety Rapid rate, shallow depth, regular rhythm; assoc iated with ac c essory musc le ac tivity Normal rate and rhythm; c harac terized by abrupt c essation of inspiration when restric tion is enc ountered; assoc iated with pleurisy Adapted from Irwin SI, Techlin JS: Cardiopulmonary Physical Therapy, ed 2, St. Louis, 1990, Mosby. 220. 2009 Accessed June 2009. Two fissures separate these three lobes from one another. Levine S.M, Anzueto A, Peters J.I, et al. FIGURE 16-15 A, Breath sound diagrams: normal tracheobronchial (A); bronchovesicular (B): vesicular (C) breath sounds. Only two leads detect posterior infarcts—V1 and V2—as they measure the direct opposite wall (anterior). Acta Oncol. Examination of cough effectiveness by the physical therapist is vital in determining the amount and type of intervention the patient will need for adequate removal of secretions. Case study 3-2 Mrs. This is an acute life-threatening situation.33 As air continues to enter and become trapped in the pleural space, the intrapleural pressure rapidly increases. Treatment of anemia with erythropoietin improves exercise tolerance, quality of life, and possibly survival.197 Fluid status should also be assessed, as hypervolemia may reduce exercise tolerance. Left anterior descending artery occlusions produce anterior septal infarctions, also termed the widow maker, whereas circumflex occlusions are responsible for generating lateral infarctions. 13-7) are increasingly being used to provide noninvasive ventilatory support. Cephalosporins are generally considered alternatives to penicillins when they are not tolerated or ineffective. Eur J Respir Dis. Anadolu Kardiyol Derg. (From Weinberger SE, Cockrill BA, Mandel J: Principles of Pulmonary Medicine, ed 5, Philadelphia, 2008, Saunders.) Specific lung lesions are assessed by observing the lung fields for any abnormal density that obliterates the vascular markings or that alters the distribution of the densities within the lung fields. The patient is positioned to eliminate gravity, either in the side-lying or semi-Fowler position. Towbin J.A, Roberts R, et al. Br J Clin Pract Suppl. Aside from a few states having their own, there is no national surveillance system.38 Pathophysiology Inhaled silica causes macrophages to enter the area to ingest these particles. Progress Report on the Joint Commission's Performance Measurement Requirements: System and Measure Selection. Data that provide measurement of outcomes should be included at the point of the initial evaluation and should consider the patient from the biologic/physiologic, functional, and quality-of-life perspectives. Pharmacologic management has already been addressed regarding risk factors for atherosclerosis and management of thrombosis. Holden D.A, Stelmach K.D, Curtis P.S, et al. Valentine B.G, Robbins R.C, Berry G.J, et al. Occupation involves lifting 20-pound loads several times per day. Therefore when the patient has tachycardia at rest, it is inappropriate to begin an exercise program without evaluation of the etiology and clear direction and mutual understanding of treatment goals from all members of the health care team. Abnormal blood pressure response to exercise in normoalbuminuric insulin dependent diabetic patients. In situations of skeletal muscle injury, both the myoglobin and the carbonic anhydrase III are elevated, but the ratio is constant, whereas in acute MI the ratio is not constant and changes within 2 to 15 hours after injury. 2006;40(4):312–327. Table 14-20 Types of insulin Adapted from Joslin Diabetes Center & Joslin Clinic: Clinical guideline for pharmacological management of type 2 diabetes, January 9, 2009. Srp Arh Celok Lek. Analysis of time-dependent risks for infection, rejection, and death after pulmonary transplantation. Receptors may have different biochemical functions common to many cells, such as opening electrolyte channels or affecting second messenger systems. Rehabilitation Measures Database. Table 8-7 Modified Naughton treadmill protocol MET, resting metabolic rate. 5-4). The Wells score is a clinical prediction rule that health care professionals may use to assist with differential diagnosis. This was consistent over body regions that they evaluated. Management of the metabolic syndrome. The Mediastinum (Tracheal Position) Evaluation of the mediastinum assesses tracheal shift that is due to disproportionate intrathoracic pressures or lung volumes between the two sides of the thorax. 64. Cooper K.H. The Aerobics Way. A rightward tilt of the transducer shows the RPA as it passes behind the superior vena cava (SVC) and ascending aorta (Asc Ao). Thoracic mobility exercises should be added to the rehabilitative process even though the patient may be averse to moving because of pain.145 Breathing exercises should be incorporated into all aspects of treatment, including thoracic mobility and the cardiovascular exercise regimens, as well as coughing and airway clearance maneuvers. The EMBLEM™ system is the world's first and only subcutaneous implantable defibrillator that provides protection from sudden cardiac arrest (SCA) while leaving the heart and vasculature untouched. Gilman A.G. G proteins: Transducers of receptor-generated signals. Hare D, Davis C. Second, diabetics should never exercise alone and should always carry medical identification and supplemental carbohydrates. 5-26, A). A, Atrial pacing; V, ventricular pacing; AV, AV interval. 18. 2013;8:CD005263. FIGURE 16-24 Pulses through the extremities. Opie L.H, Gersh B.J. Antithrombotic agents: platelet inhibitors, anticoagulants, and fibrinolytics. The use of the Patient-Specific Functional Scale to measure rehabilitative progress in a physiotherapy setting. Mechanical vibration devices are also available for use; however, they may be more difficult to coordinate with the patient's breathing pattern. ■ Heart valve abnormalities can also cause CMD as blocked or incompetent valves, or both, cause heart muscle to contract more forcefully to expel the cardiac output. 2009;30(24):3015–3026. differenc e [MCID]) Report the sc ores in c linic al terms, so that c linic ians c an easily determine what sc ores indic ate c hange. The presence of ascites further compromises pulmonary function due to diaphragmatic elevation and reduced lung volumes, resulting in tachypnea and dyspnea. Supervised exercise therapy versus non-supervised exercise therapy for intermittent claudication. Interdisciplinary involvement is important to ensure a safe therapeutic intervention. As the artery becomes more distal, a greater amount of smooth muscle is evidenced. In approximately 70% of hearts, an atrioventricular nodal artery is given off just before the posterior interventricular artery.21 FIGURE 1-19 Typical distributions of the right and left coronary arteries and veins (From Herlihy B: The Human Body in Health and Illness, ed 4, St. Louis, 2011, Saunders.) Left Coronary Artery The left coronary artery originates from the left anterolateral aspect of the aorta and splits into two major branches: the anterior interventricular and circumflex arteries. Therefore the respiratory drive controls the assisted positive breaths in all phases of the ventilatory cycle.46 Chest Tubes Chest tubes are large catheters placed in the thoracic cavity and connect to a graduated collection reservoir at the bedside.47 Chest tubes are used to remove and prevent the reentry of air or fluid from the pleural or mediastinal space and provide negative intrapleural pressure.32 Reasons for insertion of a chest tube include: ■ Thoracotomy ■ Pleural effusion ■ Pneumothorax, hemothorax, or chylothorax ■ Empyema ■ Chemical pleurodesis In nonsurgical situations, chest tubes are commonly inserted in the sixth intercostal space in the mid- or posterior axillary line. 17-5). Severe generalized quadriparesis may develop. Extremely elevated levels of an ABI (>1.10) can also be indicative of a problem. New York: Lippincott, Williams & Wilkins; 2012:95–124. The HR should be measured for 30 seconds to 1 minute. Heavy alcohol consumption has been associated with the development of cardiomyopathy, and long-term cigarette smoking has been associated with the development of chronic obstructive lung disease and also affects wound healing. 10 Pulmonary diagnostic tests and procedures Ana Lotshaw, Traci Tiemann Betts, and Ellen Hillegass CHAPTER OUTLINE Chest Imaging 338 Chest Radiographs 338 Computed Tomography 344 Magnetic Resonance Imaging 345 Ventilation and Perfusion Scans 345 Bronchoscopy 346 Pulmonary Function Testing 346 Tests of Lung Volume and Capacity 347 Tests of Gas Flow Rates 350 Tests of Diffusion 351 Additional Tests of Gas Exchange 351 Flow-Volume Loop 352 Interpretation of Basic Pulmonary Function Test Results 352 Blood Gas Analysis 352 Normal Values 352 Adequacy of Alveolar Ventilation 354 Acid–Base Balance 355 Henderson–Hasselbalch Equation 355 Acid–Base Terminology 355 Interpreting Arterial Blood Gases 355 Assessing Oxygenation and Hypoxemic Status 356 Oximetry 357 Cytologic and Hematologic Tests 357 Case study 10-1 360 Summary 361 References 362 This chapter introduces the reader to several of the diagnostic tests and procedures commonly used in the assessment of patients with pulmonary disease. The impact of mechanical circulatory support on post-transplant survival a different view. This complex is called a lipoprotein. Thiazide diuretics, potassium, and the development of diabetes: a quantitative review. Claudication in the calf is associated with stenosis of the femoral and/or popliteal artery, whereas thigh, hip, or buttock claudication is usually caused by aortoiliac arterial disease. Inherent myocardial properties of automaticity, excitability, and conduction depend on the resting polarity of pacemaker (nodal) and myocardial conduction tissue (Purkinje fibers). Tuberkuloz Ve Toraks. Furthermore, many patients will not complain of symptoms despite significant exercise intolerance because they have gradually limited their physical activity in order to avoid discomfort. Drugs used in cardiac arrhythmias. After the interview, a physical examination should involve an assessment of the patient's cardiopulmonary status, including: ■ Notation of symptoms of CHF (dyspnea, PND, and orthopnea) ■ Evaluation of pulse and electrocardiogram to determine heart rate and rhythm ■ Evaluation of respiratory rate and breathing pattern ■ Auscultation of the heart and lungs with a stethoscope BO X 4- 6 C om pa rison of NHANES, Bost on a nd Fra m ingha m C rit e ria ■ Evaluation of radiographic findings to determine the existence and magnitude of pulmonary edema ■ Performance of laboratory blood studies to determine the PaO2 and PaCO2 levels ■ Evaluation of the oxygen saturation levels via oximetry ■ Palpation for fremitus and percussion of the lungs to determine the relative amount of air or solid material in the underlying lung ■ Performance of sit-to-stand test to evaluate heart rate and blood pressure (orthostatic hypotension) and dyspnea ■ Objective measurement of other characteristic signs produced by fluid overload, such as peripheral edema, weight gain, and jugular venous distension ■ Assessment of cardiopulmonary response to exercise (e.g., heart rate, blood pressure, electrocardiogram) ■ Administration of a questionnaire to measure quality of life Upon the collection of data and the determination of a treatment diagnosis and prognosis, a plan of care is developed for the patient with CHF that details the interventions that are used to achieve the optimal outcome. Pharmacological treatment of idiopathic pulmonary fibrosis. Treatment is to discontinue the drug; the value of corticosteroids is uncertain.25,30 Chemotherapeutic Drugs These cytotoxic drugs used in cancer chemotherapy are a major cause of morbidity and mortality in the immunocompromised individual. Stamford, CT: Appleton & Lange; 2004. Results of a comprehensive rehabilitation program: Physiologic and functional effects on patients with chronic obstructive pulmonary disease. 1995;18:181–196. Leng G.C, Lee A.J, Fowkes F.G, et al. Most commonly used in physical therapy are the "6 Clicks" Basic Mobility Short Form and the "6 Clicks" Daily Activity Short Form. Ward J.J. High flow oxygen administration by nasal cannula for adult and perinatal patients. The National Heart, Lung, and Blood Institute; American College of Cardiology Foundation; American Heart Association. Most disturbing is the finding that lung cancer risk is closely related to initiating smoking at an early age. Not infrequently, pulmonary involvement precedes the musculoskeletal manifestations by several months to several years. ↓ Na+ 14. Heart disease and stroke statistics—2013 update: A report from the American Heart Association. The normal response to exercise is a decrease in R wave amplitude. Then the therapist should instruct the patient to perform the breathing slowly, with the abdomen rising out during inspiration. When initiating physical therapy treatment, the therapist should realize that all fibers need to be addressed in the cardiopulmonary treatment program. Pulmonary compromise is a common complication of many neuromuscular and neurologic disorders and is the major cause of morbidity and mortality.239–242 Respiratory muscle weakness or paralysis, or abnormal tone, restricts chest expansion and ventilation and reduces cough force and effectiveness, leading to retained secretions, atelectasis, and high risk of pneumonia. Auscultation requires appropriate equipment (the stethoscope), as well as appropriate instructions to the patient and proper positioning. 130. Preventive measures to limit disease progression include ACE inhibitors or ARBs to thwart RAAS and control BP, statins for dyslipidemia, early treatment of anemia to achieve hemoglobin levels of 11 to 12 g/dL, intensive hyperglycemia management, and smoking cessation.141,197,203 Primary and secondary prevention strategies to reduce the risk of CVD and associated mortality are also essential, and patients are usually prescribed a number of medications: β-blockers, calcium channel blockers, and ACE inhibitors or ARBs to control BP and HF and to provide secondary prevention following MI, and statins to improve lipid abnormalities and inhibit inflammatory processes involved in plaque formation. See Table 17-2 for a more complete list that is cross-referenced with the American Physical Therapy Association (APTA) Guide's Cardiopulmonary Practice Patterns.4 Table 17-1 Clinical systemic effects of immobilization The overall objective of this chapter is to provide the clinician with physical therapy interventions and evidence for hospitalized, acutely ill patients with primary or secondary cardiopulmonary conditions and the associated functional impairments described by the practice patterns in Table 17-2. The portion of the heart that strikes the chest wall is the apex of the heart and is termed the point of maximum impulse.1 Normally, this point is evidenced at the anatomic landmark of the apex, which is the fifth intercostal space at the midclavicular line. J Clin Pharmacol Suppl. J Geriatr Phys Ther. Neuromuscular Diseases and Neurologic Disorders A number of diseases and disorders affecting the neurologic or neuromuscular systems are associated with CV and pulmonary dysfunction (see Table 7-18). ■ Physical therapy interventions for acutely ill patients with cardiopulmonary dysfunction include airway clearance techniques, therapeutic positioning, breathing strategies and exercises, patient education, and monitored functional mobility exercise progression. The abnormal responses are first defined, and then the mechanism of action and clinical implications are described. 121. At rest, expiration is a passive process and achieved through the elastic recoil of the lung and relaxation of the external intercostal and diaphragm muscle. Study Questions What is this patient's admitting diagnosis? Some drugs cannot be taken orally. A systematic review and meta-analysis of longitudinal studies. Patients who are suspected of having pericardial pain should be referred for immediate medical treatment and discontinued from exertional activities until the pericarditis subsides. However, all physical therapists should understand the procedures involved in exercise testing and interpretation of the test results because one of the major purposes of these tests is the development of exercise prescriptions. 1967;20:371–379. J Am Soc Nephrol. A test that has been gaining use is the 5-meter walk or gait speed test. Both VO2max and maximal volume of CO2 production are reduced, and the peak exercise dyspnea index is 1.0.144 Dyspnea that occurs in the presence of heart failure produces a different outcome with exercise testing. 420).136–140 FIGURE 4-20 Ventilation/carbon dioxide production (e/ co2) slope in heart failure (HF). In the normal adult, resting systolic blood pressure is acceptable at approximately 120 mm Hg, and the resting diastolic blood pressure is acceptable at a range of 60 to 80 mm Hg (Table 13-2). PT Prognosis/Expected Outcomes: Patient is expected to reach PT goals noted earlier in 3 days. As the right coronary artery crosses the right margin of the heart, it gives off the right (acute) marginal artery before continuing as far as the posterior interventricular sulcus, where it usually turns to supply the diaphragmatic surfaces of the ventricles as the posterior interventricular (posterior descending) artery. They may be seen in scenarios of primary cardiovascular or pulmonary compromise, as well as in comorbid situations involving multiorgan dysfunction. Place the patient's right foot over the left (unless orthopedic precautions dictate otherwise), and place a pillow between the knees. Dahan A, vanBeek JHGM, . 1996;63:419S–422S. C, Hand changes consistent with sarcoidosis in the fingers. Segers P, Belgrado J.-P, Leduc A, et al. Abnormal Responses If one knows and understands the normal blood pressure responses to exercise, then identifying abnormal responses is simplified. ■ Evaluation: Evaluation of the data from the examination to make a clinical judgment. Exercise-induced angina alone was associated with subsequent coronary artery bypass surgery.116,117 Other variables of minor prognostic significance after MI include inappropriate blood pressure response, maximum heart rate achieved, and maximum systolic blood pressure achieved.118,119 Low-level exercise testing can also provide information useful for optimal medical management after myocardial injury or surgery, including treatment for angina, arrhythmias, or hypertension. ■ Intervention ■ Outcomes Once the elements have been performed, a plan of care is established. 2003;76(3):557–562. Table 13-1 Korotkoff sounds P hase Sound Indicates 1 First sound heard, faint tapping S ystolic pressure (blood starts to flow through c ompressed artery). Implications for Physical Therapy Intervention Because of the incidence of atherosclerotic disease in this patient population, patients with a diagnosis of carotid or vertebral disease should have their blood pressure monitored at rest and with all new activities, should be educated about primary or secondary prevention of stroke (medical management as outlined earlier), and should be taught the symptoms of instability (signs of TIAs) and the need for immediate medical treatment should these symptoms appear. A few drugs can also be actively secreted into the nephron per se. Mayrovitz H.N. Interface pressures produced by two different types of lymphedema therapy devices. Dyspnea is the most frequent symptom, occurring in more than 60% of patients, particularly those with vascular disease. 2009;32(Suppl 2):S189–S193. DL is expressed in millimeters per minute per millimeters of mercury (mL/min/mm Hg). The revisions you should notice include both major and minor changes. ■ Doses should generally be doubled when an increased effect is desired. However, this may be hard to detect in patients with cardiopulmonary disease, so the carotid or brachial artery can be used, or the therapist can use a stethoscope over the heart. Psychological stresses are common in these patients and their families and can include powerlessness, vulnerability, fear, anxiety, isolation, and spiritual distress.2 Acute cardiopulmonary conditions can be defined as diseases or states in which the patient's oxygen transport system fails to meet the immediate demands placed on it.3 Such failure may result in significant periods of bed rest for the patient and the associated adverse effects (Table 17-1). Used with permission. Electrical stimulation of the Purkinje fibers causes mechanical contraction of the ventricles. Pescatello L.S, Franklin B.A, Fagard R, Farquhar W.B, Kelley G.A, Ray C.A. American College of Sports Medicine Position Stand: Exercise and hypertension. Thus pathology of the pulmonary system will result in reduced energy production because of decreased oxygen within the tissue and a concomitant reduction in the exercise tolerance of the individual. It is also important to note that patients on mechanical ventilation often demonstrate reduced strength of the inspiratory muscles (including the diaphragm), as the ventilator assists with breathing. It is characterized by delayed motor development or early onset of progressive, generalized muscle weakness and pseudohypertrophy of certain muscle groups, especially the calves, resulting in increasing orthopedic, pulmonary, and cardiac complications and the inability to ambulate by the age of 10 or 11. 2009;16:459–481. Guidelines for the management of patients with atrial fibrillation. Lakka T.A, Lakka H.M, Rankinen T. However, both restrictive and obstructive processes alter this effortindependent portion. The abdominals contract to force the viscera upward against the diaphragm, accelerating its return to the dome position. It can be useful in higher-risk patients who are being considered for ICD implantation but who may not yet meet criteria for implantation (Fig. He has a 20 pack/year (number of packs per day multiplied by the number of years smoked) history of smoking, which he stopped at the time of his bypass surgery. Thrombolytic agents work by slightly different mechanisms, but all facilitate the conversion of plasminogen to plasmin, and therefore clot lysis can occur quickly rather than over a period of days that would naturally occur. 2014;62(4):259– 266 [serial online]. A gait belt is warranted for the patient's and the therapist's safety. ■ Plasma BNP, although consistently increased in patients with heart failure because of systolic dysfunction, is also increased in some patients with aortic stenosis, chronic mitral regurgitation, diastolic heart failure, and hypertrophic cardiomyopathy. By improving the heart's ability to pump and reducing the workload and controlling sodium intake and water retention, CHF can be relatively well controlled.159 Table 4-12 outlines these measures. Caution should be used when patients taking diuretics are encouraged to participate in aerobic exercise. RASS scores of -4 and -5 are indicative of deeper levels of sedation where the patient is unresponsive and therefore the content of the patient's consciousness cannot be appropriately assessed using the CAM-ICU. 2011 ACCF/AHA focused update of the guideline for the management of patients with peripheral artery disease (updating the 2005 guideline), a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. The HMG-CoA reductase inhibitors (statins) are often routinely prescribed in these patients to effectively lower cholesterol and possibly modulate the immune and inflammatory responses. Cell Mol Life Sci. Improved results of lung transplantation for patients with cystic fibrosis. Textbook of Pediatric Clinical Pharmacology. These venous thrombi originate predominantly in venous valve pockets and at other sites of presumed venous stasis (inset). Taheri S. 2000;342:1471–1477. Weight Assess: Weight, height; c alc ulate BMI: determine risk (obese 30 kg/m2; overweight 25 to 29.9 kg/m2). Thieme T, Wernecke K.D, Meyer R, et al. Anda R.F, Williamson D.F, Escobedo L.G, et al. Beck A. Cathelyn J.L, Samples D.A. SvO2 monitoring: tool for evaluating patient outcomes. The CAT was found to have a high intraclass correlation coefficient of 0.8.87 Convergent and longitudinal validity using Pearson's correlation coefficient were SGRQ-C 0.69 to 0.82 and 0.63, CCQ 0.68 to 0.78 and 0.60, and mMRC 0.29 to 0.61 and 0.20, respectively.183 Internal validity was established through a Cronbach α score of 0.88.87 The CAT's reproducibility was assessed across seven countries and found to be r = 0.84.184 The validity was also established through a study that showed an r of 0.8.87 Other studies have shown validity of the CAT in other languages, after acute COPD exacerbations, and with other variations to the COPD patient status.185–187 One study demonstrated that an MCID was a change of the total score by 2.184 However, this has not been further established, so it should be researched more. Tobbia D, Semple J, Baker A, et al. Stable periods can last up to 3 to 10 years with a decline in functional status correlating to a poorer quality of life. The patient's face should always be in view to be able to monitor tolerance to treatment. A flat and rigid diaphragm cannot be strengthened and will cause an automatic firing of the accessory muscles to trigger inspiration. When treatment is necessary, patients usually improve with moderate doses of corticosteroids. Perhaps the most troubling side effect of nitrate therapy in patients is headache, particularly with the short-acting sublingual tablet and during the "adjustment" stage when a long-acting transdermal patch is started. (A, From Wilkins RL, et al, editors: Egan's Fundamentals of Respiratory Care, ed 8, St. Louis, 2003, Mosby. Treatment Pneumothorax The definitive treatment of an open pneumothorax is the application of an airtight, sterile dressing over the sucking chest wound and the placement of a chest tube into the pleural space of the affected hemithorax. Another category of sympathomimetic agonists is dopamine (Intropin). Outcomes in bicaval versus biatrial techniques in heart transplantation: An analysis of the UNOS database. 10-2). Such monitoring consists of ongoing assessment of pH, PaCO2, and the signs and symptoms that suggest an increased work of breathing. A tool to assess mobility status in critically ill patients: the Perme Intensive Care Unit Mobility Score. Antiarrhythmic agents act to inhibit abnormal impulse formation or conduction by altering cell membrane permeability to specific ions. 314. Winkelman C. However, if the patient forgot to put the oxygen mask on or happened to pull the mask off because of "feelings of suffocation" and became confused and agitated as well as cyanotic, the acute change the therapist may note on entering the patient's room may be reversed by simply observing that the oxygen is not being used appropriately. Particular attention should be paid to activities that create fatigue or increased dyspnea. This chapter provides an overview of the physiologic, functional, and HRQL measures that are available for assessing outcomes in physical therapy practice. This imbalance may be due to overeating, inadequate exercise, a pathologic process that alters metabolism, or a psychological need or coping mechanism. 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The carina is located at the fifth thoracic vertebra or sternal notch and represents the cartilaginous wedge at the bifurcation of the trachea into the right and left mainstem bronchi. Cardiovascular disease is the most common cause of death in patients with SLE.234 Pericarditis can be found in 62% of patients, becoming symptomatic with chest pain and sometimes a rub mainly at the onset of SLE or during flares; constriction or tamponade is rare. The upper chest wall expansion is evaluated by the therapist placing the palms of the hands anteriorly over the chest wall from the fourth rib upward. St. Louis: Saunders; 1989. Drugs are less avidly bound to plasma proteins in neonates and infants than in children and adults. Circulation published early online; accessed November 2013. Causes and outcomes of the acute chest syndrome in sickle cell disease. Cerebral ischemia and asymptomatic coronary artery disease: A prospective study of 83 patients. Listing Criteria for Heart Transplantation: International Society for Heart and Lung Transplantation Guidelines for the Care of Cardiac Transplant Candidates—2006. 310. 1984;16(3):203– 218. C, Palpation of lower lobe motion. Sodium nitroprusside is the parenteral treatment of choice for hypertension emergencies. 2008;88:1254–1264. The focus of antiarrhythmic therapy, therefore, is to maintain adequate cardiac output in the presence of pacemaker or conduction tissue disease. Exercise Training and Quality of Life The quality of life of persons with CHF appears to be related to the ability to exercise.145,147,148,214,221–227 Two recent studies have investigated the effects of exercise training upon the quality of life of persons with CHF. ERV, expiratory reserve volume; IC, inspiratory capacity; VT, tidal volume. Chapter 6, Chronic Obstructive Pulmonary Diseases, was updated and revised to emphasize the importance of this disease and the fact that COPD is the third leading cause of death. FIGURE 8-4 Patient performing an exercise stress test. Hammond M.D, Bauer K.A, Sharp J.T, et al. It provides potent inotropic effects, but is only given via intravenous infusion.176 Like dopamine, dobutamine increases cardiac output and decreases the peripheral resistance; with the use of dopamine, there is a potentially significant increase in peripheral resistance. A randomized trial of cardiovascular risk factor reduction: Patterns of

Biologic/Physiologic Variables In addition to the collection of demographic data, such as age, gender, race, marital status, primary diagnosis, comorbidities, surgeries, and payer information, data that provide measurement of outcomes should be included at the point of the initial evaluation and should consider the patient from the biologic/physiologic, functional, and quality-of-life perspectives. The total score can range from 0 to 100. Left Ventricle The almost conical left ventricle (see Fig. To measure the regional distribution of pulmonary blood flow in the lungs, the patient is injected intravenously with radioactive iodine (I-131) and serial perfusion scans are made over the lung fields as the blood perfuses the lungs. As the heart contracts, it moves anteriorly and collides with the chest wall. β-Blockers decrease both resting and exercise heart rates. ■ The presence of a significant Q wave is diagnostic for an infarction, but the date of the infarction cannot be determined from the ECG. Cerebral hypoperfusion has been shown to be predictive of cognitive decline from mild cognitive impairment to severe dementia.155 In patients with heart failure, a 12week, 3-day-per-week cardiac rehabilitation intervention demonstrated and maintained memory improvements at 12 months.156 Aerobic activity has been demonstrated to improve cognitive function in a number of domains, including spatial and executive functioning. The effect of spironolactone on morbidity and mortality in patients with severe heart failure. 1981;60:46–52. Mayrovitz H. Therefore when these premature infants are mechanically ventilated without sufficient normal surfactant, the bronchiolar epithelium is disrupted. 1991;121(3 Pt 1):951–957. 2005;29(8):881–893. 2003;84:1109–1117. 135). Braunwald E, Sonnenblick E.H, Ross Jr. J. Hemodial Int. Efficacy and safety a recombinant antiimmunoglobulin E antibody (omalizumab) in severe allergic asthma. Cardiovascular abnormalities, mostly related to interruption of autonomic nervous system signals, also occur in patients with SCI. Identification of these interventions (e.g., pacemaker implantation, intravenous or intraarterial drug administration, parenteral nutrition, electrolyte replacement, or bed rest limitations) helps the physical therapist develop an appropriate treatment plan with appropriate precautions. The purpose is to assist the patient with the ventilatory needs when short-term ventilatory support is needed. During the exam, the patient’s speed is increased over 12 levels of intensity to place increased cardiovascular demand on the patient as he or she progresses through the exam. 2008;34:250–257. 206. Mr. Brown also smokes 1.5 packs of cigarettes a day. Musculoskeletal: L shoulder flexion limited to 90 degrees for 24 hours post–pacer placement. In: NIH publication no. A population-based autopsy study. Connor S.L, Gustafson J.R, Artaud-Wild S.M, et al. 1991;17:499. Digitalis Digitalis, not found in the preceding classification, is a cardiac glycoside that may also be used in arrhythmia management. Dyspnea appears gradually, usually within a few weeks of the drug therapy, followed by fever and a nonproductive cough. Hammond E.C, Horn D. Jacob S, Sellke F. To review, muscarinic receptors activate bronchoconstriction when stimulated; therefore inhibition of these receptors blocks their normal mechanism of action and prevents an increase in cGMP.5 This improves β-receptor activation, resulting in increased action of cAMP and bronchial smooth muscle relaxation. A battery backup is provided in such a device with an external battery pack that is held in place by a shoulder harness, allowing for greater portability and mobility.56 Clinical tip Evidence shows that patients who receive an LVAD do tolerate early activity. Henneman E.A. The art and science of weaning from mechanical ventilation. 2011;20(2):119–128. Oxygen toxicity and tolerance. 90. Time is represented on the horizontal axis, and each small square is 0.04 second. When the exercise test is initiated, the workload is increased in accordance with a specific protocol. In addition to baseline chest radiographs, patients with heart failure and acute pulmonary dysfunction can be followed with serial radiographs to monitor disease progression, effectiveness of treatment, or both. Lymphat Res Biol. Physical exertion is not recommended because it tires the patient so rapidly. Bellamy L, Casas J.-P, Hingorani A.D, Williams D.J. Pre-eclampsia and risk of cardiovascular disease and cancer in later life: Systematic review and metaanalysis. Platelet-derived growth factorstimulated superoxide anion production modulates activation of transcription factor NF-kappa B and expression of monocyte chemoattractant protein 1 in human aortic smooth muscle cells. This machine is also very effective for patients with neuromuscular and cardiopulmonary disorders. This breathing pattern causes a milking of the lymphatic vasculature to facilitate a removal of fluid out of the lungs.9 Joint and Muscle Receptors Receptors within peripheral joints and muscles of the extremities respond to changes in movement and increase ventilation. 1988(9(Suppl D):55–61. Poole-Wilson P.A, Buller N.P, Lipkin D.P. Regional blood flow, muscle strength and skeletal muscle histology in severe congestive heart failure. Superiority of treadmill walking exercise versus strength training for patients with peripheral arterial disease. MacIntyre N.R, Cook D.J, Ely Jr. E.W, et al. Legionella spp., Chlamydophila pneumonia, and M. Drugs & Aging. An S4 is commonly heard in individuals with hypertensive cardiac disease, coronary artery disease, or pulmonary disease and is also commonly found in individuals with a history of myocardial infarction or coronary artery bypass surgery. Response of atrial natriuretic factor to postural change in patients with heart failure versus subjects with normal hemodynamics. Vasc Endovascular Surg. 1983;52:489–502. This text is also utilized by many clinicians studying for advanced practice board certification as well as those involved in residency programs. Functional Status/Activity Level: Rolls bilaterally in bed independently. Weinberger S.E, Cockrill B.A, Mandel J. Resistance training improves metabolic health in type 2 diabetes: A systematic review. The purpose of this section is to briefly describe the intervention considerations that are indicated in pediatrics because of body size, physiologic differences, and level of psychological and communicative development. Rosengren A, Wilhelmsen L, Wedel H. It is important to know the MCID of a test in order to determine if the individual’s change will actually result in a functional change. Badenhop D.T. The therapeutic role of exercise in patients with orthotopic heart transplant. Thus alveoli of different radii can coexist. Akimova E.V, Bogmat L.F. Premature coronary heart disease: The influence of positive family history on platelet activity in vivo in children and adolescents (family study). The number of fractions into which a dose is divided seems to be the most important factor.9 Also important is the total dose and the span of time over which the radiation is delivered. Combinations of diuretics can be prescribed to treat hypertension. A, At rest. The specific criteria for termination vary from one institution to another, but the general criteria for termination of a maximal stress or low-level stress test are found in Box 8-4. Ambulatory veno-venous extracorporeal membrane oxygenation: innovation and pitfalls. The cause of the fatigue may need to be investigated further if it is the only symptom-limiting activity and all other responses are normal. 1996;28(2):391–395. Kacmarek R.M. The Essentials of Respiratory Care. There does not appear to be a reliable relationship between heart rate response and drug dosages among individual drugs. Cardiogenic pulmonary edema, which is discussed in this section, is an increase in the pulmonary capillary hydrostatic pressure, often secondary to left ventricular failure (see Fig. 1999;83:153–179. Training effects may be lost over time if training is discontinued. Some patients develop serious ventricular or supraventricular arrhythmias. Clinical tip Individuals with obstructive defects will demonstrate large lung volumes but reduced FVC because of inability to get the air out forcefully (as in asthma or emphysema). 328. A trial of CPAP using nasal prongs is indicated. October 2011;1D(10):931– 941. Breathing efforts during activity may elicit more work from the neck accessory muscles to lift the chest wall up and assist in breathing during rest. This can lead to pelvic floor dysfunction that can manifest as urinary incontinence in both males and females. 5 Rushmer R.F. Cardiovascular Dynamics. Ciba Foundation Study Group No. 37. Vital Signs The American College of Sports Medicine (ACSM) Resource Manual for Guidelines for Exercise Testing and Prescription (7th edition) provides rehabilitation professionals, including physical therapists, with clearly defined definitions of safe ranges for vital signs during exercise and exercise testing. Since 1993 the JCAHO has encouraged outcome measurement as an important form of evaluation leading to continuous improvement, and since 1998 it has been required under the ORYX Initiative (ORYX is The Joint Commission’s performance measurement and improvement initiative, first implemented in 1997).29 Under the pay-for-performance initiatives, CMS continues to encourage the use of quality measures, with particular focus on health outcomes for the patient, transition of the patient across settings, and resources used to treat the patient, especially in medical settings that include the treatment of patients with heart disease or diabetes. The basic reason for this difficulty is insufficient knowledge. 2008;27(2):178–183. There must be precision in aligning the amount of realistic family or social support available with the amount of assistance the patient requires. Leung L.K.: Overview of hemostasis. Valle B.K, Lemberg L. 14-1).4 It must be added that drugs have defined and fixed parameters, whereas individuals can show differences in the way they interact with them. Between the two layers of the pericardium is a closed space termed the pericardial space or pericardial cavity filled with approximately 10 to 20 mL of clear pericardial fluid.18 This fluid separates the two layers and minimizes friction during cardiac contraction. Percutaneous placement of an intra-aortic balloon pump in the left axillary/subclavian position provides safe, ambulatory long-term support as bridge to heart transplantation. Simonsick E.M, Gardner A.W, Poehlman E.T. Assessment of physical function and exercise tolerance in older adults: Reproducibility and comparability of five measures. Case study 7-1 JF is a 76-year-old woman admitted 2 days ago because of confusion, incoherent speech, and lethargy. A descriptive study of individuals successful at long-term maintenance of substantial weight loss. Thus surfactant orients itself perpendicularly to the surface in the alveolar fluid layer, with its nonpolar end projecting toward the lumen. The timed “up & go”: A test of basic functional mobility for frail elderly persons. Different breath sounds are auscultated over different portions of the tracheobronchial tree, which are also normal. Certain acute disorders, such as pulmonary edema, atelectasis, and consolidation, also cause a reduction in TLC. There exists a potential space between the pleurae called the pleural space or pleural cavity. 1989;64:10G–17G. Noncardiac pulmonary edema develops in 13% to 28% of patients during the administration of cytosine arabinoside (Cytarabine) and in a few patients months after treatment with mitomycin C. With the respiratory tract being open to the atmosphere, air rushes into the lungs to normalize the pressure difference, allowing inspiration to occur and the lungs to fill with air. They simply conduct air to and from the respiratory units. Cahalin L.P. Cardiovascular medications. Ned Tijdschr Geneeskd. 87. Cough strong, dry and nonproductive. 2006;129:15–26. Angina pectoris. Cardiotonic Drugs: A Clinical Survey. Hydration state, medications, and disease can affect these values. As the understanding was enhanced of the time course and cellular events that take place in the development of a myocardial infarction (MI) from an ischemic condition, the clinical syndrome of acute coronary syndrome (ACS) was established. These latter are probably produced by the reunion of several of the air cells through rupture of the intermediate partitions; sometimes, however they appear to arise from the simple enlargement of a single vesicle.”23 Today, emphysema is defined similarly. The alveolar macrophage engulfs and ingests foreign material in the alveoli and provides a protective function against disease. Failure to reach a systolic blood pressure in excess of 130 mm Hg at maximal effort in the absence of any medication that restricts the blood pressure is associated with a high risk for future sudden death.32 However, this is equivalent to the blunted response that is seen in individuals who are receiving βadrenergic antagonists as part of a therapeutic pharmacologic regimen. Medical management usually consists of angiotensin-converting enzyme (ACE) inhibitors, calcium-channel blockers, diuretics, or possibly β blockers. Therefore regardless of the mechanism, obstructive lung diseases generally result in incomplete emptying of the lung, which produces the classic signs of lung hyperinflation seen in chest radiographs (chest x-rays [CXRs]) and reduced lung function as seen on pulmonary function studies. However, once the lung has undergone fibrotic changes, the pathologic alterations are irreversible and only supportive interventions are used. 2007;147:357–369. ■ People who have had surgical procedures that frequently disrupt the lymphatic system should carefully follow the recommended lymphedema precautions and contraindications so as to decrease the likelihood of developing lymphedema in the limb “at risk.” ■ Conservative methods of treating lymphedema (compared with medication or surgery) are still the gold standard for effective lymphedema treatment. Wong M, Chair S. Can Respir J. The influence of endotheliumderived nitric oxide on myocardial contractile function. 2004;34:632–638. There is evidence that periods of brief repetitive walking can successfully improve oxygenation in the feet of limbs with more severe arterial obstruction.281 FIGURE 3-14 Signs and symptoms of arterial insufficiency. Prognosis As a result of multivariate analysis of clinical variables, the most significant predictors of survival in individuals with CHF have been identified and include decreasing LVEF, worsening NYHA functional status, degree of hyponatremia, decreasing peak exercise oxygen uptake, decreasing hematocrit, widened QRS on 12-lead electrocardiogram, chronic hypotension, resting tachycardia, renal insufficiency, intolerance to conventional therapy, and refractory volume overload.208,209 In addition, elevated circulating levels of neurohormonal factors are associated with high mortality rates, but routine laboratory assessment of norepinephrine or endothelin is neither practical nor helpful in managing the patient’s clinical status. The mediastinal structures are pushed away from the affected side. 2000;35(4):614–618. 2007;13((Suppl 3):S1–S9. The CRQ is an appropriate objective measure to use with patients with respiratory dysfunction. Clot-specific thrombolytic agents: Is there an advantage? Consequently, the changes in skeletal muscle metabolism that are associated with fatigue might be expected to occur at lower absolute workloads and hence to limit maximal exercise capacity in these patients.90 Pancreatic Function Severe CMD can potentially reduce blood flow to the pancreas “as a consequence of splanchnic visceral vasoconstriction, which accompanies severe left ventricular failure.”100 The reduction in blood flow to the pancreas impairs insulin secretion and glucose tolerance, which are further impaired by increased sympathetic nervous system activity and augmented circulatory catecholamines (inhibiting insulin secretion) that stimulate glycogenolysis and elevate blood sugar levels.101 Reduced secretion of insulin is of paramount importance because hypoxic and dysfunctional heart muscle depends a great deal on the energy from the metabolism of glucose, which is reduced significantly if insulin secretion is impaired.100 Ultimately, there is further deterioration of left ventricular function, creating a vicious circle. Inadequate sleep as a risk factor for obesity: Analyses of the NHANES I. Update on the medical treatment of stable angina. Clinical tip Portable automatic blood pressure cuffs are often used in the hospital. 1983;1(6):1396–1404. Mathier M.A, Ramanathan R.C. Impact of obesity and bariatric surgery on cardiovascular disease. The excess soft tissue in the abdominal wall exerts pressure on the abdominal contents, forcing the diaphragm up to a higher resting position. Archives of Cardiovascular Disease. Patients with rib fractures breathe very shallowly in an effort to keep the thoracic wall still. Principles and Practice of Intensive Care Monitoring. This results in increased cardiac output and, at doses greater than 10 μg/kg/min, markedly increased systemic vascular resistance and preload.20 For this reason, the primary indication for dopamine is hemodynamically significant hypotension in the absence of hypovolemia.20 Dopamine is also useful for patients with refractory CHF, in which case it is carefully titrated until urine flow or hemodynamic parameters improve. Contrast bronchography involves the opacification of the bronchial tree by the instillation of contrast medium so that the radiographic shadows of the airways may be studied. A population at risk. Respiratory Medicine. Brandfonbrener M, Landowne M, Shock N.W. Changes in cardiac output with age. 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Packer M, Carver J.R, Rodeheffer R.J, et al. IDLs are partly converted to cholesterol-rich LDL (low-density lipoprotein) particles and taken up by the LDL receptors on the liver (apo B and apo E) or on the receptors of extrahepatic tissue. In preload reduction, as measured by decreased pulmonary artery wedge pressure, amrinone/inamrinone is more effective than dopamine (Intropin) or dobutamine (Dobutrex); as a positive inotrope and vasodilator, it is intermediate between nitroprusside (Nipride) and dobutamine. Atherosclerotic occlusive disease is a result of the same atherosclerotic process previously described and causes symptoms when the atheroma becomes so enlarged that it interferes with blood flow to the distal tissues, it ruptures and extrudes its contents into the bloodstream or obstructs the arterial lumen, or it encroaches on the media, causing weakness of that layer and aneurysmal dilation of the arterial wall. Drugs taken by mouth are absorbed from the stomach and intestine and then pass through the liver (portal circulation) before reaching the systemic circulation. The therapist should keep these limitations in mind when evaluating the findings of a portable AP chest radiograph. A, Frontal view. Before silencing the alarm, any significant change in the rate or electrical activity of the myocardium should be ruled out.1 Often, rate or rhythm artifacts causing the alarm to sound may relate to faulty application of electrodes, electrical interference, coughing, or movement. 5-26, B). ■ Are other structural abnormalities present (pericardial, valvular functioning, right ventricle) that would affect LV functioning?23 The echocardiography report should include EF, ventricular dimensions, ventricular volume, wall thickness measurement, chamber geometry, and regional wall motion.23 Medical Management The treatment of CHF, in general, is directed at the underlying cause or causes. 339. Association of ankle-brachial index level with stroke. Cahalin L.P, Zambernardi L, Dec G.W. Multiple systems assessment during inpatient cardiopulmonary rehabilitation [abstract]. The phrenic nerve arises from the third, fourth, and fifth cervical spinal nerves (C3 to C5) and is involved in contraction of the diaphragm. Hemofiltration as short-term treatment for refractory congestive heart failure. Noninvasive mechanical ventilation improves endurance performance in patients with chronic respiratory failure due to thoracic restriction. Special Considerations for Mechanically Ventilated Patients Intubation and mechanical ventilation are required for most patients with acute respiratory failure. Haskell W.L, Alderman E.L, Fair J.M, et al. Adverse effects occur in approximately 75% of patients undergoing dobutamine stress testing. 14-3, B). Structural and functional adaptations of the cardiovascular system by training. The chest radiograph may show focal lobar, lobular, multilobar, or patchy bronchopneumonia or segmental pneumonia that usually involves the lower lobes. 2011;104:536–544. Leikis M.J, McKenna M.J, Peterson A.C, et al. source=search_result&search=criteria+for+diagnosis+of+acute+myocardial&selecte July 14, 2015). Anemia Anemia is defined as a reduced circulating red blood cell (RBC) mass relative to an individual’s gender and age and can result from impaired RBC production, excessive destruction of RBCs (hemolysis), loss by hemorrhage, or a combination of these factors. Depending on the location of the suspected disease, the patient is placed in the supine, prone, or right or left side-lying position. 251. c Definitions of severe hypoglycemia vary and include hypoglycemia, resulting in a seizure or a coma, reactions that require the intervention of another person, or a reaction that requires the administration of intravenous glucose, intramuscular glucagon, or hospitalization. In the respiratory system, the strength of the diaphragm and other inspiratory muscles is measured as a function of standard pressure–volume curves.35 Weakness of the diaphragm will decrease the negative inspiratory pressure generated by the patient, and thereby decrease the volume of air inhaled. 2-6); because of the size difference, the smaller alveolus must have a higher pressure than the larger alveolus if the surface tension of each is the same. Outpatient continuous parenteral inotropic therapy as bridge to transplantation in children with advanced heart failure. ■ The physical examination includes a thorough inspection, auscultation, palpation, percussion, and activity assessment. This disease predominantly affects women, and its onset is usually between 20 and 40 years of age.53 Pathophysiology The antibody immunoglobulin G (IgG) binds to the acetylcholine receptor sites, which impairs the normal transmission of impulses from the nerves to the muscles. Changes in the fibrinolytic system associated with physical conditioning. 305. Int Disability Stud. Palpation is performed to locate the brachial artery pulse. Frenneaux M.P, Counihan P.J, Caforior A.L, et al. St. Louis: CV Mosby; 1978. 2009;36:357–377. Diastolic dysfunction refers to changes in ventricular diastolic properties that lead to an impairment in ventricular filling (reduction in ventricular compliance) and an impairment in ventricular relaxation. Under the influence of the activated clotting factors XIIa, XIa, IXa, and VIII, the pathway proceeds to Xa. 3. It is estimated that 5.7 million or more Americans suffer from CHF and that 670,000 new cases occur yearly, requiring 1.1 million hospitalizations each year.4 In addition, the lifetime risk of developing heart failure for both men and women at age 40 years is 1 in 5, with the annual rate of developing heart failure over the age of 85 years is 65%.4 Individuals with a wide variety of heart and lung diseases very likely will develop CHF at some time during their lives,3 frequently manifested as pulmonary congestion or pulmonary edema.1 This chapter describes the etiology, pathophysiology, clinical manifestations, medical management, prognosis of CMD and CHF, and indications for physical therapy, including patient management. The physical examination. Sholto-Douglas-Vernon C, Bell R, Brice G, et al. Cardiol Res Pract. There are four categories of pneumonias: community-acquired pneumonias, hospitalacquired pneumonias (HAPs), health care–associated pneumonia (HCAP), and ventilator-associated pneumonia (VAP). Dyspnea in the weaning patient: Assessment and intervention. The key to treatment of pneumonia is to first identify the microbe (virus vs. In a study of 26 patients with intermittent claudication and no exercise-limiting comorbid diseases, WIQ distance and speed scores significantly correlated with peak treadmill walking time and with time to onset of intermittent claudication on a treadmill.190 WIQ scores also correlate significantly with existing walking tests ($p < 0.001190$); the WIQ distance score demonstrated moderate correlation with the 6MWT ($r = 0.557$), and the speed score from the WIQ correlated moderately with both the usualpaced 4-meter walk ($r = 0.528$) and the fast-paced 4-meter walk ($r = 0.56$). Donnelly J.E, Blair S.N, Jakicic J.M, et al. The pulmonary arterioles undergo obliterative changes; however, necrotizing vasculitis is rare.35 These changes may be accompanied by parenchymal cystic scleros

therapeutic positioning, breathing and chest wall exercises, patient education, and monitored functional mobility exercise progression. Resting muscle pain in the first few weeks after starting a statin medication usually indicates toxicity to the medication and can lead to muscle breakdown and in extreme cases rhabdomyolysis (dark urine and kidney failure from protein processing by the kidney). 1987;10:S172–S183. Exercise capacity and cardiovascular adaptations to aerobic training early after stroke. A brand name drug is a drug that is manufactured by the company and solely sold by this company (under its brand name with its specific generic name) as long as it has the patent for the drug. With ventilation, there exist two opposing forces, including an inward pull from the elastic tension of the lung tissue trying to collapse the lung and an outward pull of the thoracic wall trying to expand the lungs.1,2,5 These two opposing forces give rise to a subatmospheric (negative) pressure within the intrapleural space, termed the intrapleural pressure. The advances in transplantation were discussed in Chapter 12 and Monitoring and Life Support (Chapter 13) was revised to increase the depth of information on ventilators as well as other monitoring equipment found in intensive care units and used by PTs when mobilizing patients earlier. 9-47). Also, individuals who have a decrease in palpated heart rate are not actually showing a true decreased heart rate, but rather a decrease in palpable heart rate. Pretransplant Period An attempt was made to manage JJ's CHF with pharmacologic support. If viral infection reaches the level of the alveoli, there may be edema, hemorrhage, hyaline membrane formation, and possibly the development of adult RDS. Pharmacologic Intervention Corticosteroids Corticosteroids were the first group of drugs to be recognized as having lympholytic properties. The results of the GXT can also be used for exercise prescription. Perloff J.K, de Leon A.C,J, O'Doherty D. It takes a greater transpulmonary pressure to expand the lung to a given volume in a person with decreased lung compliance.3 If the amount of pressure used to move air into the lungs is constant, the volume of air would be decreased. 1990;120(6):1403–1408. Effect of captopril on mortality and morbidity in patients with left ventricular dysfunction after myocardial infarction: results of the Survival and Ventricular Enlargement trial. 143. The alveolar walls become thinner, and the capillary bed incurs considerable loss, with an increase in ventilation–perfusion mismatching. In addition, contrast echocardiography appears to have potential for quantifying coronary flow and assessing myocardial viability.67 It is a method for noninvasively assessing areas of the myocardium at risk for damage, presence or absence of coronary collateral flow, and revascularization of occluded arteries after coronary angioplasty. 1988;138(3):689–696. (From Goldberger AL. 1995;47:258–263. Cipkin D, Scriven J, Crake T, Poole-Wilson P. If the patient is having difficulty maintaining appropriate saturation levels, the therapist should have the patient rest or reduce the intensity or duration of the exercise first and communicate these findings with the patient's physician. When obtaining the patient's history, the risk factors and signs/symptoms for venous insufficiency and VTE are important to consider (utilization of the Wells Prediction Model for VTE is important and found in Chapters 8 and 16; see Table 3-8).291 When examining the lower extremity for a DVT, the therapist must distinguish a DVT from other medical problems that can mimic a DVT, such as a baker 's cyst or muscle injury. Green D.E. New therapies for diabetes. 55. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases; 2009. Mechanism of relaxations to dendroaspis natriuretic peptide in canine coronary arteries. Toni S, Reali M.F, Barni F, et al. Aerobic exercise and resting blood pressure: A meta- analytic review of randomized, controlled trials. In general, class 1 drugs are very effective in the treatment of ventricular tachycardia (VT). Zhonghua Yi Xue Za Zhi. Effect of coenzyme Q10 therapy in patients with congestive heart failure: A long-term multicenter randomized study. Goldschlager and colleagues reported an increased incidence of subsequent MI in a group of patients who exhibited ST-segment depression at light workloads.136 The severity of coronary disease has also been correlated with the length of recovery time (postexercise rest) for ST segment to return to normal. Fatty nodules are beginning to appear on the distal thighs. Semisynthetic penicillins have a broader spectrum of antibacterial activity than the natural penicillins and are also orally effective.22,32 The principal disadvantage to the use of penicillins are allergic reactions, which manifest as skin rashes, hives, bronchoconstriction, or even an anaphylactic response. Trans-unsaturated fatty acids in plasma phospholipids and coronary heart disease: A case-control study. Assmann G, Schulte H, von Eckardstein A, Huang Y. Napoli N, Shah K, Waters D.L, Sinacore D.R, Qualls C, Villareal D.T. Effect of weight loss, exercise, or both on cognition and quality of life in obese older adults. Imbalances of potassium, sodium, or magnesium often occur as a result of compromised renal function and/or excess fluid administration. Philadelphia: Saunders; 2002. Heron M, Hoyert D.L, Murphy S.L, et al. 1991;6(1):68–75. The cranial facet is smaller than the caudal, and a crest between these permits attachment of the interarticular ligament. Biochemistry. Material uses best practices defined by the American Physical Therapy Association. Burlis, PT, DPT, CCS, Associate Director of Clinical Education, Assistant Professor, Program in Physical Therapy and Internal Medicine, Washington University, St. Louis, Missouri Rohini K. Cardiac rehabilitation and rehabilitation of the patient with cardiovascular disorders are synonymous and used in this chapter to discuss the interventions used for individuals with cardiac disease and dysfunction. Lymphangiogenesis in myocardial remodelling after infarction. The mirror image of this is seen in Fig. 2003;347(23):1825–1833. Development of an objective psychological test for the determination of the coronary prone behavior pattern in employed men. 1974;109:537–541. This compresses the lung and squeezes air out of the alveoli.50 This may occur with a pleural effusion, pleural tumor, or empyema.50 (5) Cicatrization atelectasis indicates volume loss, which is due to decreased pulmonary compliance due to fibrosis.50 Diagnostic Tests Atelectasis is seen by chest radiograph using anteroposterior and lateral projections (Fig. Men are affected 1.7 times as often as women.44,53 It is estimated that 20,000 to 30,000 Americans have ALS, with approximately 5600 people diagnosed each year.44,54 Table 5-19 Innervation levels of the respiratory muscles Pathophysiology Amyotrophic means the muscle is void or has limited nourishment; demyelination and death of the upper and lower motor neurons occurs, and defects in protein degradation also play a role. Diseases of the aorta. Drugs that increase myocardial contractility are known as positive inotropes and drugs that decrease contractility as negative inotropes. Pulmonary manifestations of liver diseases. A stretch can also be incorporated when brushing his hair, while also utilizing the mirror for visual feedback. If PD is used exclusively, each position should be maintained for 5 to 10 minutes or longer, if tolerated.10 The clinical approach to adding airway clearance maneuvers such as percussion and vibration during PD includes reexamination and utilization of the techniques until the secretions clear.11 Precautions and relative contraindications for percussion and vibration may be found in Box 17-2. S4, otherwise known as the atrial gallop sound, is not normal and is associated with an increased resistance to ventricular filling. Creasy T.S, McMillan P.J, Fletcher E.W, et al. Restrictive lung dysfunction differs from obstructive lung dysfunction in several important aspects. However, a recent metaanalysis of treatment of OB found that treatment with azithromycin was shown to reverse or halt FEV1.69 The mean percentage increase in FEV1 was 8.8% after an average follow-up period of 2.9 years.69 Immunosuppressants, immune-modulating medications, low-dose macrolide antibiotics, leukotriene-receptor antagonists, and combinations of inhaled bronchodilators and glucocorticoids are other options for treatment. Carbonic anhydrase inhibitors, acting on the proximal tubules, and potassium-sparing diuretics, acting on the collecting tubules and ducts, are the mildest diuretics. The additional volume of air that can be let out beyond the normal tidal exhalation is called the expiratory reserve volume (ERV). A commonly used example, clopidogrel (Plavix), is frequently used after PCI and stent placement.14,15 Anticoagulants Anticoagulants are used prophylactically to prevent blood clot formation. Tetanus can produce the most severe example of decreased chest wall compliance, leading to a restrictive impairment incompatible with life. It usually causes hypoxemia, severe shortness of breath, cyanosis, tachypnea, and tachycardia.9,35,63 There may be an accompanying pleuritis, with or without pleural effusion. Borer J.S, Jason M, Devereux R.B, et al. 1951;34:1243–1250. Monitoring systems in the intensive care unit. He also has impaired gas exchange as evidenced by desaturation on supplemental O2 during the 3-minute walk test. Atherosclerosis. Principles and Practice of Cardiopulmonary Physical Therapy. Wong C, Marwick T.H. Obesity cardiomyopathy: diagnosis and therapeutic interventions. PD positioning may also be coordinated with other procedures such as bathing, turning schedules for skin protection, or changing the bed linen. A randomized trial of digoxin versus placebo. Additionally, the constriction of the central pulmonary vascular beds associated with hypoxia can be reduced or reversed.65 Supplemental oxygen is most commonly administered via nasal tubes at flow rates between 1 and 6 L/min. 2006;12(2):139–143. The medication should be discontinued when this symptom occurs, and the effects are usually reversible. Fisher J.D. New York Heart Association classification. 1984;69(2):203–213. The panel recommended guidelines for treatment, including dietary and pharmacologic interventions, as well as screening programs to identify persons at risk. Fanta C.H. Asthma. The physiology of the collateral circulation in the normal and hypoxic myocardium. Kyphosis and scoliosis are two postures that functionally limit vital capacity and may therefore affect exercise tolerance. However, the usefulness of these agents is still under study.5,22,32 Respiratory Stimulants and Depressants A drug that stimulates the central respiratory centers is considered a respiratory stimulant. Exercise in the treatment of obesity: effects of four interventions on body composition, resting energy expenditure, appetite, and mood. Mathur S, Reid W, Levy R. Grundy S.M, Balady G.J, Criqui M.H, et al. New York: Marcel Dekker; 1991. The ascending aorta and the superior vena cava (SVC) form the second curve. The core is surrounded by monocytes, macrophages, lymphocytes, and fibroblasts. Washko G, Fan V, Ramsey S, et al. 2009;28:1007–1022. Cognition Cognitive impairment is increasingly becoming recognized as an important predictor of poor clinical outcomes, repeat hospitalizations, and higher mortality rates.154 Exercise has been established as preventing and reducing the effects of inactivity in peripheral vasculature; the effects of exercise on cerebral vasculature are starting to be studied. Thus trouble breathing or dyspnea is reduced and exercise tolerance improved.34–41 The most commonly used methylxanthines are theophylline (Bronkodyl, Theo-Dur, Slo-Phyllin) and aminophylline (Aminophyllin, Cardophyllin), which are associated with a variety of side effects, including increased myocardial work load, heightened susceptibility to ventricular and supraventricular dysrhythmias, and possibly diuresis. For cross-sectional clinical purposes, it is important to use outcomes not only to inform clinical decision making, but also provide discrimination in treatment decisions that are often subject to time/cost constraints. New York: John Wiley & Sons; 1984. ■ Lymphedema is often categorized into two forms: primary lymphedema (caused by an abnormally developed lymphatic system) and secondary lymphedema (from a known insult to the lymphatic system such as mastectomy). ■ Orient the patient to respective timing and trunk movements for expulsion. ICU-acquired weakness. Physiology of the cardiovascular and pulmonary systems The Pulmonary System The Cardiovascular System Summary Section 2. Papademetriou V, Kokkinos P.F. The role of exercise in the control of hypertension and cardiovascular risk. Venous diseases often result from impaired connective tissue properties with resultant "floppy" vessels due to loss of wall integrity and valvular incompetence. Folkers K. Pedrosa H.G. Correlation between the walk, two minute step test and TUG in hypertensive older women. Cardiac rehabilitation is associated with lasting improvements in cognitive function in older adults with heart failure. It provides patients and clinicians with a disease-specific approach to evaluate and appropriately monitor and treat those with heart failure. B, Posterior views of the bones of the thorax. What Your Cholesterol Level Means. The mechanism of action of the ACE inhibitors in these cases is complex and not fully understood, but they may play a favorable role in limiting adverse ventricular remodeling and ventricular dilatation after MI.31 Colucci, in an exhaustive literature review of ACE inhibitors in EFrEF, found that the randomized clinical trials consistently demonstrated a significant reduction in mortality, an alleviation of symptoms, and an improved clinical status due to ACE inhibitors.32 These studies also showed that combination therapy with an ACE inhibitor and betablocker was more effective than either one alone in both the symptomatic and asymptomatic populations. Thus the sympathetic nervous system directly influences four major variables: peripheral vascular resistance, heart rate, force, and venous tone. Hilton T.C, Chaitman B.R. The prognosis in stable and unstable angina. A cardiac plexus contains both sympathetic and parasympathetic nerve fibers and is located anterior to the tracheal bifurcation. The catheter is placed by a physician and is advanced to rest in the proximal superior vena cava. In some testing laboratories, expired gas analysis permits the assessment of oxygen uptake during the test (Fig. 162. B, The positions on the anterior and posterior chest walls at which normal vesicular and bronchovesicular breath sounds are identified. Following placement of the chest tube, the patient should be monitored carefully by chest radiograph to be sure all the blood is evacuated from the pleural space. An analysis of all the activities an individual performs helps to develop an inventory to set priorities and organize the individual's day. Havranek E.P, Ware M.G, Lowes B.D. Prevalence of depression in congestive heart failure. Fuhrman I, Krause R. The lymphatic system 22. Eur J Heart Fail. These include prostacyclin and inhaled nitric oxide (see discussion in the section "Cardiac Drugs Used in Critical Care"). FIGURE 9-45 Electrocardiogram tracing showing an inverted T wave, often indicating ischemia (arrows). ■ Although surgical advances such as sentinel lymph node biopsy have minimized the damage to the lymphatic system, even the best surgical techniques do damage the lymphatic system and can cause lymphedema. And throughout the session, it is essential to assess vital signs as well as for signs and symptoms of a PE. The potency of the drug is dependent on its site of action in the nephron (see Fig. They are roughly divided into α1 and α2 and β1 and β2 agonists. A few of these drug categories or specific drugs are discussed. The antibiotic of choice is erythromycin. 2005;1:76–83. The risks and benefits of these newer medications are still being evaluated for long-term side effects, but they are approved for the treatment of DVT/PE after the patient has been treated with parenteral anticoagulant for 5 to 10 days. First is a direct injury from inhaling hot, dry air containing heated particulate matter. Complication: pericatheterization myocardial infarction (MI). Bottom, Paradoxical breathing during paralysis of the diaphragm. Coronary angiography in 506 patients with extracranial cerebrovascular disease. 2002;87:9–15. Fibrinous pleuritis is found in 20% to 40% of patients who die of CRF and is manifested as pleuritic chest pain with pleural rubs, pleural effusion, or fibrothorax.206 Other pulmonary complications that occur in patients with CRF include pulmonary calcification that may be induced by secondary hyperparathyroidism, pleural effusion due to uremia, and an increased risk of respiratory tract infection, especially TB and pneumonia, probably caused by pathologic changes in the respiratory tract and impaired immune function. Appropriate equipment, which includes intravenous and emergency medications, intubation, and suctioning materials, should be present and updated when necessary. Early institution of mechanical support improves outcomes in primary cardiac allograft failure. Canoy D, Boekholdt S.M, Wareham N, et al. Veins also have less elastic tissue and hence are not as distensible. If the deformity is very severe, the patient may have decreased TLC, VC, and maximum voluntary ventilation and may complain of dyspnea on exertion, precordial pain, palpitation, and dizziness. After assessing the patient's chest movement through a respiratory cycle, the therapist's arm follows the upper chest to the resting position on exhalation. The first seven ribs attach via their costal cartilages to the sternum and are called the true ribs (also known as the vertebrosternal ribs); the lower five ribs are termed the false ribs—the eighth, ninth, and tenth ribs attach to the rib above by their costal cartilages (the vertebrochondral ribs), and the eleventh and twelfth ribs end freely (the vertebral ribs; see Fig. Goal: Individualized exerc ise presc ription defining frequenc y (times/week), intensity (THR, RPE, MET levels), duration (minutes), and modality to ac hieve aerobic , musc ular, flexibility, and energy expenditure goals. Two major types of epithelial cells exist along the alveolar wall. Obesity has increased during the past 20 years, and statistics state that 47 million adult Americans are overweight, thereby making this risk factor a serious health problem.4 The 2014 health statistics update from the World Health Organization listed ischemic heart disease as the number-one cause of death globally.8 Primary prevention programs therefore have a large target audience. There are a number of important reasons for individual programs to measure outcomes, including to demonstrate accountability, to improve clinical and management decision making for optimal care delivery, for research, and as incentives, such as the current PQRI in which therapists may qualify for bonus payments for using objective measures in practice. Cardiac Drugs Used in Critical Care Many pathologic conditions warrant observation and management in the critical care setting. The cardiomyopathies. National Cholesterol Education Program (NCEP) Expert Panel on Detection. Document drops in oxygen saturation below 90% and continue bagging with 100% O2 until saturation is above 90% before continuing. Hirsch I.B. Insulin analogues. The patient does not need to be extubated to start ambulation training. Oxygen consumption in the respiratory muscles is increased, causing an increase in the minute ventilation. 2008;7(2):116–122. In patients with SCI, it allows freedom from the ventilator.58 Poliomyelitis Poliomyelitis (polio) is a viral disease that attacks the motor nerve cells of the spinal cord and brainstem and can result in muscular paralysis.3 Table 5-21 Clinical manifestation of amyotrophic lateral sclerosis ERV, expiratory reserve volume; FRC, functional residual capacity; IC, inspiratory capacity; MEP, maximal expiratory pressure; MIP, maximal inspiratory pressure; MVV, maximum voluntary ventilation; Paco2, arterial partial pressure of CO2; PaO2, arterial partial pressure of O2; RR, respiratory rate; RV, residual volume; TLC, total lung capacity; VC, vital capacity; VT, tidal volume. An estimate of the aggregate incidence of radiation-induced cardiac dysfunction is between 10% and 30% by 5 to 10 years posttreatment, although asymptomatic abnormalities of the heart muscle, valves, pericardium, conduction system, and the vascular system are detected in up to 88% of patients.323 Factors that increase the risk of cardiac sequelae after mediastinal irradiation include cotreatment with anthracycline chemotherapy, location of tumor close to the heart border, age less than 18 years at the time of treatment, presence of CV risk factors or preexisting cardiac disease, treatment occurring more than 10 years earlier, and a number of radiation factors (use of orthovoltage radiation [mostly before 1970s], increased volume of irradiated heart, total dose to heart >30 Gy or daily dose fraction >2 Gy/day, or absence of subcarinal blocking). The newer, more technologically advanced imaging techniques are discussed in this chapter in their role to confirm or provide differential diagnostic information that can contribute to information obtained from a chest radiograph. Risks associated with thrombolytic use include systemic bleeding. Aldosterone is a key component in the renin–angiotensin–aldosterone system (RAAS), and suppression of aldosterone favorably decreases the adverse effect of the RAAS on the management of heart failure. ■ LVRS, BiPAP, MCSDs, and pharmacologic agents are often used to medically manage thoracic organ transplant candidates until a donor organ is available. Physical and Psychological Impairments Associated with Obstructive Lung Diseases As physical therapists, identification of patients' impairments is a crucial part of our evaluation and assessment, as it leads to the development of an appropriate treatment plan. A reactive hyperemia test may be performed by sharply elevating the limbs to produce blanching. Evidence-based guidelines for cardiovascular disease prevention in women: 2007 update. (From Monahan FD, Sands JK, Neighbors M: Phipps' Medical-Surgical Nursing, Health and Illness Perspectives, ed 8, St. Louis, 2007, Mosby.) Abandoned Procedures Although somewhat unusual, the use of muscle flaps (cardiomyoplasty), usually dissected from the latissimus dorsi or trapezius muscle, had been an alternative treatment for a limited number of patients with severe CMD and CHF.203 The muscle flap is wrapped around the LV and attached to a pacemaker, which stimulates the flap to contract, thus contracting the LV. On May 12, his condition stabilized and he was transferred to a monitored bed on the cardiac floor. An example of defibrillation during firing of an implantable cardiac defibrillator (ICD) is shown in Fig. They are β-antagonists with intrinsic sympathomimetic activity (ISA). Oxygen saturation (SaO2) is measured with a pulse oximeter. These changes combine to cause an acute increase in ventilation–perfusion mismatching, a decrease in lung compliance, and impaired gas exchange. Treatment Treatment is aimed at decreasing the cardiac preload and maintaining oxygenation of the tissues. In: Paz J.C, West M, eds. This results in a flattening of the diaphragm as a result of the presence of hyperinflated lungs.1,5 It is essential for therapists to reverse hyperinflation and restore the normal resting arched position of the diaphragm using any exercise aimed at strengthening the diaphragm muscle. If the sounds heard anteriorly near the sternal notch are found posteriorly in any of the segments of the lungs or anteriorly at the middle and lower parts of the ribs, these are abnormal breath sounds. 2006;7:60–70. Awareness of family health history as a risk factor for disease: United States, 2004. Clinical tip A patient with decreased venous return, as in congestive heart failure, may need to start an exercise program in a semi-Fowler position so that venous return is not compromised further by gravity and blood pooling in the lower extremities. It is known to metastasize widely and early, and in most patients has metastasized by the time the diagnosis is made. The normal cardiac index for adults is approximately 3.0 L/min/m2. If the patient is asymptomatic in risk categories A or B, meaning that the patient has zero to one risk factor for an adverse cardiac event with a blood pressure of 180/110 mm Hg or less who will engage in light-tomoderate dynamic physical activity (VO2 < 60% of max), there is generally no need for further testing beyond the routine evaluation. Studies have shown that the frequency of deep vein thrombosis (DVT) perioperative is 80% in patients after hip or knee surgery.28,43 Pathophysiology The pathophysiologic changes that occur following pulmonary embolism affect the pulmonary system and the cardiovascular system. 1989:36–40. Klein S, Romijn J.A. Obesity. Oxygen toxicity can be minimized by keeping the FiO2 less than 40% and the PaO2 less than 120 mm Hg.25 Antibiotics Some antibiotics used to fight infections can be neurotoxic. Larson J.L, Kim M.J, Sharp J.T, et al. ■ Severe obstruction: FEV1 less than 1.0 L. Mechanical ventilation is rarely needed. • Peak airway pressure (Ppk) depends on CRS, VT, and airway resistance, (Raw) = (Ppk − Pplat)/Inspiratory flow rate. Steroid-sparing agents often are administered to minimize the long-term side effects of systemic corticosteroids.32 In treating the three pulmonary manifestations of this disease, corticosteroids are used early to suppress the alveolitis and granuloma formation, especially if the patient has respiratory symptoms and/or a 20% to 30% reduction in PFT values.10,28 Established granulomas with pulmonary fibrosis are relatively fixed lesions and do not respond to therapy. FIGURE 17-13 Decision tree for discharge planning. 25. 2007;23:55–69. Assessment of the performance of the heart muscle itself, especially the regional functioning of the left ventricle, is a valuable application of echocardiography. 282. Clinically, patients with occasional arrhythmias may not demonstrate serious arrhythmias with increased activity; in fact, arrhythmias may decrease or disappear with activity (as in sinus arrhythmia). The progression of these techniques can be applied to transfers, ambulation, and stair climbing. Spertus et al's sample population of post–open heart surgery individuals demonstrated dramatically improved scores on the SAQ.84 Suggested Usage This survey is most appropriate for patients with active symptoms of angina in the setting of CAD or myocardial infarction. Supplemental oxygen Utilization During Physical Therapy Interventions. Four or more of the following, serially or simultaneously, during any interval of observation must be present for diagnosis of SLE: (1) abnormal titer of antinuclear antibodies (ANAs); (2) butterfly (malar) rash; (3) discoid rash; (4) hemolytic anemia, leucopenia, or thrombocytopenia; (5) neurologic disorder, seizures, or effusion; (6) nonerosive arthritis of two or more peripheral joints characterized by tenderness, swelling, or effusion; (7) oral or nasopharyngeal ulcerations; (8) photosensitivity; (9) pleuritis or pericarditis; (10) positive lupus erthematosus cell preparation, anti-DNA, or anti-Sm test or chronic false-positive serologic test for syphilis; and (11) renal disorder with profuse proteinuria (>0.5 g/day) or excessive cellular casts in urine. New York: McGraw-Hill; 1978. If two people are performing the positioning, then one person controls the head and upper trunk and the other person controls the lower trunk and the legs. Clinical tip It is always important to know ventilator settings, respiratory rate, and oxygen saturation before starting the therapy session. 2004;19:1919–1932. Physiotherapy after coronary artery surgery: Are breathing exercises necessary? Cardiorenal hemodynamics and sodium excretion in rats with myocardial infarction. 15. Piirila P, Sovijarvi A.R, Kaisla T, et al. Perceived exertion as an indicator of somatic stress. Gollnick P.D, Armstrong R.B, Saltin B, et al. Furosemide-induced thiamine deficiency. The stimulatory and inhibiting signals are dependent on a very complex, and only partially understood, mechanism of receptor-mediated activation. For air to enter the lungs during inspiration, muscles of the thoracic cage and abdomen must move the bony thorax to create changes in volume within the thorax and cause a concomitant reduction in the intrathoracic pressure. Pulmonary Veins The pulmonary veins, unlike the systemic veins, have no valves. J Fam Pract. This permission is only granted after the pharmaceutical company has demonstrated that the drug is both efficacious (therapeutically effective) and relatively safe (acceptable toxicity), or that the therapeutic effects outweigh the adverse reactions. Antuna-Puente B, Feve B, Fellahi S, et al. ■ Through control of these risk factors, the progress of CAD can be arrested and in some cases reversed. It is my true hope that you appreciate this edition and are able to learn from all the wealth of information provided by such wonderful contributors. Kerr H.D. Doxapram in hypercapnic chronic obstructive pulmonary disease with respiratory failure. The diaphragm is said to be elevated if, during a deep inhalation, fewer than nine ribs are visible above the level of the domes; depressed if more than 10 ribs are visible. Bipyridines/phosphodiesterase inhibitors As a group, phosphodiesterase inhibitors (bipyridines) act as positive inotropes and vasodilators. Typically, it is strapped on proximal to the antecubital space in the upper extremity to assess the pressures in the brachial artery. Obesity, inflammation, and atherosclerosis. D, A characteristic flow-volume loop in a patient with a fixed tracheal stenosis (predicted flow-volume loop in the red line). Living Environment/Equipment: He lives in a two-story house, 6 steps to enter, 14 steps to bedroom on second floor. 81. When the arms and shoulders are fixed, by leaning on the elbows or grasping onto a table, the pectoralis major can use its insertion as its origin and pull on the anterior chest wall, lifting the ribs and sternum, and facilitate an increase in the anteroposterior diameter of the thorax. Effect of continuous positive airway pressure on intrathoracic and left ventricular transmural pressures in patients with congestive heart failure. ■ The primary function of the lymphatic system is transport and drainage (similar to the sanitation system of a city). Lung expansion is restricted, and therefore the volume of air or gas moving in and out of the lungs is decreased.2 Restrictive lung dysfunction is not a disease. Rales are heard on auscultation. They are especially indicated for the treatment of supraventricular and ventricular arrhythmias that occur in the post-MI period and arrhythmias that occur during exercise. In the case of left bundle branch block, the left side of the myocardium demonstrates delayed depolarization, thereby allowing the right side of the myocardium to depolarize first and hiding any possible significant Q waves coming from the left ventricle (Fig. Voice control can also be used to assess shortness of breath, as well as strength of the musculature used in speaking and breathing, because poor voice control often indicates weak musculature in both breathing and speaking. The seventh report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure: The JNC 7 report. Following the loading dose, a lower maintenance dose is given. Thorax The bony thorax covers and protects the major organs of the cardiopulmonary system. This often occurs as early as 1 to 2 days after an uncomplicated myocardial infarction. Table 1-1 describes the topographic boundaries for the bronchopulmonary segments of each lung. Signs of atrial hypertrophy can be noted by examining the P waves of the ECG for a diphasic P wave in the chest lead V1, or a voltage in excess of 3 mV. Weight loss programs now often include extensive medical evaluation and a variety of therapeutic interventions, including diet, increased activity, behavior modification, psychological support, nutritional counseling, and family involvement. During inspiration, an increase in lung volume within the thoracic cavity decreases intrapulmonary pressures below atmospheric levels. 16-2). van de Vijver L.P, van Poppel G, van Houwelingen A, et al. ■ In the presence of acute injury, the ST segment is elevated above the isoelectric line and gradually returns to the level of the isoelectric line over a period of 24 to 48 hours. A RAP waveform should be recognizable when RAPs are being monitored; likewise, it should be possible to recognize a pulmonary arterial waveform when PAPs are being monitored. Obesity Rev. The patient's satisfaction with physical therapy and outcomes related to angina improvement and quality of life can also be assessed using the SAQ. Evaluative measurement properties of the patient-specific functional scale for primary shoulder complaints in physical therapy practice. Clinical tip An evaluation of electrocardiographic (ECG) changes is necessary to help a clinician recognize and differentially diagnose reduced exercise tolerance caused from an electrical disturbance producing mechanical alterations that reduce cardiac output and exercise tolerance and not a true mechanical problem within the heart. Association between anxiety and C-reactive protein levels in stable coronary heart disease patients. In standard hemodialysis, patients go to an outpatient dialysis center, typically 3 days per week, to be connected to a dialysis machine (dialyzer) through an arteriovenous fistula or venous graft; the treatment typically takes 3 to 4 hours, but can take longer in very large individuals. The posterior aspect is at the level of the lower portion of the third cervical vertebra, the bodies of the fourth and fifth cervical vertebrae, and the upper portion of the body of the sixth cervical vertebra. See Chapter 8 for more detailed information. The extension of the pleural covering below and behind the hilus from the root of the lung forms the pulmonary ligament. Use of AST has been replaced by more specific tests like cardiac troponins.22 Enzyme and isoenzyme levels increase within the first 36 hours after myocardial injury, reaching their individual peaks at different rates (Table 8-3).23 Marked elevation in CPK enzyme levels occurs whenever thrombolytic medications (streptokinase and tPA) are used to lyse clots. "I am here to teach you a little bit about what to expect after your surgery and to teach you your responsibilities and expectations of you after the surgery to help prevent postoperative complications. Albert J, Rippe J. 2007;4:480–490. Effect of nasal continuous positive airway pressure on cardiac output and oxygen delivery in patients with congestive heart failure. Predictors of quality of life in patients with advanced heart failure awaiting transplantation. 2002;360(9326):7–22. The goal of level I cardiac rehabilitation is to progress duration of walking time from 3 to 5 minutes to 30 to 45 minutes78; patients will most likely discharge home with a walking program that assists them with the appropriate progression to meet this goal. FIGURE 8-3 A, Diagram of common scan planes during a transesophageal echocardiogram (TEE) with a two-dimensional view. Exercise training performed regularly has demonstrated changes in systolic pressure of 10 mm Hg and diastolic pressure of 8 mm Hg, but must be maintained throughout an individual's lifetime to maintain benefits. Presse Med. The therapist should note resting vital signs, including oxygen saturation. Limited cutaneous systemic scleroderma, also known as CREST syndrome, has close correlation with pulmonary hypertension. 1957;21:343–349. Arterial blood gases are discussed in greater detail in Chapter 10. The use of the wheeled walker (Fig. When lidocaine (Xylocaine) or amiodarone (Cordarone) is unable to control ventricular arrhythmias, procainamide (Pronestyl) may be useful. St. Louis, 2006, Mosby.) BO X 13- 1 Som e indica t ions of de clining ca rdia c st a t us • ST change (elevation or depression) • Onset, increase, or change of foci of premature ventricular contractions (PVCs) • Onset of ventricular tachycardia or fibrillation • Onset of atrial flutter or fibrillation • Progression of heart block • Loss of pacer spike Modified from Paz JC, West MH: Acute Care Handbook for Physical Therapists, ed 3, St. Louis, 2009, Saunders. 2008;26:3–10. 8-1). Drugs used for erectile dysfunction, such as sildenafil and others, can cause severe hypotensive episodes combined with fainting and should not be used with these drugs. Cannon C.P. Obesity-related cardiometabolic complications. See Table 16-12 for normal resting heart rate values. 2008;9:11–22. Symmetry of the chest wall is also assessed dynamically with palpation of the spinous processes, ribs, and clavicles, comparing the motion from side to side and from top to bottom, anteriorly, laterally, and posteriorly. With complete obstruction, the trapped air is absorbed gradually and the alveoli then collapse, causing areas of atelectasis. Monitoring symptoms of weakness and improvement of symptoms with rest is an important aspect of differential diagnosis, as many other diseases need to be ruled out. Crestani B. Kannel W.B. Epidemiological aspects of heart failure. Rathore S.S, Wang Y, Krumolz H.M. Sex-based differences in the effect of digoxin for the treatment of heart failure. This increase in synaptic norepinephrine occurs on all receptors and reacts with all adrenergic receptors. Patients should not try to manipulate the timing of their medications because medications need to be taken at regular intervals; a delay in taking the medication, for example, waiting until after a physical therapy appointment, only delays the onset and effectiveness of the medication. 211. 107. Drug therapy in the heart transplant recipient, Part III: common medical problems. The progression of this activity is based on the patient's response. To establish the patient's walking speed, the first minute of the test involves accompanying the patient during walking to set the pace. Hemoglobin values are reported as a concentration in the blood (in grams per 100 mL of blood). To keep the air in the smaller alveolus from emptying into the larger, a surface-active agent is needed to decrease the overall surface tension of the alveoli so as to lower wall tension in proportion to the radius of the alveolus (see Fig. Consequently, an increased stretch is placed on the diaphragm muscle, and it adapts by becoming flatter and thus less effective (see Fig. During weaning, these techniques remain a priority to assist in continued success with spontaneous breathing. B, The back. The severity during this period has been shown to correlate with long-term severity and disabling nature. 16-12). Lasinski B.B. The lymphatic system. Approximately 93% of all cholesterol is found in cell membranes, and the other 7% circulates within the blood plasma. The sensation of dyspnea during exercise is not determined by the work of breathing in patients with heart failure. Health-related quality of life is a measure of how biologic and physiologic processes affect perception of symptoms, which influences function, general health perception, and quality of life (anxiety, depression, perceived disease burden, general health perception). ■ The goal of preoperative rehabilitation is to improve or prevent deterioration of the candidate's physical condition for increased physical function postoperatively. Willett W, Sampson L, Stampfer M, et al. Pathophysiology The action potential and the diastolic interval between action potentials are affected by changes in the ■ Maximum diastolic potential ■ Slope of phase 4 depolarization ■ Threshold potential required to depolarize the cell38 Fig. A drive line exits the patient's abdomen and attaches to a system controller that controls pump operations. An SCI in the cervical region produces paralysis or paresis in the arms, legs, and trunk, therefore resulting in tetraplegia. 1997;11(Suppl 1):199–212. The five areas where sounds are best heard are: ■ The aortic area: auscultated best in the second intercostal space close to the sternum on the right of the sternum ■ The pulmonary area: auscultated best at the second intercostal space to the left of the sternum ■ The third left intercostal space: murmurs of both aortic and pulmonary origin are best heard here Table 16-8 Summary of adventitious breath sounds IN: inspiration EX: expiration ■ The tricuspid area: located at the lower-left sternal border, approximately the fourth to fifth intercostal space ■ The mitral area (apex of heart): located in the fifth left intercostal space, medial to the midclavicular line As with breath sounds, auscultation of heart sounds should be performed in a systematic manner, such as by beginning at the aortic area and listening to both the first and second heart sounds. This results in scarring and destruction of the lung architecture (Fig. Electrical stimulation may be used to improve and maintain muscle strength, and use of progressive isometric resistance training has been shown to improve overall strength and cardiovascular and pulmonary status.54 Table 5-22 Clinical manifestation of poliomyelitis DLCO, diffusing capacity of the lungs for carbon monoxide; MEP, maximal expiratory pressure; MIP, maximal inspiratory pressure; MVV, maximum voluntary ventilation; Paco2, arterial partial pressure of CO2; PaO2, arterial partial pressure of O2; RR, respiratory rate; VT, tidal volume. Medical management includes platelet antiaggregants (primarily aspirin), anticoagulants, lipid-lowering medications, glycemic control, antihypertensive medications, and appropriate interventional methods.254,255,258 The benefit of the use of aspirin outweighs the risk of bleeding in all individuals who are at moderate to high risk of stroke based upon risk factors, especially women. Conversely, parasympathetic stimulation is cardioinhibitory and slows down heart rate and contractility. What are the signs of organ rejection for the patient after cardiac transplantation? Drug use is one habit that may not be readily acknowledged but that may be suspected from the individual's behavior (e.g., extreme nervousness), history of sleeplessness, muscle twitching, anorexia, and nasal irritation. Examples of risk factors that may induce heart failure include20,21: Table 14-8 Factors that influence stroke volume Factors Preload Afterload Contrac tility (inotropy) Definition Filling pressure of the left ventric le (left ventric ular end-diastolic pressure) Resistanc e against whic h the left ventric le c ontrac ts Ability of the myoc ardial musc le to c ontrac t Influenced by/dependent on Venous return Distention of the left ventric le Arterial pressure Resistanc e ac ross the aortic valve Adequate amounts of sodium, potassium, and c alc ium to fac ilitate c ellular depolarization and ac tin–myosin interac tion ■ Significant loss of contractile tissue as a result of an MI ■ Arrhythmias (especially if cardiac output is impaired as a result) ■ Increased preload associated with fluid overload ■ Increased afterload as seen with hypertension ■ Significant decrease in contractility as a result of ischemia, cardiac muscle dysfunction, or cardiomyopathy ■ Diabetes mellitus ■ Metabolic syndrome A major clinical cause of HFrEF is CAD, particularly for those patients who have had a previous MI. (From: FIGURE 13-19 LifeVest (The implantable defibrillator is evolving. 1981;47:33. ■ Cardiac autonomic neuropathy should be suspected in all individuals with type 2 DM and in those with type 1 DM for more than 5 years. The sounds auscultated over the artery are called Korotkoff sounds (Table 13-1).5 FIGURE 13-2 Guide to decision making regarding supplemental oxygen. ■ The posterior scalene muscle arises from the posterior tubercles of the transverse processes of the fifth and sixth cervical vertebrae, passing between the middle scalene and levator scapulae, to attach onto the second or third rib. Treatment Treatment of the seriously burned patient is usually divided into emergency, acute, and rehabilitative care and involves monitoring and providing support and care for every body system. Knowing the test has good validity will help to avoid false-positive and false-negative results. Individuals who required ventilatory assistance in the acute phase or had an onset of polio after 10 years of age and those with chest deformities are at highest risk of respiratory impairment, which often occurs

exercise to understand their individualized response to exercise. The following will present medications used to control bronchoconstriction based on recommendations promulgated by the National Asthma Education and Prevention Program and the National Institutes of Health.23 Principal drug groups recommended by the National Heart Lung and Blood Institute for treatment of bronchoconstriction are listed in Table 15-1. On the basis of the data in A, there is an approximately 25% risk of post-MI adverse event. The clinician can facilitate the mobilization of secretions by using one or more airway clearance techniques with acutely ill patients. Weiss E.S, Nwakanma L.U, Russell S.B, et al. Hematologic Function The normal morphology of the blood and blood-forming tissues is frequently disrupted in CHF. Assad-Kottner C, Chen D, Jahanyar J, et al. The second heart sound, S2 (the dub of lub-dub), is associated with the closure of the aortic and pulmonary valves and corresponds with the start of ventricular diastole. This increases intraaortic pressure and diastolic pressure in general and forces blood in the aortic arch to flow in a retrograde direction into the coronary arteries. Exerciseinduced ST-segment depression of 2.0 mm or greater on low-level exercise tests has been identified as the single most valuable indicator of prognosis after MI according to the regression analysis by Davidson and DeBusk.114 In addition, early onset of ST-segment depression is related to increased incidence of coronary events. Nevens F, Janssens J, Piessens J, et al. Partial left ventriculectomy for dilated cardiomyopathy: Is this an alternative to transplantation? Table 14-21 General guidelines for making food adjustments for exercise From Franz MJ, Norstrom RD, Norstrom J: Diabetes Actively Staying Healthy [DASH]: Your Game Plan for Diabetes and Exercise, Minneapolis, International Diabetes Center. Although both are potent βadrenergic agonists, dobutamine has no α-adrenergic stimulation and therefore does not increase blood pressure through vasoconstriction, whereas dopamine is able to do so. Also, initial investigations appeared to indicate that the removal of dilated, noncontracting myocardium (partial left ventriculectomy or Batista procedure) of persons with CHF and subsequent suturing of remaining viable myocardial tissue decreased the left ventricular chamber size and improved myocardial performance. Howard D.K, Iademarco E.J, Trulock E.P. The role of cardiopulmonary exercise testing in lung and heart-lung transplantation. … In addition, like ACE inhibitors, beta blockers can reduce the risk of death and the combined risk of death or hospitalization. Recovery in RDS is usually preceded by an abrupt unexplained diuresis.9 Many infants still die or have chronic effects from RDS. 2008;15(3):306–311. L1 Penninga, Møller C.H, Penninga E.I, Iversen M, Gluud C, Steinbrüchel D.A. Ant induction therapy for lung transplant recipients. McAlister F.A, Ezekowitz J.A, Wiebe N, et al. Fulton W.F.M. Coronary Arteries: Arteriography, Microanatomy, and Pathogenesis of Obliterative Coronary Artery Disease. JACC Heart Fail. The openings of the coronary arteries block blood from entering into the arteries when the aortic valve is open (during systole). 41. 1994;23:393–400. 2001;20(9):935–941. ■ An individual's prognosis post-MI is related to the complications, infarction size, presence of disease in other coronary arteries, and, most importantly, left ventricle function. 3-16). Arrhythmias are discussed in Chapter 9. (From Scully R, Barnes ML: Physical therapy, Philadelphia, 1989, JB Lippincott.) Exercise Testing with Ventilatory Gas Analysis Although exercise testing alone is diagnostic for coronary disease, exercise testing with ventilatory gas analysis using a metabolic cart can provide greater information regarding ventilatory, cardiac, or metabolic limitations of the patient (see Fig. A perspective for the elderly. What are the goals of pulmonary rehabilitation postoperatively? Thoracic expansion exercises repeated three to four times. Chambers of the Heart The heart is divided into right and left halves by a longitudinal septum (Fig. Disease management programs for heart failure should include components that not only improve the management of the disease, but also demonstrate improved outcomes and reduction of costs. 1991;83(3):778–786. Like the 6MWT, encouragement should not be provided to the patient during this test, with the only feedback to the patient being the audio beeps from the recording and instructions to the patient to increase walking speed slightly at each minute. An extremely elevated ventricular and occasionally elevated atrial pressure commonly seen in patients with CMD tend to produce a less effective pump as the myocardial contractile fibers become overstretched, thus increasing the work of each myocardial fiber in an attempt to maintain an adequate cardiac output.8,9 Myocardial work continued in this manner eventually produces left ventricular hypertrophy as the contractile fibers adapt to the increased workload.10,11 The two problems with left ventricular hypertrophy are the increase in afterload and the increased energy expenditure (metabolic cost) required for myocardial contraction because of increased myocardial cell mass.8,10,12 The increased cell mass without an additional increase in vasculature also affects blood supply to the muscle, resulting in a decreased blood supply to some of the new muscle mass. PT Goals: Patient able to transfer independently. • Always keep chest tube drainage system below the chest level. Use of corticosteroids may accelerate the resolution.25 Diagnostic Tests Much like RA, SLE has a set of 11 criteria that the American College of Rheumatology has set forth for diagnosis. Diuretics can decrease or increase potassium levels, leading to various arrhythmias. 86. The CFQoL scale is 52 items across nine domains. Endothelial cells serve several important functions, including filtration and permeability, vasomotion, clotting, and inflammation.19 Atherosclerosis is initiated through endothelial dysfunction, evidenced by endothelial cells that are extensively permeable to fat cells and white blood cells. Moser M. AACVPR Consensus Statement: Outcomes Evaluation in Cardiac Rehabilitation/Secondary Prevention Programs. The sternal angle marks the level of bifurcation of the trachea into the right and left main stem bronchi and provides for the pump-handle action of the sternal body during inspiration.1 FIGURE 1-1 A, Anterior. It is cytotoxic to certain subsets of T cells and further suppresses antibody, prostaglandin, and leukotriene synthesis, all important components of the immune system. The payfor-performance initiatives are allowing CMS to transition to a value-based purchasing system, with emphasis placed on evidence-based measures that would have the greatest impact on improving quality and value, and paying based on demonstration of quality, rather than on volume of patients treated.30 Physical therapists must be aware that they are not immune to the requirements of value-based purchasing. FIGURE 1-16 Schematic of the heart. An exhaustive list couldn't be provided here, so the clinician is advised that research beyond this chapter may be needed as applicable to the cardiovascular and pulmonary population (Box 22-8). Like active smoking at an early age, passive smoking during childhood and adolescence may pose a significantly increased risk.30,43 Occupational agents have also been implicated in the development of bronchogenic carcinoma. Right Atrium The chamber of the right atrium (see Fig. A scientific statement from the Stroke Council of the American Heart Association/American Stroke Association. 2004;71:301–326. When inadequate muscle action, incompetent venous valves, or venous obstruction occurs, venous insufficiency can result. The V-HeFT VA Cooperative Studies Group. Decreases in TLC and functional residual capacity (FRC) are a direct result of a decrease in lung compliance. An Hb value below 8 g/100 mL would cause the individual to have an extremely low oxygen-carrying capacity and therefore be performing a lot of work even with bed rest and activities of daily living (ADLs). Nonetheless, the highest point of visible pulsation is determined as the trunk and head are elevated, and the vertical distance between this level and the level of the sternal angle of Louis is recorded (Fig. 1994;13:767–773. 2006;45:14–17. 1984;251:2840–2853. Internal reliability was found with a Cronbach α coefficient range of 0.72 to 0.92 across the domains and item to total domain score.88 Test–retest reliability was r = 0.74 to 0.96.88 Discrimination of the tool based on severity of CF was also found to be significant across all the domains ($p < 0.005$ to $p < 0.000$).88 The CFQoL scale has been validated for use in at least one other language besides English.188 To date, no studies have been found that examined the MCID of the CFQoL scale. This difference in pressure between the atmosphere and the lungs facilitates the flow of air into the lungs to normalize pressure differences. Other inotropes frequently used include isoproterenol (Isuprel), dopamine (Intropin, Dopastat), and dobutamine (Dobutrex). For another example, a postural drainage program can be done while reading, studying, or watching a favorite television program. Inhaled hypertonic saline (7% NaCl) has been found to increase mucociliary clearance by increasing sputum volume. 1985;56(3):29B– 32B. Upon evaluation, the KCCQ was significantly more sensitive than either the MLHFQ or the SF-36.180 The KCCQ scores showed an improvement by between 15.4 and 40.4 points, and its responsiveness to change was summarized using a responsiveness statistic that resulted in a statistic of 1.48 in the physical limitation domain, almost three times larger than the corresponding domains of the MLHFQ (0.52) and SF-36 (0.59).180 The KCCQ was specifically found to detect clinical changes, particularly in the outpatient population with advanced symptoms of heart failure. Am Coll Cardiol. Packer M, Bristow M, Cohn J, et al. In addition, these cells have a large number of mitochondria (25% of cellular volume) to provide sufficient energy in the form of adenosine triphosphate (ATP) to the heart, an organ that can never rest.5,17 The conducting myocardial cells are joined by intercalated disks forming a structure known as a syncytium. Other Specific Diseases and Disorders A wide variety of other specific diseases may be associated with cardiopulmonary complications. Eliska O, Eliskova M. The HPS was the first large study to document the use of statins for secondary prevention of stroke.128 Individuals with a prior history of stroke showed a 20% reduction in frequency of major vascular events (MI, stroke, revascularization procedure, or vascular death) with the use of statins. Wynne J, Braunwald E. (Redrawn from Scully R, Barnes ML: Physical Therapy, Philadelphia, 1989, J B Lippincott.) Table 16-16 Summary of normal responses to activity P hysiological variable Heart rate S ystolic blood pressure Diastolic blood pressure S pO 2 Respiratory rate Response to increased work Response to endurance activity Gradual rate of rise with inc rease in workload Remains the same with c ontinuation of the ac tivity past steady state (first few minutes) Remains the same with c ontinuation of the ac tivity past steady state (first few minutes) ±10 mm Hg with any ac tivity Gradual rate of rise with inc rease in workload ±10 mm Hg with any ac tivity S tays the same or inc reases S tays the same or inc reases Gradual inc rease with workload, rapid rate of rise after anaerobic S tays the same threshold SpO2, pulse oximeter oxygen saturation. When excessive lactic acid accumulates in the muscle, pain is experienced (this symptom is known as intermittent claudication); when it reaches the central circulation, respiration is further stimulated and patients may experience shortness of breath (Table 3-7). PMN, polymorphonuclear neutrophil. ■ The term acute coronary syndrome is used to describe patients who present with either unstable angina or AMI, which includes STEMI and non-STEMI. 179. 1998;19(Suppl A):A24–A30. 1-16, A), like the right atrium, may be considered in two parts: (1) a posteroinferior inflow tract, termed the body, which contains the tricuspid valve, chordae tendineae, papillary muscles, and trabeculated myocardium; and (2) an anterosuperior outflow tract, called the infundibulum, from which the pulmonary trunk arises.8 Four muscular bands separate the inflow and outflow portions of the right ventricle, including the infundibular septum, the parietal band, the septal band, and the moderator band. Variant angina Variant angina, defined as angina produced from vasospasm of the coronary arteries in the absence of occlusive disease (i.e., the arteries are free of disease), is called Prinzmetal angina. (Accessed February 15, 2015.) 290. 335. Kotloff R.M, Ahya V.N, Crawford S.W. Pulmonary complications of solid organ and hematopoietic stem cell transplantation. In the inpatient setting, a comprehensive listing can be found on the nurse's medication chart. Trulock E.P, Cooper J.D. Reduction pneumoplasty for COPD [abstract]. (From Wilkins RE: Fundamentals of Respiratory Care, ed 9, St. Louis, 2009, Mosby.) FIGURE 1-10 Types of cells composing the mucosal lining of the upper and lower respiratory tracts. Continuous renal replacement therapy (CRRT) is a slower continuous mode of dialysis. The cardiopulmonary rehabilitation staff should access, review, and utilize these data when available and then determine whether additional disease-specific quality-of-life information is needed and feasible to obtain. Mucociliary transport, removal of secretions, and subsequent alveolar ventilation and oxygenation can only occur once bronchodilation is achieved in a constricted airway.6 Bronchomotor Tone Normal bronchomotor tone is a balance between constrictive and dilatational stimuli and results from equal adrenergic and cholinergic influences (Fig. Grauer K, Curry R.W. Clinical Electrocardiography: A Primary Care Approach. Pulmonary edema can also be caused by increased alveolar capillary membrane permeability secondary to various causes. And although it may not be normal, the VC may have doubled since the acute postinjury period. Psychosomatics. All the waveform configurations should be evaluated, as well as the PR intervals, the QRS intervals, the RR intervals, and the rate to assess the rhythm disturbance. In this case, an RPE would be the only accurate measure to use to determine if an appropriate exercise intensity has been selected. 1998;56:989–1007. ■ In RLD, one or more of the following is abnormal: lung compliance, chest wall compliance, lung volumes, or the work of breathing. 2008;88:1265–1278. Perme C, Chandrashekar R. 2007;167(14):1471– 1475. A review by Limongelli et al defines the link between heart and skeletal muscle dysfunction and lists the disease, noncardiac phenotype, and the corresponding cardiomyopathy. This process releases lysosomal enzymes that then induce progressive formation of collagen, which eventually becomes fibrotic. Compliance allows lung tissue to stretch during inspiration; the elastic recoil of the lung allows passive expiration to occur; and surface tension forces with the alveoli allow the lung to get smaller during expiration. After exhalation, the therapist scoops the hand up and under the anterior thorax, giving a slow stretch, and subsequently instructs the patient to "breathe into my hand." The scoop stretch is repeated with each breath at the end of exhalation, and the patient is instructed to "breathe into my hand" during inhalation. Yui Y, Fujiwara H, Mitsui H, et al. University of Miami, School of Medicine; February 19–22, 1991. Ways of Coping Questionnaire. If a change occurs with increased activity, four factors should be considered in the clinical decision-making process: (1) whether the arrhythmias represent a new finding, (2) whether the arrhythmias are benign or life threatening, (3) whether the patient's pharmacologic regimen may be producing the arrhythmias, and (4) the severity of the symptoms associated with the arrhythmias. Mucus production is increased, and commonly there is damage to the mucociliary clearance mechanism. The laryngeal orifice and the posterior surfaces of the arytenoid and cricoid cartilages form the anterior aspect of the laryngopharynx. The therapist should be able to observe the chest radiograph and distinguish between acute changes and chronic changes. Kotsimbos T, Williams T.J, Anderson G.P. Update on lung transplantation: Programmes, patients, and prospects. Patients should store nitroglycerin in a dark container, keep it tightly closed, and avoid moisture. ■ Are symptoms provoked or do they occur at rest? Notation of the extent of movement and the symmetry of the movement is important (see Fig. Br J Med. 2013;64(3):626–637. Systemic Lupus Erythematosus Systemic lupus erythematosus (SLE) results in diffuse and widespread inflammation involving the skin, joints, brain, kidney, heart, and virtually all serous membranes. The act of bridging helps with placement and removal of the bedpan, linen changes, and positioning in bed. 2005;28:1289–1296. Reverse Trendelenburg position helps reduce hypertension and facilitate the movement of the diaphragm by using gravity to decrease the weight of the abdominal contents against it. It may be necessary to incorporate simple thoracic mobilization techniques to increase the ability of the thorax to expand during breathing. • Before you get tired, stop and rest. Cahalin L.P, Tk LaPier, Shaw D.K. Sternal precautions: Is it time for change? New York: Elsevier Health Sciences; 2014:410– 419. It can be used in conjunction with vibration techniques to aid in airway clearance.27 It can also improve the flow of air into poorly ventilated regions of the lungs.27 The patient is instructed to hold his or her breath (without using a Valsalva maneuver) at the height of inspiration for 2 to 3 seconds28 followed by a relaxed exhalation. 2004;85:661–666. In: Mountcastle V.B, ed. 1983;63:655–659. However, choosing a more generic outcome tool like the SF-36 (Short Form 36 Health Survey) or CES-D (Center for Epidemiologic Studies Depression Scale) may have benefits in reporting outcomes that are not disease specific. Gensini G.F, Comeglio M, Colella A. Kuhn W.F, Davis M.H, Lippman S.B. Emotional adjustment to cardiac transplantation. Next, the patient is log-rolled gently from the side-lying position toward prone. A thrombus may form as a result of stagnate blood flow along the wall of the aneurysmal section. An MRI scanner produces a gradient magnetic field in the region of the body to be imaged. Remember that the object is to walk as far as possible for 6 minutes, but don't run or jog. Reliability and Validity To assess the validity of the KCCQ, the tool was compared to the functional limitation domain of the Minnesota Living with Heart Failure Questionnaire (MLHFQ), 6MWT, The New York Heart Association (NYHA) classification for heart failure, and the physical limitation domain of the SF-36. Ross E.M, Gilman A.G. Pharmacodynamics: mechanisms of drug action and the relationship between drug concentration and effect. A comprehensive understanding of anatomy is fundamental to the knowledge base of the therapist in understanding the central components involved in the delivery of oxygen and nutrients to peripheral tissue. FIGURE 16-3 The increased size of the abdomen in obesity (or pregnancy) restricts the full downward movement of the diaphragm during inspiration and restricts lung tissue at rest, therefore creating a restrictive effect on the lung. Aerobic exercise and atrial natriuretic peptide. To decrease cardiac preload, venous return to the heart is decreased, which decreases the left ventricular filling pressure. St. Louis: Mosby; 2004. Alveolar hemorrhage is a rare but life-threatening pulmonary manifestation of SLE. Patients with COPD who quit smoking experience an FEV1 decline that parallels a nonsmoking, age-matched person. A mechanism for the negative interval-strength relationship. Schocken D.D, Holloway J.D, Powers P.S. Weight loss and the heart. Treatment with acetylcholine esterase inhibitors (e.g., neostigmine and pyridostigmine) results in improvements in cardiac function and respiratory muscle strength and pulmonary function, but may have relatively little effect on respiratory muscle endurance. 1994;89:2605–2615. The patient is instructed to continue this technique independently. Pharmacologic management of these conditions is also imperative to establish hemodynamic stability. 2001;92:1368–1377. Fibrous and elastic tissues and smooth muscle fibers complete the ring posteriorly. Adequate inspiratory volumes for an effective cough are noted to be at least 60% of the patient's predicted vital capacity.11 The second stage is the closure of the glottis. Occupational History Identifying the type of work the patient currently performs allows for the setting of realistic goals and for developing a plan for return to work, if possible. J Am Diet Assoc. Quality of Life: The Dyad of Caregivers and Lung Transplant Candidates [ebook]. This clinical method for MVO2 assessment is called the double product or rate–pressure product (RPP). Although the primary origin is due to left ventricular pathophysiology, HF also includes systemic impairments such as sympathetic nervous system and renal system impairments, as well as skeletal muscle dysfunction (see Chapter 4). The half-life of digoxin is 36 hours; that of propranolol is only 3 to 6 hours. FIGURE 14-1 Schematic representation of the pharmacokinetic and pharmacodynamic processes. Effects of 2000 kcal per week of walking and stair climbing on physical fitness and risk factors for coronary heart disease. There is also excessive infiltration of the muscle with fibrous tissue and fat. Mechanical compression, in addition, is important to utilize for prevention of DVT as well as postthrombotic syndrome.292,301,302 A Cochrane Systematic Review showed evidence that graduated compression stockings worn by hospitalized surgical patients were effective in reducing the risk of DVT.302 Another systematic review found compression stockings decreased the incidence of DVT in airline passengers.303 Postthrombotic syndrome is the most frequent complication of lower extremity DVT and develops in up to 50% of these patients even when appropriate anticoagulant therapy is used; therefore physical therapists should evaluate all patients who have a diagnosis of lower extremity DVT for PTS.304–306 A clot remaining in the vein of the LE can obstruct blood flow, leading to venous hypertension. Insulin deficiency results in increased levels of free fatty acids (FFAs) from the breakdown of adipose tissue. ed 63. However, a radiograph on August 24, 2010, revealed no evidence of CHF, and ventilatory measurements demonstrated improved pulmonary function. 2011;60:1–23. 2001;286:1218–1227. Seventy percent of patients report a preceding viral illness.32 This type of pneumonia occurs more frequently during the winter and early spring. Solid explanations and good instructions by the prescriber to the patient can minimize these problems. A sample goal for an airway clearance program for a cystic fibrosis patient may be "Patient's caregiver independently completes percussion and postural drainage to assist in airway clearance." The caregiver 's independence with the specific techniques can then be observed by the therapist and documented, or verbally assessed if demonstration is not possible. 9-53). Clin J Sports Med. 10-13 and 10-14 and include a graphic tracing called a spirogram. At rest, patient uses accessory muscles, with respiratory rate 24, SpO2 92%, and heart rate 89 beats per minute. Benefits and obstacles of health status assessment in ambulatory settings. 2009;2:57–65. 1991;85(Suppl B):13– 16. In adults, supplemental oxygen and proper fluid balance are also very important. Mancini D.M, Henson D, LaManca J, et al. Purpose The AM-PAC's purpose is to be used with patients receiving post–acute care rehabilitation. Common techniques used to treat postoperative atelectasis include deep breathing exercises, early mobilization of the patient out of bed, incentive spirometry, and CPAP.28 Nosocomial pneumonias are not uncommon after upper abdominal surgery, and 12% to 20% of patients experience this complication.29 Nosocomial pneumonias are treated with an appropriate antibiotic and possibly with postural drainage, percussion, and vibration if the patient's secretion clearance mechanisms are impaired. Opacification of the costophrenic angle is indicative of either pleural thickening (if the change has occurred over many months or years) or a pleural effusion (if the change has occurred recently). Frost P.H, Havel R.J. Rationale for use of non-high-density lipoprotein cholesterol rather than low-density lipoprotein cholesterol as a tool for lipoprotein cholesterol screening and assessment of risk and therapy. The PSFS gives an objective measure of the patient's perception of his or her functional status related to his or her injury and pain. 271. 336. 6-3). Baltimore: Lippincott Williams and Wilkins; 2006. Lower maximal workloads compared with those of subjects without heart disease 8. Posterior to the AV node are several parasympathetic autonomic ganglia that serve as receptors for the vagus nerve and cause slowing of the cardiac cycle. Persistence of lymphedema reduction after noninvasive complex lymphedema therapy. In patients with type 2 DM, medications used to treat comorbidities can affect exercise responses. Treatment The pulmonary status of surgical patients should be evaluated before surgery. He subsequently underwent coronary artery bypass graft surgery exactly 1 month after the myocardial infarction. It is the responsibility of the physical therapist working with a patient who is wearing or has worn a Holter monitor to obtain the interpretation of the results to determine whether modifications are needed in the patient's activities. Sui X, LaMonte M.J, Laditka J.N, et al. 1996;27:45–52. 62. Salpeter S.R, Walsh J.M.E, Greyber E, Salpeter E.E. Coronary heart disease events associated with therapy in younger and older women; a meta-analysis. If a patient has supplemental oxygen, the amount of oxygen given must be adequate to keep the saturation at the prescribed minimum level (usually ≥90%). ■ Overweight and obesity represent major health problems in this country because of their association with increased prevalences of HTN, CAD, stroke, osteoarthritis and other orthopedic problems, GI problems, glucose intolerance, insulin resistance, type 2 DM, dyslipidemia, gallbladder disease, sleep-related breathing disorders, gynecologic problems, pulmonary dysfunction, and certain forms of cancer. Cardiovascular and Pulmonary Physical Therapy: Evidence and Practice. Idiopathic Pulmonary Fibrosis: A Comprehensive Clinical Guide. These devices are capable of automatically delivering staged therapy in treating ventricular tachycardia (VT) or ventricular fibrillation (VF), including antitachycardia pacing (A) and cardioversion shocks (B) for VT, and defibrillation shocks (C) for VF. FIGURE 22-3 Simple form for preparing a patient for the 6-minute walk test. The reliability of PEF as a clinical tool for evaluation of lung mechanics is limited because of the initial high flows that can occur even in obstructive disorders. Yin F.C.P, Spurgeon H.A, Weisfeldt M.L, et al. 4-14, C). From the time the physical therapist says go until the 30 seconds are up, a count of the number of fully completed sit-to-stand transfers is recorded. A brief dietary screen for high fat intake. Neurons in parts of the brainstem, including the medulla oblongata and pons, provide control for automatic breathing and adjust ventilatory rate and tidal volume for normal gas exchange (Fig. The patient brings the arm on the involved side into an abducted position to the level of the head. Other chemotherapeutic agents that can induce interstitial pneumonitis include: ■ Busulfan ■ Chlorambucil ■ Cyclophosphamide ■ Methotrexate ■ Mitomycin C ■ The nitrosoureas (particularly carmustine and lomustine) ■ Sometimes fludarabine, irinotecan (Camptosar), paclitaxel (Taxol), and procarbazine (Matulane, Natulan) A number of other agents are also associated with other types of lung injury: busulfan (Myleran) can cause pulmonary fibrosis and sometimes an alveolar–interstitial process with alveolar proteinosis, which is often fatal. 1995;13:559–567. FIGURE 5-1 Pathophysiologic aspects of lung disease. 1994;89:975–990. Dialysis is a process that replaces the excretory functions of the kidney through the use of a semipermeable membrane and a rinsing solution (dialysate) to filter out toxic waste substances from the blood. The "6 Clicks" forms are used to give a more direct measure of certain functional tasks. St. Louis: Mosby-Year Book; 1995. Boyton R.J. Infectious lung complications in patients with HIV/AIDS. FIGURE 1-8 Topography of the lung demonstrating the lobes, segments, and fissures. Expert Panel on the Identification. The systolic blood pressure, or the maximum systolic left ventricular pressure, reflects the compliance of the large arteries and the total peripheral resistance. Braunwald's Heart Disease. Evaluation, and Treatment of Overweight and Obesity in Adults. Goble A, Jackson B, Phillips P, et al. The other four types of chest pain in addition to angina are pericarditis, mitral valve dysfunction, bronchospasm, and esophageal spasm. The acinus includes all the lung tissue distal to the terminal bronchiole and is composed of respiratory bronchioles, alveolar ducts, and alveolar sacs, all of which participate in gas exchange.24 Chronic Bronchitis Bronchitis "Pulmonary catarrh is inflammation of the mucous membranes of the bronchia. Guidelines for the early management of patients with ischemic stroke: A scientific statement from the Stroke Council of the American Stroke Association. 1997;11:99– 109 discussion 110, 113–114. The therapist places a hand on the patient's abdomen and allows two to three breathing cycles to occur to become familiar with the patient's breathing pattern. 1986;74(6):1255. The diaphragm may show muscle atrophy and fibrosis with minimal inflammation.9 Other ventilatory muscles may also be weak, even with no noticeable weakness in the muscles of the extremities. Springfield, IL: Charles C Thomas; 1965. ■ Lymphedema is often divided into four stages (from least to most severe) from the clinically undetectable stage 0 progressing through stages 1 and 2 to the severe form of lymphedema found in stage 3 called elephantiasis. Questions: 1. As a result, vasoconstriction and aldosterone secretion are reduced. Arch Dis Child. There are two main components to the LifeVest: a garment and a monitor. Assisted mechanical ventilation is usually required with the use of these drugs. ■ Proteinuria; elevated urine specific gravity, BNP, BUN, and creatinine levels; and decreased erythrocyte sedimentation rates are associated with CHF. Typically, a patient who has pure primary lymphedema should respond to CDT faster than one who has a combination of lipolymphedema or pure lipedema.6 Because patients with lipedema or lipolymphedema usually have pain and hypersensitivity in the areas affected by lipedema, the therapist may need to use less pressure during MLD and bandaging while waiting for the hypersensitivity to resolve, which is usually the case.6 FIGURE 21-11 Stage I lipedema. More advanced CHF may produce a "global respiratory impairment" that is associated with varying degrees of obstructive and restrictive lung disease.73,74 Neurohumoral Effects The neurohumoral system profoundly affects heart function in physiologic (fight-orflight mechanism) and pathologic states (CMD). J Man Manip Ther. Due to the complexities and number of conditions of restrictive lung dysfunction many more tables were created in Chapter 5 to separate the material and assist the learner to identify key information quickly. Divertie M.B. Respiratory System. Physical Therapy (PT) Tests and Measures (initial evaluation): Resting values—ECG paced rhythm, HR = 72. In general, the most influential receptor agonists are the sympathetic neurotransmitters norepinephrine and epinephrine, as they relay excitatory autonomic nervous system stimuli to both postsynaptic α- and β-adrenergic receptors (primarily β for norepinephrine) in the myocardium.75 Inhibitory autonomic nervous system stimuli are transmitted by the parasympathetic nervous system via the vagus nerve and the neurotransmitter acetylcholine. Functional Performance Because physiologic data are not always directly tied to functional performance, as in the case of left ventricular ejection fraction,65 it is also important to consider functional performance outcome measurement in patient and program assessment. In the normal heart, the mitral area is the apical pulse point and the point of maximal impulse. 1989;14:323–325. Dimopoulou I, Bamias A, Lyberopoulos P, et al. Effective pharmacologic management is most successful when close patient monitoring occurs and a reliable system exists for dynamic, ongoing reevaluation and aggressive pharmacologic intervention as determined by the degree of hemodynamic compromise. 2009;32(Suppl 2):S194–S198. 2008;12(4):274–280. Boyda E.K. Respiratory Problems. Rheumatoid nodules and Caplan syndrome rarely produce significant RLD.27,31 Pulmonary vasculitis often occurs adjacent to pulmonary nodules. The posterior aspect of the oropharynx is at the level of the body of the second cervical vertebra and upper portion of the body of the third cervical vertebra. These areas include physical limitations (question 1), symptoms (frequency [questions 3, 5, 7, and 9], severity [questions 4, 6, 8], change over time [question 2]), self-efficacy and knowledge (questions 11, 12), social interference (question 16), and quality of life (questions 13 to 15). There is fibrotic replacement of the connective tissue within the alveolar walls. Jessup M, Abraham W.T, Casey D.E, et al. Any abnormally fast, slow, or unsynchronized rhythm can impair ventricular and atrial function quickly and progress to CHF and even death.20 Many patients with CMD have preexisting arrhythmias that must be controlled, typically with medication, but sometimes by other methods (e.g., ablation, ICD)21 to prevent further deterioration of a muscle that is already compromised. The MCV Twin Study. The European "Corwin" Study Group. Morgenthau A.S, Iannuzzi M.C. Recent advances in sarcoidosis. Annu Rev Physiol. The intercartilaginous portion of the internal intercostals elevates the ribs and assists in inspiration. Formal exercise testing involves the following modes of exercise: ■ Walking up and down steps ■ Exercising on a stationary bicycle ■ Using arm or wheelchair ergometry BO X 8- 1 Indica t ions for e x e rcise st re ss t e st ing • Evaluation of chest pain suggestive of coronary disease • Evaluation of atypical chest pain • Determination of prognosis and severity of coronary artery disease • Evaluation of the effects of medical or surgical therapy or intervention • Evaluation of arrhythmias • Evaluation of hypertension with activity • Assessment of functional capacity • Screening to provide an exercise prescription • Providing motivation for a lifestyle change to reduce the risk of developing coronary artery disease ■ Walking or jogging on a treadmill at variable speeds and inclines ■ Walking a specified distance, as in the 6-minute walk test Informal testing is performed to screen for exercise programs, sometimes on a group basis, and includes such tests as the 12-minute walk, Cooper 's 12-minute run, the pulse recovery test, or the 1.5-mile run (Table 8-6).108–110 Maximal versus Submaximal Stress Testing The protocols that are used are described as either maximal or submaximal; the distinction between them is the termination point of the test. DiPietro L. 2014;20(18):5177–5190. ACSM's Guidelines for Exercise Testing and Prescription. Side effects of omalizumab include itching, headaches, injection site pain, or, in severe cases, anaphylaxis.34 New Drug Development Protease inhibitors and inhibitors of neutrophil elastase, cathepsins, and matrix metalloproteases are in the clinical development pipeline as possible new antiinflammatory treatments. Maintaining control of bronchomotor tone and inflammation are the main components of airway management for patients with pulmonary disease. Opie L.H, Sonnenblick E.H, Frishman W, Thadini U. 309. The test is filled out by the therapist and should take about 5 to 15 minutes to perform. It is not being used as often as the antithymocyte globulins, as there is an increased incidence of severe allergic reactions to these agents.85 Anticytokine antibodies can replace the antilymphocytic preparations. This allows for calculation of the difference between gastric pressure and esophageal pressure, which is the transdiaphragmatic pressure. In normal ventilation, air is pulled into the lungs because of a negative pressure created through activation of the respiratory muscles. Pathophysiology Unlike striated muscle, the myocardium can function without adequate oxygen for only a relatively short period. Position statement. Ryttov N, Holm N.V, Qvist N, Blichert-Toft M. Isaacs H, Muncke G. Central and peripheral limitations to upright exercise in untrained cardiac transplant recipients. Reproducibility and validity of a semiquantitative food frequency questionnaire. Physical functioning in end-stage renal disease patients: update 2005. 1992;23:433– 436. This reaction can begin within minutes of an intravenous injection or within an hour of oral ingestion. 1985;12:221. Can J Biochem. Clinical tip The recommended drug dose might have to be increased in very heavy individuals because the volume of distribution is much greater and the drug is much more diluted in their bodies. This restrictive impairment may be due to direct pressure from the tumor, may result from susceptibility to other disease processes in the weakened cancer patient, may be related to changes that occur as the tumor metastasizes to other body systems, or may be produced by hormones arising from the tumor, which can cause a variety of symptoms in different body systems. The presence of an S3 indicates a noncompliant LV and occurs as blood passively fills a poorly relaxing LV that appears to make contact with the chest wall during early diastole.121 The presence of an S3 is considered the hallmark of CHF.122 There are several reasons why the left ventricle may be noncompliant, of which fluid overload and myocardial scarring (via myocardial infarction or cardiomyopathy) appear to be the most common. Patients with long-standing smoking history may have underlying COPD and may need to have oxygen saturation monitored, arterial blood gases, and CXR. Garcia J.P, Iacono A, Kon Z.N, et al. Stone NJ, Robinson J, Lichtenstein AH, et al. Pimobendan Multicenter Research Group. At the level of the fifth thoracic vertebra, it splits into right and left pulmonary arteries. B, Blood pressure measured using a handheld Doppler unit. 2006;24:2765–2772. They lie next to the vertebral bodies of the fifth, sixth, and seventh thoracic vertebrae. 33. 1984;246(6 Pt 2):H784–H791. Complications are the same as those in community-acquired Klebsiella pneumonia. The right hemidiaphragm is protected by the liver and is stronger than the left. 1-19) open near these aortic sinuses of Valsalva. Obesity. The flow generator releases a stream of compressed air through the hose to the face/nose mask and keeps the upper airway open under continuous air pressure. If these drugs cannot be prescribed because of intolerance, vasomotor center–acting agents like clonidine typically can be used. 2008;52:799–806. Elevated levels of troponin occur earlier3 and may last for up to 5 to 7 days in plasma (normal range = 0 to 3.0 mg/mL).4 The troponins are a group of structurally related proteins found in striated muscle cells and are bound to the actin filament. doi: 10.1016/j.rmed.2010.09.002 Epub 2010 Sep 29. 1994;90(4):2085–2092. Baltimore: Williams and Wilkins; 1978. Miller W.C, Koceja D.M, Hamilton E.J. A meta-analysis of the past 25 years of weight loss research using diet, exercise, or diet plus exercise intervention. The safety of mobilization and its effect on hemodynamic and respiratory status of critical care patients. 2004;61(Suppl 1):S10–S13. Prescription of antiarrhythmics is empirical, and several agents may need to be tried before one is found that is both effective and well tolerated by the patient. The changes seen in individuals with emphysema include a barrel chest and flattened diaphragms. American Association of Cardiovascular and Pulmonary Rehabilitation (AAVCPR). Update December 2014. The fundamental treatment for CHF involves controlling the pathophysiologic mechanisms responsible for its existence. Usefulness of noninvasive detection of left ventricular diastolic abnormalities during isometric stress in hypertrophic cardiomyopathy and in athletes. Eur J Neurol. Clin Rehabil. . Fireman P. If BG levels are excessively low (300 mg/dL) or if ketones are present, exercise is contraindicated, at least until corrective measures have taken effect. Because no β1-selective antagonist is able to completely avoid interactions with β2-receptors, caution should be exercised in prescribing βblockers for patients with pulmonary disease. Individuals with lower extremity PAD should be assumed to have ASHD, which is the main cause of higher morbidity and mortality rates in these individuals.262 Studies report up to 60% to 80% of those with PAD have significant coronary atherosclerosis in at least one coronary artery.263 Individuals with asymptomatic disease appear to have the same increased risk of cardiovascular events and death found in those with symptoms of claudication.264 Further information on PAD and medical diagnostic testing and interventions can be found in the American College of Cardiology Foundation and American Heart Association's Guidelines for the management of patients with PAD, updated in 2011.265 Exercise and Peripheral Arterial Disease Individuals with PAD are unable to produce the normal increases in peripheral blood flow essential for enhanced oxygen supply to exercising muscles. Vital signs such as heart rate, temperature, blood pressure, and respiration are important to review for trends as well as for the establishment of a baseline. Ultrafiltration can be performed vein to vein using an extracorporeal pump or with an arteriovenous approach.199 Although hemodynamic side effects (hypotension, organ malperfusion, and hemolysis) are also possible with ultrafiltration, proper monitoring of the rate of blood flow through the filter (rates above 150 mL/min or below 500 mL/hr are tolerated without side effects), as well as right atrial pressure (ultrafiltration should be discontinued when the right atrial pressure falls to 2 or 3 mm Hg)200 and hematocrit levels (should not exceed 50%), should, for the most part, prevent them.199 Assisted Circulation Several methods of treatment assist the circulation of blood throughout the body. Accessed July 8, 2014. Diagnostic Tests Routine chest x-ray can be used to identify nodules or tumors if they are large enough. Content, reliability and validity of a new measure—The Minnesota Living with Heart Failure Questionnaire. Mixed Connective Tissue Disease Mixed CTD is an overlap syndrome with clinical features of SLE, SSc, and myositis. Crizzle A.M, Newhouse I.J. Is physical exercise beneficial for persons with Parkinson's disease? Heart rates above or below the preset ranges and changes in the rhythm will trigger an alarm. The anteroposterior diameter decreases, and the lateral diameter increases. Although drug prescription is looked at across broad populations, it would be remiss to ignore the individual's response to a drug or category of drug. Chest Radiographs Despite the availability of newer methods, in most clinical settings the standard radiograph (chest x-ray [CXR]) remains the predominant diagnostic test to determine anatomic abnormalities and pathologic processes within the chest. Desc ribe reliability in statistic al terms. Am J Cardiol. Anderson L, Taylor R.S

symptoms being described constitute angina, the patient’s terms used to describe the angina should be remembered and used in all future assessments of symptoms. FIGURE 9-46 Acute inferior myocardial infarction with ST elevation in the inferior leads. Hum Reprod. Cardiovascular abnormalities most often involve the pericardium, arterial vasculature, and cardiac valves and usually cause minimal CV dysfunction (e.g., asymptomatic mitral valve prolapse or mild aortic root dilatation) but occasionally results in significant problems (e.g., cardiomyopathy producing CHF, MI, severe aortic or mitral insufficiency, or dissecting aortic aneurysm). Practical Guide on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. 1999;54:995–1003. Am Med. Soon after, he developed swelling in his ankles, rales in the bases of his lungs and an S3 heart sound. In general, patients with pulmonary disease should avoid the use of these drugs because they suppress ventilatory drive. A direct current defibrillator should be available and functioning properly. Although calcium-channel blockers are relatively safe drugs with few serious side effects, these medications may have negative inotropic properties at high doses; therefore clinical observation for heart failure is warranted. Ahrens T. The patient should be able to complete this questionnaire independently, but may need assistance of a physical therapist just for clarification of a response choice. It should be noted that a difference exists between pulsus alternans and pulsus paradoxus, which is characterized by a marked reduction of both systolic blood pressure (−20 mm Hg) and strength of the arterial pulse during inspiration. Exercise therapy and other types of physical therapy for patients with neuromuscular diseases: A systematic review. The same agents are typically used for the same physiologic abnormalities. Reitz B.A, Wallwork J.L, Hunt S.A, et al. (See Table 14-7.) Medical management of HF is a true art, as it is neither simple nor easy. In many instances, as the circumflex artery crosses the left margin of the heart, it gives off a large branch that supplies this area—the left marginal (obtuse) artery. The second function of the pulmonary system is temperature homeostasis, which is achieved through evaporative heat loss from the lungs. Philadelphia: Saunders; 2008. 1993;270(14):1702–1707. This type of lung cancer rapidly involves the vascular channels, lymph nodes, and soft tissue. 1999;65:388–392. 2001;345:1444. Coronary blood flow and myocardial ischemia. Murray & Nadel’s Textbook of Respiratory Medicine. BO X 13- 9 Act ivit ie s t ha t m a y incre a se IC P • Isometric exercise • Valsalva maneuver • Extreme hip flexion • Lateral neck flexion • Coughing • Prone position • Head position below 15 degrees horizontal (ideal position for venous drainage: HOB >30 degrees) • Occlusion of the tube • Pain Data from Batavia M: Contraindications in physical rehabilitation: doing no harm, Philadelphia, 2006, Saunders. Using this treatment results in less need for sedation and fewer complications than intubation and use of a ventilator. A number of 65 or less puts the patient in a higher-risk category. 1997;112:523–529. Adv Exp Med Biol. These catheters are considered a safe alternative to temporary catheters. 1998;280:2001–2007. Oxygen is given as a preventive measure, and suction is used as needed. Goldstein B.J, Scalia R.G, Ma X.L. Protective vascular and myocardial effects of adiponectin. Cardiovascular dysfunction also occurs in many patients with neuromuscular and neurologic disorders, although the typical symptoms of dyspnea and reduced exercise tolerance are difficult to appreciate in nonambulatory patients. 2013;14(10):472–474. Acute humoral or vascular rejection occurs days to weeks after transplantation and is an antibody-associated form of rejection. The therapist may also use weights for diaphragmatic strengthening. Corzillius M. This chapter serves as a guide to the practicing clinician in understanding cardiovascular medications, their indications, and side effects. 7. In terms of ventilation, quiet resting breathing does not alter the point of maximum impulse because of minimal excursion of the diaphragm. 2014;44(8):560–564 Date of Electronic Publication: 2014 May 14. Receptors in the connective tissue and blood, such as mast cells, also respond to foreign stimuli and release mediator substances that produce a reaction known as inflammation. 2007;49:472–479. 2007;115:692–699. The epithelium of the nasopharynx is composed of ciliated columnar cells. Myaskovsky L, Dew M.A, McNulty M.L, et al. Chemotherapy and radiation in combination with chemotherapy are often used to treat small cell carcinoma. Patients are often unaware of the consequences of self-regulation of medications. In contrast, interstitial patterns represent interstitial thickening, for example, inflammation (Fig. Validation of the Killip–Kimball Classification and Late Mortality after Acute Myocardial Infarction. Blood pressure is lowered by decreased vascular tone and decreased water and sodium retention (see Table 14-11).51 Both ACE inhibitors and ARBs are equally effective in controlling blood pressure; however, the cough found in about 20% of individuals taking ACE inhibitors is not a side effect of ARBs. Centrally Acting Drugs A number of drugs reduce central sympathetic outflow, of which clonidine (Catapres, Duraclon) is the most important one. The administration of oxygen may help limit the severity of hypoxemia and consequent tissue hypoxia. 2007;178:1748– 1758. For example, patients with life-threatening arrhythmias recorded by the Holter monitor should not begin physical therapy activity until treatment for the arrhythmia is initiated or modified. Rales are frequently heard at both lung bases in individuals with CHF, but may extend upward, depending on the patient’s position, the severity of CHF, or both. 2006;13:491–500. Current treatment strategies for the obese patient combine interventions. 2009;30:445–454. Risks and benefits of estrogen plus progestin in healthy postmenopausal women: Principal results from the Women’s Health Initiative randomized controlled trial. 2007;67(11):1531–1539. Philadelphia: Lippincott Williams & Wilkins; 2003:229–272. The use of an inspiratory aid provides air under pressure during attempts to inhale (intermittent positive-pressure ventilation [IPPV]). Orens J.B, Becker F.S, Lynch J.P, et al. ■ Although echocardiography is the most widely used method for the confirmation of the clinical diagnosis of heart failure, BNP is rapidly emerging as a very sensitive and specific adjunctive diagnostic marker.66 It may also be an important prognostic marker and can be used as a rapid screening test in the urgent care setting.65,66 Greater levels of ANP and BNP have also been found to be associated with higher morbidity and mortality rates. Rather than primarily a proinflammatory disorder, IPF now appears to be the result of an atypical reparative process that occurs after an injury to the lung epithelium. In: Zipes D.P, Libby P, Bonow P.O, et al., eds. Slapping sounds indicate poor technique and may cause discomfort or injury to the patient. Hurst’s The Heart. Gently roll the patient onto the left side using the draw sheet. Lopez Sendon J. Ann Surg. Unlike vasodilators, ACE inhibitors do not result in reflex sympathetic nervous system activity. Cardiopulmonary effects are often subclinical or found only at autopsy, although this may be due, at least in part, to limitations imposed by the musculoskeletal features that mask their presence. Used in adults with respiratory failure such as pneumonia, COPD, and pulmonary edema. Steinbeck R. Compared with a few years ago, the patient placed on the waiting list today may be able to stay at home longer and participate in a preoperative program at a local facility on an outpatient basis instead of immediately moving to the city of the transplantation facility and participating in preoperative rehabilitation at the transplantation facility. The clinical manifestation of PPS includes new weakening of muscles that were previously affected, as well as muscles that were not affected. Consequently, β blockers are indicated for patients with symptomatic or asymptomatic heart failure and a depressed EF of lower than 40%. After the systems review the therapist is able to utilize an extensive battery of tests and measures to further define limitations or problems. It is characterized by swelling of endothelial cells, capillary engorgement and disruption, intimal proliferation, subintimal accumulation of macrophages, and capillary occlusion and thrombosis.10 Endothelial injury may lead to increased vascular permeability, which may have a profound effect on gas exchange and ventilation–perfusion matching. Katcher H.I, Hill A.M, Lanford J.L, Yoo J.S, Kris-Etherton P.M. Lifestyle approaches and dietary strategies to lower LDL-cholesterol and triglycerides and raise HDL-cholesterol. Hodis H.N. Reversibility of atherosclerosis—Evolving perspectives from two arterial imaging clinical trials: The cholesterol lowering atherosclerosis regression study and the monitored atherosclerosis regression study. The gradual workload increments allow closer attainment of a steady state at each stage and facilitate the measurement of true maximal oxygen consumption. Nyenwe E.A, Jerkins T.W, Umpierrez G.E, et al. One session consists of one or more sets of five cycles of MI-E followed by a short period of normal breathing or ventilator use to avoid hyperventilation. Progressive inc rease in low-impac t exerc ise with monitoring of blood pressure response. Kelley G, Kelley K, Tran Z. This pattern of breathing, therefore, is another clinical finding that can be timed (time for the dyspnea to subside) and occasionally measured (blood pressure and heart rate) to document progress or deterioration in patient status. The problems and goals in this period are similar to those of the heart transplant recipient, with attention given to the changes in the lungs caused by pulmonary denervation. Cardiorespiratory responses to incremental exercise in patients with systemic sclerosis. Steroid myopathy and osteoporosis may occur in patients who require a higher dose of steroids for adequate immunosuppression or in patients who have frequent bouts of rejection necessitating repeated bolusing with steroids.151 Steroid myopathy presents with a weakness of the proximal muscles of the extremities and may be characterized by a patient’s inability to climb stairs, rise from low surfaces such as a toilet seat, or increased reliance on the upper extremities when rising from a crouched or seated position. McGregor C.G.A. Evolution of heart transplantation. Approximately 1 inch farther, it gives off its second branch—the middle lobe bronchus— from within the oblique fissure. Lowers, and Erinn Barker CHAPTER OUTLINE Causes and Types of Cardiac Muscle Dysfunction 79 Hypertension 79 Cardiac Arrhythmias 80 Renal Insufficiency 80 Cardiomyopathy 80 Heart Valve Abnormalities and Congenital/Acquired Heart Disease 82 Pericardial Effusion or Myocarditis 83 Pulmonary Embolism 83 Pulmonary Hypertension 83 Spinal Cord Injury 84 Age-Related Changes 84 Cardiac Muscle 86 Pathophysiology 86 Congestive Heart Failure Descriptions 87 Specific Pathophysiologic Conditions Associated with Congestive Heart Failure 88 Cardiovascular Function 88 Renal Function 91 Pulmonary Function 92 Neurohumoral Effects 93 Hepatic Function 94 Hematologic Function 95 Skeletal Muscle Function 95 Pancreatic Function 96 Nutritional and Biochemical Aspects 96 Clinical Manifestations of Congestive Heart Failure 97 Symptoms of Congestive Heart Failure 97 Signs Associated with Congestive Heart Failure 97 Quality of Life in Congestive Heart Failure 102 Cognition 103 Radiologic Findings in Congestive Heart Failure 104 Laboratory Findings in Congestive Heart Failure 104 Echocardiography 104 Medical Management 104 Dietary Changes and Nutritional Supplementation 104 Pharmacologic Treatment 104 Mechanical Management 108 Implantable Cardiac Defibrillator Implantation 108 Cardiac Resynchronization Therapy 108 Special Measures 108 Surgical Management 109 Abandoned Procedures 110 Cardiac Transplantation 110 Prognosis 110 Physical Therapy Assessment 111 Physical Therapy Interventions 112 Exercise Training 112 Guidelines for Exercise Training 112 Exercise Training and Quality of Life 114 Ventilation 115 Ventilatory Muscle Training 115 Instruction in Energy Conservation 116 Self-Management Techniques 116 Summary 117 Case study 4-1 118 References 119 Cardiac muscle dysfunction (CMD) is a term that has gained popularity in describing an apparently common finding in patients with heart and lung disease.1-3 Cardiac muscle dysfunction effectively, yet very simply, describes the most common cause of congestive heart failure (CHF).2 It develops as a result of some underlying abnormality of cardiac structure or function. Loomis-King H, Flaherty K.R, Moore B.B. Pathogenesis, current treatments and future directions for idiopathic pulmonary fibrosis. A, During inspiration, the lowering of pleural pressure produces inward motion of the flail segment. For example, the therapist might ask, “What did your discomfort feel like when you were admitted to the hospital?” or “How long have you had this breathing problem?” Listening is essential for learning about the patient’s problems, as well as the patient’s understanding of and reaction to them. 9-44). These complications of small cell carcinoma can include progressive dementia, ataxia, vertigo, sensory neuropathy with numbness and loss of reflexes, motor neuropathy with progressive muscle weakness and wasting, atrophic paresis of the proximal limb-girdle musculature, marked fatigability, osteoarthropathy, arthralgia, and peripheral edema.32 Squamous cell carcinoma accounts for 25% to 30% of all lung cancer.45 It arises from the bronchial mucosa after repeated inflammation or irritation caused by cancer stimuli. The respiratory syncytial virus and the parainfluenza virus cause viral pneumonias in children. Onders R.P, Elmo M.J, Khansarinia S, et al. Egan T.M, Kaiser L.R, Cooper J.D. Lung transplantation. National Heart, Lung, and Blood Institute. The various tests of breathing mechanics are measured again 5 to 20 minutes (the time depends on the specific drug and its dosage) after the administration of a bronchodilator. Signs, Symptoms, and Causes This type of ventricular tachycardia has been identified only in individuals receiving antiarrhythmic therapy and for whom the medication is toxic. The wide variation could also have been affected by the type of population included in each study. Canadian Cardiovascular Society position statement—Recommendations for the diagnosis and treatment of dyslipidemia and prevention of cardiovascular disease. 1990;16:1367. However, even a second bout of the syndrome usually resolves.3,53 Myasthenia Gravis Myasthenia gravis is a chronic neuromuscular disease characterized by progressive muscular weakness on exertion.2 Etiology Myasthenia gravis is caused by an autoimmune attack on the acetylcholine receptors at the postsynaptic neuromuscular junction. Serratus Posterior Superior The serratus posterior superior passes from the lower part of the ligamentum nuchae and the spinous processes of the seventh cervical and first two or three thoracic vertebrae downward into the upper borders of the second to fourth or fifth ribs. Olszewski W.L, Engeset A. Watkins D.N, Jenkins I.R, Rankin J.M, Clarke G.M. Inhaled nitric oxide in severe acute respiratory failure—Its use in intensive care and description of a delivery system [see comments]. Low-level exercise testing soon after MI is a safe, noninvasive method for evaluating the functional capacity for physical activity; for detecting arrhythmias, angina, and hypertensive responses with exercise; for determining optimal medical management; and for predicting the risk of subsequent cardiac events. Prolongation of the refractory period of diseased tissue inhibits reentry by creating bidirectional block in these cells (see Fig. Anticoagulants may also be used when a thrombus is already formed to prevent emboli. 1996;275:1571–1576. Actuation of the device releases a single metered dose of the formulation that contains the medication either dissolved or suspended in the propellant. The following is a list of locations for pulse palpation: FIGURE 16-21 Palpation of fremitus. Interpretation of Results Once the test is concluded, the results are recorded on a worksheet or electronically to provide data for the interpretation (Fig. B, To obtain a four-chamber view (Level 3), the transducer is advanced in the esophagus with slight retroflexion of the scope. 9-48]). 2003;42(10):1811–1817. Annu Rev Immunol. Pediatr Cardiol. Repolarization lasts longer and exhibits a slow, spontaneous depolarization during phase 4 diastole. An elevated blood glucose level (mild hyperglycemia is 120 to 130 mg/100 mL) indicates a surplus of glucose in the blood. Erbasan O, Kemaloglu C, Bayezid O. Rocha V.Z, Libby P. After the patent has expired, any company can now manufacture and sell this drug (under its own brand name or often under its generic name), which is now referred to as a generic drug. St. Louis: Mosby; 2007. Anatomy and Physiology 1. In addition, murmurs are classified by the position of the patient in which the murmur is best heard and by the part of the respiratory cycle in which it is best heard. 5 Restrictive lung dysfunction Ellen Hillegass, Tamara Klintworth-Kirk, and Karlyn Schiltgen CHAPTER OUTLINE Etiology 126 Pathogenesis 126 Compliance 126 Lung Volumes 126 Work of Breathing 128 Clinical Manifestation 129 Signs 129 Symptoms 129 Treatment 129 Maturational Causes of Restrictive Lung Dysfunction 129 Abnormalities in Fetal Lung Development 129 Respiratory Distress Syndrome 130 Bronchopulmonary Dysplasia 131 Normal Aging 131 Interstitial Causes 133 Idiopathic Pulmonary Fibrosis 133 Sarcoidosis 134 Bronchiolitis Obliterans 136 Environmental/Occupational Causes 137 Coal Workers’ Pneumoconiosis 137 Silicosis 137 Asbestosis 139 Infectious Causes 140 Pneumonia 140 Neoplastic Causes 145 Bronchogenic Carcinoma 145 Pleural Diseases 147 Pleural Effusion 147 Atelectasis 150 Acute Respiratory Distress Syndrome/Acute Lung Injury 150 Cardiovascular Causes 152 Pulmonary Edema 152 Pulmonary Emboli 154 Neuromuscular Causes 157 Spinal Cord Injury 157 Amyotrophic Lateral Sclerosis 158 Poliomyelitis 159 Guillain–Barré Syndrome 160 Myasthenia Gravis 161 Tetanus 161 Pseudohypertrophic (Duchenne) Muscular Dystrophy 162 Other Muscular Dystrophies 162 Musculoskeletal Causes 163 Diaphragmatic Paralysis or Paresis 163 Kyphoscoliosis 164 Ankylosing Spondylitis 165 Pectus Excavatum 166 Pectus Carinatum 166 Connective Tissue Causes of RLD 166 Rheumatoid Arthritis 166 Systemic Lupus Erythematosus 168 Scleroderma 169 Polymyositis 170 Dermatomyositis 170 Immunologic Causes 170 Goodpasture’s Syndrome 170 Wegener’s Granulomatosis 172 Pregnancy as Cause 172 Nutritional and Metabolic Causes 173 Obesity 173 Diabetes Mellitus 174 Traumatic Causes 174 Crush Injuries 174 Penetrating Wounds 176 Pulmonary Laceration 176 Thermal Trauma 178 Therapeutic Causes 178 Surgical Therapy 178 Lung Transplantation 180 Pharmaceutical Causes 181 Oxygen 181 Antibiotics 181 Anti-inflammatory Drugs 182 Cardiovascular Drugs 182 Chemotherapeutic Drugs 182 Poisons 182 Anesthetics 182 Muscle Relaxants 182 Illicit Drugs 182 Radiologic Causes 183 Radiation Pneumonitis and Fibrosis 183 Summary 184 References 185 Pulmonary pathology can be organized and discussed in a number of ways. Cancer J Clinicians. (Adapted from Katzung BG: Basic and Clinical Pharmacology. Occlusion of a coronary artery produces an infarction in a defined region within the heart. The disadvantages of the use of thallium are related to the fact that it is not an ideal isotope; its low-energy photons are easily scattered and have a half-life of 73 hours. Casley-Smith J.R. Varying total tissue pressure and the concentration of initial lymphatic lymph. At any one moment, several mechanisms interact to maintain adequate pressure in the circulation to allow vital systems to function properly. Development and testing of the Pulmonary Functional Status and Dyspnea Questionnaire (PFSDQ). Finally, the responsiveness, or whether or not the test was able to pick up changes that may occur as a result of improvements, was evaluated. 2013;21(8):997–1003. Miscellaneous drugs In addition, adenosine and atropine are sometimes used. CPAP may func tion to reduc e preload and afterload on heart, and dec rease the workload on inspiratory musc les, whic h may also inc rease lung c omplianc e. A major contributing factor appears to be physical inactivity. The average norm for distance walked during the 6MWT can vary based on the patient population, patient age, and patient gender, but distances of less than 300 meters are predictive of mortality across various patient populations. submaximal, 279, 281b See also Stress testing ventilatory gas analyses with, 286 female-specific tests, 293–294 heart rate variability (HRV), 289 imaging modalities, 277–278 computed tomography (CT), 277–278 magnetic resonance imaging (MRI), 278 multigated acquisition imaging, 278 positron emission tomography (PET), 277 radioactive nuclide perfusion imaging, 287–288 indications for, 267t intravascular ultrasonography (IVUS), 292–293, 294f noninvasive tests, 274–277 contrast echocardiography, 276–277 echocardiography, 275–276, 275f, 391t Holter monitoring, 274–275, 274f overviews of, 266–267, 267t, 299–300 peripheral venous disease (PVD) diagnosis, 297 pharmacologic stress testing, 288–289, 289b adenosine, 288–289 contraindications for, 289b dipyridamole, 288–289 ergovine stimulation, 289 resources for, 300 Rubor dependency tests, 295–296 test interpretation and disease probability, 267 test sensitivity and specificity, 267 Trendelenburg test, 297–298 vascular tests, 294–295 ankle-brachial index (ABI), 295, 297f, 297t aortic aneurysms, 296t aortic disease and dysfunction, 294–295 arterial duplex ultrasonography, 295 exercise studies, 295 peripheral artery disease (PAD), 295–298, 297t pulse volume recordings, 295 segmental limb pressures, 295 venous filling time test, 296 Cardiovascular disease (CVD) interventions and prevention measures, 568–604 case studies of, 600b–601b clinical tips for, 585b, 593b, 595b overviews of, 568–569, 601 primary prevention, 569, 571b rehabilitation, 570–572, 571f activities of daily living (ADLs), 570 patient populations, 570 phases of, 571t programs, 570–571 resources for, 601 risk assessment guidelines, 570b Cardiovascular ischemic conditions, 42–77 See also Ischemic conditions American Heart Association (AHA), ideal cardiovascular health metrics, 47–48, 47b aortic aneurysms, 68, 67t atherosclerosis, 44–57, 45f, 52f–53f case studies of, 69b cerebrovascular disease, 62–63 clinical tips for, 44b, 47b, 59b, 61b coronary arteries, anatomy of, 43, 43f epidemiology of, 43 Framingham Heart Study and, 43, 43b, 46–47 historical perspectives of, 42 hypertension (HTN), 58–62, 58f–59f, 59b, 60t myocardial perfusion, 43–44, 44f, 44b overviews of, 42, 68–70 peripheral artery disease (PAD), 63–65 pulmonary embolism (PE), 66 renal artery disease, 68 renal artery disease (RAS), 68 resources for, 70 risk factors of, 48–49 vascular disorders, 65–68 Cardiovascular medications, 445–488 See also Medications arterial diseases, 485–486 atherosclerosis, 485 pulmonary hypertension (HTN), 486, 486t brand name vs. The formation of lymphokines results from the interaction of antigens with T lymphocytes and initiates the cell-mediated immune response. Effect of nasal continuous positive airway pressure on sleep apnea in congestive heart failure. Smith E.R, Heffernan L.P, Sangalang V.E, et al. Electrocardiogram and Serial Monitoring The electrocardiogram (ECG) provides valuable information regarding the state of the heart muscle and the rhythm of the heart at the time of the ECG. Limb salvage after successful pedal bypass grafting is associated with improved long term survival. 2005;65:325–340. In general, the pathologic changes in the lungs associated with oxygen toxicity can be described in three phases: exudative, proliferative, and recovery.69–71 In the exudative phase, damage to the alveolar–capillary membrane results in an increased permeability to water, electrolytes, and protein. Serratus Anterior and Rhomboids The serratus anterior arises from the outer surfaces of the upper eight or nine ribs to attach along the costal aspect of the medial border of the scapula. Acute Respiratory Failure in Chronic Obstructive Pulmonary Disease. 18 Steps to Prevention Revised: Lymphedema RiskReduction Practices. Guyatt G, Sullivan M, Thompson P, et al. N Engl J Med 356(5), 2007; Perspective www.nejm.org; Joslin Diabetes Center & Joslin Clinic: Clinical guideline for pharmacological management of type 2 diabetes, January 9, 2009. 114. 2005;118:948–956. However, in general, long-term survival after lung transplantation is limited primarily by BOS and its complications. Agents used in cardiac arrhythmias. 2013. Exercise training in systolic and diastolic dysfunction effects on cardiac function, functional capacity, and quality of life. Spencer F.A, Lessard D, Emery C, Reed G, Goldberg R.J. Venous thromboembolism in the outpatient setting. 323. Active sublingual nitroglycerin gives a burning sensation when placed under the tongue. The narrower pH range of 7.38 to 7.42 and PaCO2 range of 38 to 42 mm Hg represent 1 SD from the normal values. Treatment Corticosteroids and immunosuppressant drugs are commonly used to treat pulmonary involvement in RA.33,35,54 Rheumatoid arthritis is often treated with medications that can slow the progression and relieve symptoms. There are usually no symptoms for 24 hours after ingestion, and then the person experiences progressive respiratory distress leading to death in 1 to 38 days.8 Other drugs can cause RLD via a variety of pathophysiologic mechanisms other than that of producing alveolar pneumonitis and fibrosis. The effects of these medications and the associated period of immobility can lead to complications, including neuromuscular weakness, delirium, and impaired physical function. At 1 year posttransplant, 76% of patients are taking MMF, as it appears to have slightly less bone marrow depression than AZA.85 A coated MMF demonstrates GI tolerance to higher doses of this agent. ■ Because these patients may have to be on bed rest for protracted periods, the pulmonary system is at risk for atelectasis and bronchopneumonia.12,64 Diagnostic Tests Chest radiographs may be helpful in identifying interstitial, intraalveolar infiltrates, and other pulmonary complications.54 Clinical Manifestation The clinical manifestation of thermal injuries can be found in Table 5-38. 1986;711:131–136. These patients may benefit from breathing exercises, positioning, and the use of an inspiratory muscle trainer to improve functioning of the inspiratory muscles. The patient must be in a seated position with the back exposed to evaluate diaphragmatic excursion. Philadelphia: Saunders; 1995. 2003;24:1601–1610. Because the diaphragm is the major muscle of inspiration, the restrictive impairment involving the chest wall may result in only minimal respiratory symptoms.9,32 However, approximately 6% of patients with AS develop specific fibrosing lesions in the upper lobes as part of this disease process.8 Why these lesions occur in some patients is unknown, but the immune system may be involved.31 The pulmonary lesions may be unilateral or bilateral; they begin as small irregular opacities in the upper lobes. If the patient is alert and is strong enough, he or she can hold onto the bedrail while one person adds the external support. 16-21). Clin Obstet Gynecol. It causes 15% of all HAPs and affects 40% of all mechanically ventilated patients.32 Those at most risk for this infection are patients with cystic fibrosis, bronchiectasis, tracheostomy, or neutropenia or those who are on mechanical ventilation or corticosteroid therapy. 1994;26:649–660. The LLL bronchus descends posterolaterally for approximately one-third of an inch before giving off the superior segmental bronchus from its posterior surface (its distribution is similar to that of the RLL superior segmental bronchus). Pickering T.G, Hall J.E, Appel L.J, et al. Lin S.J. Risk factors, endothelial cell turnover and lipid transport in atherogenesis. 2006;16:422–425. 230. This is usually corrected by renal dialysis, but patients with chronic CHF may demonstrate a mild-to-moderate level of platelet dysfunction.88 Clinical tip Hematologic impairments in CHF consist of the following: possible polycythemia, possible anemia (if present, oxygen saturation should be monitored), and possible hemostasis abnormalities such as thrombocytopenia (monitoring laboratory blood values is recommended). The line that connects the PEFR and the end of expiration at the residual volume RV is normally straight. Wasserman K, Hansen J.E, Sue D.Y, et al. Atherosclerosis, the most common disease of arteries, is in part due to proliferation of smooth muscle and monocytes moving from the media into the intima in response to injury; as the intima increases in size, the lumen narrows. Optimally, the therapist will coordinate activities with other disciplines involved with the care of the patient. Sjögren A.L. Left ventricular wall thickness determined by ultrasound in 100 subjects without heart disease. Am J Prev Med. Obstructive sleep apnoea in patients with dilated cardiomyopathy: Effects of continuous positive airway pressure. Effects of physical training on peripheral vascular disease: A controlled study. They may provide better quality of sound than the conventional stethoscopes; however, it is still unproven as to whether or not this improvement is clinically significant.13 As technology improves and the electronic stethoscopes become more refined, we may see the conventional stethoscope become obsolete. The instructions provided to the patient are explicitly outlined by the American Thoracic Society and are found in Box 22-5. Hence, digitalis can be used to prevent conduction of atrial arrhythmias into the ventricles. A variant form of angina pectoris. Scottish Intercollegiate Guidelines Network. The Cholesterol Lowering Atherosclerosis Study (CLAS): Design methods, and baseline results. Wigle J.T, Oliver G. Technique to reduce air leaks after resection of emphysematous lung. 289. Third-generation cephalosporins are effective against the greatest number of gram-negative bacteria, but they are of limited effectiveness against gram-positive cocci. Ann Thorac Surg. Address issues affec ting health-related quality of life. (From Damjanov I: Pathology for the Health Professions, ed 3, St. Louis, 2006, Saunders.) FIGURE 5-20 Pulmonary edema (From Mettler F: Essentials of radiology, ed 2, St. Louis, 2014, Saunders.) Clinical Manifestation The clinical manifestation of ARDS can be found in Table 5-16. You will also have an abdominal incision, which may make it uncomfortable to cough. Perfusion defects with normal ventilation strongly suggest PE. Horm Metab Res. Histamines interact with two specific receptor types referred to as H1 and H2 receptors.22 The H2 receptors are located in the stomach and are involved in acid secretion. Elevation of the ST segment above the baseline when following part of an R wave indicates acute injury (Fig. The degree of weakness of the diaphragm is best measured by transdiaphragmatic pressure.54,62 The normal transdiaphragmatic pressure is higher than 98 cm H2O.26,35 When the transdiaphragmatic pressure is lower than 20 cm H2O, the patient exhibits significant respiratory distress.35 The maximum transdiaphragmatic pressure is decreased 50% and the maximum inspiratory pressure is decreased 40% with unilateral paralysis.28,32 The reduction is even more profound with bilateral involvement. Abnormalities in gas exchange are seen by examining the arterial blood gas (ABG) values. With a straight edge, line up the two points and read where the straight edge intercepts the FAI nomogram for either active or sedentary. 94. Arch Pathol Lab Med. 2008;5(4):442–446. Notice the significant Q waves in I and V5 with inverted T waves in aVL as well. Vinik A.I, Freeman R, Erbas T. Mortality associated with diastolic hypertension and isolated systolic hypertension among men screened for the Multiple Risk Factor Intervention Trial. Palpitations Palpitations are a common complaint of patients with cardiopulmonary dysfunction. Demand is increased under conditions that increase heart rate, blood pressure, or both: exercise; increased systemic vascular resistance; high-output states such as pregnancy, fever, and increased thyroid function; anemia; emotional stress; and anxiety are but a few examples. Evaluation includes the development of a diagnosis or diagnoses based on the clinical findings and includes the impact of the findings or problems, otherwise known as functional limitations and disability. ■ Mucoactives promote the mobilization and removal of secretions from the respiratory tract. 1996;15:139–148. In the normal person, the V/Q scans will show greater ventilation and perfusion in the bases of the lung and less ventilation and perfusion in the apices. Schweickert W.D, Pohlman M.C, Pohlman A.S, et al. Exercise-induced benefits in individuals with type 1 diabetes. Ball E, Michel T, Cahalin L.P. Quality of life in elderly heart failure patients is related to quadriceps muscle performance [abstract]. The first consideration is positioning. The ECG results in a picture of grossly irregular up and down fluctuations of the baseline in an irregular zigzag pattern (Fig. If post-discharge teaching is indicated, the physical therapist can refer the patient to other health care professionals, community organizations, or other resources. Endurance training of the diaphragm will increase capillary density, myoglobin content, mitochondrial enzymes, and the concentration of glycogen. Effects of exercise training on aerobic capacity and quality of life in individuals with heart failure. Clinical Imaging: With Skeletal, Chest, and Abdominal Pattern Differentials. Darovic G.O. Handbook of Hemodynamic Monitoring. Using the BIS monitor in palliative care: a case study. Cohen J, Wilson W.F. Homocysteine, fibrinogen, Lp(a), small dense LDL, oxidative stress, and C. The resultant increase in automaticity and ectopic activity can increase the likelihood of arrhythmias. Nath A.R, Capel L.H. Inspiratory crackles and the mechanical events of breathing. For example, if sinoatrial node cells have an excess of potassium (hyperkalemia), the resting polarity is greater than normal (more negativity). The increase in intraaortic and diastolic pressure forces the blood in the aortic arch to flow in a retrograde direction into the coronary arteries. There is depletion of oxygen at the venous end of the capillary bed, and the partial pressure of venous oxygen (PvO2) is approximately 40 mm Hg. The amount of oxygen returning to the heart is called the venous oxygen reserve. Frazier O, Okereka O, Cooley D. Barker A, Bergeron A, Rom W, Hertz M. 2005;35:485–499. Haley S.M, Coster W.J, Andres P.L, et al. It is the responsibility of practitioners, relying on their own experience and knowledge of their patients, to make diagnoses, to determine dosages and the best treatment for each individual patient, and to take all appropriate safety precautions. The patient underwent open reduction internal fixation with spinal anesthesia 3 days earlier, and the physician has just ordered physical therapy for out-of-bed activities and ambulation with a walker. Values for PFTs may be described as abnormal due to the static values (volumes and capacities), the dynamic values (flow volumes and rates), or both. The therapist also needs to be aware of the patient’s current medications and their effect on exercise response. Weight loss will decrease the work of breathing, increase the VC, and increase the ventilatory drive in these patients.10 Sleep apnea is most commonly treated with weight loss, avoidance of ethanol, position therapy, dental devices, nasal CPAP, increased FiO2, and tracheostomy.10,30 Table 5-35 Clinical manifestation of obesity CHF, congestive heart failure; ERV, expiratory reserve volume; MVV, maximum voluntary ventilation; Paco2, arterial partial pressure of CO2; PaO2, arterial partial pressure of O2; RR, respiratory rate; VT, tidal volume. Common etiologies include the following: ■ Acute myocardial ischemia or infarct ■ Congestive heart failure and pulmonary edema ■ Cardiac structural abnormalities ■ Cardiac conduction system disease Clinical presentations of these cardiac dysfunctions may include the following: ■ Hypoxia ■ Pain ■ Alterations in blood pressure (e.g., hypertension or hypotension) ■ Shock ■ Alterations in heart rate ■ Heart rhythm abnormalities Whenever possible, drug therapy is directed at correction of the underlying pathologic condition, for example, thrombolysis (discussed elsewhere in this chapter). Heberden E. Chobanian A.V, Bakris G.L, Black H.R, et al. Lower R.R, Dong E, Shumway N.E. Long-term survival of cardiac homografts. Effects of intensive multiple risk factor reduction on coronary atherosclerosis and clinical cardiac events in men and women with coronary artery disease. In addition, calcium intake, particularly in dairy products, is inversely related to body fat levels, and sleep deprivation is associated with higher body fat levels. Eur J Cardiovasc Prev Rehabil. With β-blockade, lipolysis is inhibited. Respiratory muscle training for cervical spinal cord injury. 1991;144:526–530. If a patient is a mouth breather and is given supplemental oxygen via nasal cannula, the patient will not obtain the maximal benefit from the supplemental oxygen. If there is direct lung involvement, then treatment of repeated pulmonary infections is required. The blood pressure may vary between extremities, with change of position, and with any type of activity. MK also reported thick, yellow sputum; slight abdominal discomfort; and low back pain. Tumescent liposuction: A new and successful therapy for lipedema. For further discussion of medications and their indications and side effects, see Chapters 14 and 15. J Epidemiol Community Health. A modern plethysmograph setup, with a highly transparent box, self-contained calibration equipment, and computerized data reduction and display. Goraya T.Y, Leibson C.L, Palumbo P.J, et al. This will distribute the force more evenly against the patient’s body. Pulmonary function tests reveal decreased volumes and flows to about 60% to 70% predicted normal values239–242,254; these abnormalities take on additional clinical significance in the presence of preexisting pulmonary disease. 1983;245(1):H98–H103. Symptoms may include dry mouth, cough, and throat irritation. Often a patient’s primary diagnosis may have been the reason for admission (e.g., a fractured hip), yet a secondary diagnosis may be the reason for referral for physical therapy (e.g., pneumonia postoperatively). 2001;119:1533–1546. Radina M.E, Armer J.M. Surviving breast cancer and living with lymphedema: Resiliency among women in the context of their families. These processes of drug clearance are influenced by genetic and environmental factors, nutritional habits, weight of the person, exercise, and age, with very young and older individuals having lower capacities. LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle. Several immune (donor/recipient mismatches, recurrent cellular rejection, CMV infection) and nonimmune (hyperlipidemia, hypertension, diabetes mellitus, older donor age) risk factors have been identified and are thought to be linked to development and progression of transplant allograft vasculopathy.152 Treatment includes management of risk factors, use of proliferation signal inhibitors (sirolimus) and statin therapy, percutaneous revascularization for focal lesions, and repeat transplantation.43,56,142 Recent registry data report that in the first 3 years after transplant, graft failure and infection are the most common causes of mortality, and in the 3- to 5-year period, malignancy, cardiac allograft vasculopathy (CAV), and renal failure cause the most deaths.28 Both acute and chronic rejection are “likely contributors to graft failure” with CAV affecting 50% of recipients by the tenth year after transplant.28 However, in spite of some complications from heart transplantation, many recipients fare quite well—50% of survivors don’t require hospitalization during the initial posttransplant year, and more than 70% do not require hospitalization in the following 4 years.28 FIGURE 12-11 Reintegration into community activity. BO X 5- 1 Support ive m e a sure s for t re a t m e nt of re st rict ive lung dysfunct ion • Supplemental O2 • Antibiotic therapy for secondary infection • Interventions to promote adequate ventilation • Interventions to prevent accumulation of secretions • Good nutritional support Treatment Treatment interventions for RLD are discussed briefly for each disease. Preliminary results from a prospective randomised trial. Use of prophylactic sublingual nitroglycerin is sometimes recommended before exercise, but this decision must be by physician order and cannot be decided by the physical therapist and patient. Mediastinum, Trachea, and Cardiovascular System The size of the mediastinum varies with body size, ranging from long and narrow in tall, thin persons to short and wide in short, stocky persons. Nutritional Assess: Current dietary behavior: dietary c ontent of fat, c holesterol, sodium, c aloric intake, sugar; eating and drinking habits. 1984;70:176–184. The spectrum of right ventricular involvement in inferior wall myocardial infarction. Exton J.H. Molecular mechanisms involved in alpha-adrenergic responses. Decreasing renal function results in a number of abnormalities involving changes in coagulation, fibrinolysis, endothelial dysfunction, anemia, calcium–phosphorous balance, RAAS, lipid abnormalities, and arrhythmia.197,198,202 By the time patients require dialysis, 40% have evidence of CAD and 85% of these patients have abnormal LV structure and mass.198 The annual mortality rate for patients with end-stage renal disease (ES

airway clearance techniques if indicated. Cardiovasc Drugs Ther. Normally palpation reveals a uniform vibration throughout the entire chest wall. It is a rule of thumb that in this patient group (as well as in the geriatric group discussed earlier) drug therapy usually starts with one-half or one-third of the adult dose and then is adjusted according to the clinical response. 2014;29(3):475.e1 Epub 2014 Jan 31. (From Goodman CC: Pathology: Implications for the Physical Therapist, ed 3, St. Louis, 2009, Saunders.) FIGURE 5-16 Pleural diseases. The uppermost branch ascends for approximately one-third of an inch before yielding the anterior segmental bronchus, and then continues its upward path as the apicoposterior segmental bronchus before subdividing further into its subsegmental distribution. Postgrad Med J. 2008;9:41–51. Respiratory involvement and failure are common as this disease progresses.9,53 Table 5-25 Clinical manifestation of pseudohypertrophic muscular dystrophy MVV, maximum voluntary ventilation; Paco2, arterial partial pressure of CO2; PaO2, arterial partial pressure of O2; RR, respiratory rate; RV, residual volume; TLC, total lung capacity; VC, vital capacity; VT, tidal volume. Eldar R, Marincek C. 1982 1998, 2003. Jiang W, Alexander J, Christopher E, et al. lung, 386–418 See also Thoracic organ transplantation Transposition, great arteries, 631 Trastuzumab (Herceptin), 244t, 253–256, 254t Trapezius, upper, 6, 6f Trendelenburg test, 297–298 Tricuspid atresia, 631, 632f See also Atresia Truncus arteriosus, 632, 632f TUG tests, See Timed tests Turbulence bifurcation, 29–30, 29f Turbulent flow, 29–30, 29f TV, See Tidal volume (TV) Twelve-Minute Walk Test (12MWT), 683–690, 684t–687t, 688b, 689f Two-minute tests Two-Minute Step Test, 684t–687t, 688 Two-Minute Walk Test (2MWT), 683–690 U Ultrasonography arterial duplex, 295 intravascular (IVUS), 294f United Network of Organ Sharing (UNOS) database, 391–392, 392t, 393b UNOS database, See United Network of Organ Sharing (UNOS) database Unstable angina, 34–40, 50 See also Angina Upper chest inhibiting technique, 551–552 Upper respiratory tract, 11–12, 11f–12f, 12b See also Respiratory tract Upper trapezius, 6, 6f V VADs, See Ventricular assist devices (VADs) Validity, construct, 676–677 Valve abnormalities, 82–83 Valvular repair and replacement, 372–375, 373f–374f VAPs, See Ventilator-associated pneumonias (VAPs) Variant angina, 535–536 See also Angina Varicella zoster, 138 Varicose veins, 65 See also Veins VAS, See Visual analogue scale (VAS) Vascular disorders, 65–68 deep vein thrombosis (DVT), 66 venous disease, 65 venous insufficiency, 65, 66f venous thromboembolic disease (VTD), 66 venous thromboembolism (VTE), 65 Vascular pathologies, 42–77 Vascular tests, 294–295 ankle-brachial index (ABI), 295, 297f, 297t aortic aneurysms, 296t aortic disease and dysfunction, 294–295 arterial duplex ultrasonography, 295 exercise studies, 295 peripheral artery disease (PAD), 295–298, 297t pulse volume recordings, 295 segmental limb pressures, 295 Vasodilation, 39 Vasodilators, 107 Vasomotor tone (VMT), 44, 44f Vasospasm, 46 VATS, See Video-assisted thoracoscopic surgery (VATS) Veins, 21f, 22 cardiac, 20f, 21 pulmonary, 20f, 21 varicose, 65 Vena cava, 20f, 21 Venous disease, 65 Venous distension, jugular, 99–100, 99f–100f Venous filling time test, 296 Venous insufficiency, 65, 66f Venous return, 39 Venous thromboembolic disease (VTD), 66 Venous thromboembolism (VTE), 65 Ventilation, 23–30, 30f brain stem afferent connections, 24–26, 24b hypothalamic influences, 24 limbic influences, 24 receptors, chemoreceptors, 24–25 receptors, joint, 26, 26f receptors, lung, 26, 26b receptors, muscle, 26, 26f breathing mechanics, 26–30, 27f inspiration, 26, 27f lungs, physical properties of, 27–30, 28f paradoxical breathing, 27 pressure, atmospheric, 26 pressure, intrapleural, 27 pressure, intrapulmonary, 26 pressure, subatmospheric, 27 pressure, transmural, 27 resting state, 27f for cardiac muscle dysfunction (CMD), 115–117 See also Cardiac muscle dysfunction (CMD) breathing exercises, 115–116 expiratory muscle training, 115 inspiratory muscle training, 115–116 ventilatory muscle training, 115–116 control of, 24, 25f lung volumes and capacities, 23–24, 24f expiratory reserve volume (ERV), 23–24 functional residual capacity (FRC), 23–24 inspiratory capacity (IC), 23–24 inspiratory reserve volume (IRV), 23–24 respiratory rate, 23 tidal volume (TV), 23 total lung volume (TLV), 23–24 ventilatory rate, 23 vital capacity (VC), 23–24 mechanical, 554–557 Confusion Assessment Method in the ICU (CAM-ICU), 555, 556f, 558t consciousness assessments, 555 Richmond Agitation and Sedation Scale (RASS), 555, 558t weaning criteria, 554–555 weaning methods, 555 muscles, 3–7, 4f–5f, 4b See also Muscles overviews of, 23 pulmonary, 7–15, 7b terminology, 436t Ventilator-associated pneumonias (VAPs), 140–145, 141t–142t See also Pneumonias Ventilatory gas analyses, 286 Ventilatory movement strategies, 547–549 Ventilatory muscle training, 115–116 Ventilatory rate, 23 Ventricular arrhythmias, 325–328 Ventricular assist devices (VADs), 109, 110f Ventricular remodeling, 57 Ventricular septal defects (VSDs), 630 Vessels cardiac, 19–21, 20f pulmonary, 19–21, 20f VF-16, See Etoposide (VF-16) Vibration, 542t, 544, 544b, 546f See also Airways Video-assisted thoracoscopic surgery (VATS), 367–368, 367f, 368b Vinblastine (Velban), 244t, 253–256, 254t Vinca alkaloids, 244t, 253–256, 254t Vincasar, See Vincristine (Oncovin, Vincasar) Vincristine (Oncovin, Vincasar), 244t, 253–256, 254t Vindesine (Eldisine), 244t, 253–256, 254t Vinorelbine (Navelbine), 244t, 253–256, 254t Virchow's triad, 66 Visual analogue scale (VAS), 684t–687t VMT, See Vasomotor tone (VMT) VO2max, See Volume of oxygen consumption (VO2max) Volume of oxygen consumption (VO2max), 683 Volumes, lung expiratory reserve volume (ERV), 23–24 inspiratory reserve volume (IRV), 23–24 tidal volume (TV), 23 total lung volume (TLV), 23–24 VSDs, See Ventricular septal defects (VSDs) VT, See Tidal volume (TV) VTD, See Venous thromboembolic disease (VTD) VTE, See Venous thromboembolism (VTE) W Walking Impairment Questionnaire (WIQ), 684t–687t Walking speed tests, 684t–687t, 690–692, 691t 2-Minute Walk Test (2MWT), 683–690 3-Minute Walk Test (3MWT), 683–690 6-Minute Walk Test (6MWT), 372b, 683–690, 684t–687t, 689f 12-Minute Walk Test (12MWT), 683–690, 684t–687t, 688b, 689f Walk protocol, 288–289 Wandering atrial pacemaker, 317, 318f Warning signs, heart attack, 51f Waveforms, normal, 310–322, 310f–313f Ways of Coping Questionnaire, 684t–687t Weaning See also Mechanical ventilation criteria, 554–555 methods, 555 Weber classification, 101t Weight body, 47 gain, 100 Wells Criteria, 66, 509, 510t Williams syndrome, 635 WIQ, See Walking Impairment Questionnaire (WIQ) Working myocytes, 305 X Xiphoid process, 1, 2f Z Zevalin, See Ibritumomab (Zevalin) Zoster, varicella, 138 Knebel A. St. Louis: Mosby-Year Book; 1996:271. (Accessed February 14, 2015.) 288. Exercise-induced left ventricular dysfunction in alcoholic and non-alcoholic cirrhosis. Pressure support ventilation augments the patient's inspiratory effort with pressure assistance. May have flow limitations (10 to 12 L/min), or c ardiovasc ular func tion from the mec hanic ally driven c ardiac output, and the effec ts of a 6-lb mass resting below the diaphragm that may alter ventilatory performanc e. Your main responsibility after the surgery is to do a lot of deep breathing and coughing to keep your lungs healthy. Keens T.G, Bryan A.C, Levison H, Ianuzzo C.D. Developmental pattern of muscle fiber types in human ventilatory muscles. There can be severe involvement of the diaphragm early in the course of this disease.9,53 Myotonic Muscular Dystrophy Myotonic muscular dystrophy is an autosomal-dominant disorder that combines myotonia with progressive peripheral muscle weakness. Kozakova M, Palombo C, Pratali L, et al. What settings are most appropriate for the tool? 13-1). 2003;41:447–454. Graded Exercise Stress Test Performance on and outcomes of a GXT can be very beneficial to the clinician. 1995;14:2–10. Patients who are on vasoactive drips typically require continuous blood pressure management. (From Kacmarek R, Stoller J, Heuer A: Egan's Fundamentals of Respiratory Care, ed 10, Mosby, St. Louis, 2013.) BO X 13- 11 Pa ra m e t e rs of t ra dit iona l ve nt ila t ion • Minute ventilation (VE) = Respiratory rate (RR) − Tidal volume (VT). Methaemoglobin production in normal adults inhaling low concentrations of nitric oxide. Rev Med Interne. In patients with cardiopulmonary dysfunction, the skills of inspection, palpation, percussion, auscultation, and activity assessment are the most common procedures utilized to assess the impairments and functional limitations, so these are the ones that will be discussed in this chapter. ■ The anteroposterior (AP) view is taken at the patient's bedside when the patient is unable to travel to the radiology department. The autonomic nervous system contains two divisions: the sympathetic and the parasympathetic. Balancing the patient's energy expenditure during the weaning process with the added energy required for performing functional mobility activities or exercise is a challenge for the physical therapist. Noncardiac comorbidities in heart failure with reduced versus preserved ejection fraction. Acute care interventions are discussed in Chapter 17, cardiac interventions in Chapter 18, pulmonary rehabilitation in Chapter 19, and pediatric interventions in Chapter 20. Exercising the limb sooner than that may cause the insulin effect to peak prematurely because the increased blood flow associated with exercise facilitates the entry of insulin into the blood. Plast Reconstr Surg. Airway diameter progressively decreases with each succeeding generation of branching, starting at approximately 1 inch in diameter at the trachea and reaching 1 mm or less at the terminal bronchioles. ed 62. Mitral Valve Dysfunction Individuals with mitral valve dysfunction (mitral valve prolapse or mitral valve regurgitation) may demonstrate classic angina with exertion yet lack a suspicious risk factor profile. Abciximab (Reapro), tirofiban (Aggrastat), and eptifibatide (Integrilin) are commonly used gp2b/3a inhibitors. The muscular splinting around the fracture site also decreases chest wall excursion and lung expansion. Evidence has been presented both supporting and dismissing IMT as a reliable treatment method. 5-16).3 FIGURE 5-15 Pleural effusion, a collection of fluid in the pleural space between the membrane encasing the lung and the membrane lining the thoracic cavity, as seen on upright x-ray examination. The role of depression and anxiety symptoms in hospital readmissions after cardiac surgery. Lefkowitz R.J, Caron M.G. Adrenergic receptors: Models for the study of receptors coupled to guanine nucleotide regulatory proteins. Table 5-1 Examples of restrictive and obstructive lung disease with general presentation and symptoms. Manolas J, Kyriakidis M, Anastasakis A, et al. The surface-active agent in the human lung that performs this function is called surfactant.14,15 Pulmonary surfactant is not composed of a single class of molecules, but, rather, is a collection of interrelated macromolecular lipoprotein complexes that differ in composition, structure, and function.14,15 Nonetheless, the principal active ingredient of surfactant is dipalmitoyl phosphatidylcholine (DPPC). ■ Connective tissue diseases affect all pulmonary and CV structures, either separately or in combination. Schelbert K.B. Comorbidities of obesity. The tests and procedures that are discussed in this chapter include clinical laboratory studies (e.g., for cardiac enzymes and markers, cholesterol and triglycerides, and complete blood cell count), Holter monitoring, echocardiography, contrast echocardiography, positron emission tomography (PET), computed tomography (CT), single-photon emission computed tomography (SPECT), electron beam computed tomography (EBCT), multigated acquisition or angiogram (MUGA) imaging, magnetic resonance imaging (MRI), perfusion imaging, exercise testing, coronary angiography and ventriculography, digital subtraction angiography (DSA), ergonovine stimulation, heart rate variability, and endocardial biopsy. Dizziness is a symptom that must be evaluated with reference to the activity that produces it and then compared with the blood pressure response. Therefore to prevent confusion in this chapter, cardiac rehabilitation programs will be the term used for the multidisciplinary program and discussed later in this chapter. J Exp Biol. It is important to keep track of the number of times an inhaler was used so that it can be replaced after its recommended number of uses. Diagnosis, pathogenesis, and management. Bilateral paralysis or paresis of the diaphragm may result from high SCI, thoracic trauma, Guillain–Barré syndrome, multiple sclerosis, muscular dystrophy, or anterior horn cell disease.28,32,35 Pathophysiology Normally, as the crural portion of the diaphragm contracts, the pleural space pressure decreases; the central tendon moves caudally; the lungs inflate; and the abdominal pressure increases, which moves the abdominal wall outward. Nutr Rev. Romero-Corral A, Sierra-Johnson J, Lopez-Jiminez F, et al. FIGURE 1-3 A-C, Actions of major respiratory muscles. 1994;7:148–152. Spagnolo P, Luppi F, Montanari G, Richeldi L. FIGURE 16-31 The systolic blood pressure gradually rises with a gradual increase in workload. Which risk factors did Mr. H modify after his bypass surgery? The left hilum is partially obscured by the overlying shadow of the heart and great vessels, and it lies at a slightly higher level than the right hilum. Laboratory studies such as muscle enzymes, muscle fiber biopsy, and electromyography to measure electrical activity must be conducted to diagnose myositis. 5-2).3 Work of Breathing With RLD, the work of breathing is increased. 10. Exercise-induced arrhythmias on a low-level exercise test may be an indication for therapeutic management before hospital discharge. Pediatric bronchiolitis obliterans is often caused by a viral infection, most commonly by the respiratory syncytial virus (RSV), parainfluenza virus, influenza virus, or adenovirus.32 An adult form of the disease has now been recognized that can occur in persons from 20 to 80 years of age and has a wider variety of causes. 1998;97(5):437–443. Treatment The underlying cause of the pleural effusion must be identified and treated. ■ Motor. Lancet. Taylor S.H, Verma S.P, Hussain M, et al. Izquierdo-Alonso J.L, Jimenez-Jimenez F.J, Cabrera-Valdivia F, et al. 1983;32:267–274. On stimulation, these receptors initiate a rapid, shallow breathing pattern.7 Additionally, the interstitial J receptors produce a cough reflex with fluid accumulation within the lung in patients with pulmonary edema and pleural effusions. Structural abnormalities within the immature lung, such as alveolar septal thickening, may also contribute to the pathophysiology of this syndrome. Aminoglycosides, macrolides, tetracyclines, and lincomycins inhibit microbial protein synthesis. 120. ■ Medical management includes platelet antiaggregants (aspirin), anticoagulants, lipidlowering medications, glycemic control, antihypertensive medications, and appropriate interventional methods. The quality of the film taken with portable equipment and using the AP orientation is generally poorer than a PA film due to the position of the patient and the patient's inability to cooperate or to perform a maximal inspiration. It is important for physical therapists to be able to differentiate between medical emergencies that require immediate treatment and inaccuracies that may be caused by extraneous factors unrelated to the physiologic status of the patient. de Sousa A.G.P, Cercato C, Mancini M.C, et al. 1983;51(3):455–458. 2014;56(4):457–464. Inspection—increased AP diameter of his chest, 4 cm incision under L clavicle, clean and dry, 2+ pedal edema. PLoS Med. Am J Nephrol. Spertus J.A, Peterson E.D, Conard M.W, et al. Etiology Obliterative bronchiolitis, sometimes referred to as bronchiolitis obliterans syndrome (BOS), is primarily a restrictive lung impairment and the major long-term complication of lung transplantation. 1995;49:1–10. The secretions should be assessed and described with regard to quantity, color, smell, and consistency (Table 16-5). Angina, shortness of breath, and palpitations are the most common symptoms of patients with cardiopulmonary dysfunction. The history of most patients with Guillain–Barré syndrome includes a viral illness (hemophilic influenza, Epstein–Barr virus, and cytomegalovirus), bacterial infections, surgical intervention, or vaccinations (specifically the Menactra meningococcal vaccine).43 Two-thirds report acute infection within 2 months, and 90% had an illness within the past 30 days.3,54 Pathophysiology Guillain–Barré syndrome is characterized by a rapid bilateral flaccid motor paralysis and areflexia. 1991;324:1446–1495. Such patients do not achieve their best results because the maximal heart rate may be well below what is considered diagnostic (85% of PMHR).125 The treadmill is relatively large, requires a patient to have balance and coordination, and is extremely noisy, making the auscultation of blood pressure very difficult. The right pulmonary artery runs behind the ascending aorta, superior vena cava, and upper pulmonary vein, but in front of the esophagus and right primary bronchus to the root of the lung. The signs and symptoms often include many extrapulmonary manifestations that are not common in bacterial or viral pneumonias. Boston: Little, Brown; 1994. The physical examination revealed the following: • General appearance: slight grayish color; thin, slightly underweight • Neck: observation of hypertrophy of sternocleidomastoid muscles bilaterally; forward head, and sits in bed with the head of the bed elevated to 60 degrees • Chest: upward movement of chest with every breath; patient is observed to have increased accessory muscle use, increased AP diameter, and increased respiratory rate • Phonation, cough, and cough production: patient is observed to have moist, nonproductive, ineffective cough; phonation requires breaths between words in sentence; extremities have mild clubbing, gray-blue color with tobacco stains • Auscultation: decreased breath sounds auscultated with coarse wheezing and wet crackles on expiration in bilateral bases but slightly cleared with a cough; auscultation of the heart demonstrates loud atrial gallop with rapid heartbeat • Palpation: decreased chest wall motion palpated throughout, with palpable fremitus in bilateral bases; increased accessory muscle use, including sternocleidomastoid and scalenes, with decreased diaphragmatic excursion; good pulses throughout, except bilateral dorsalis pedis • Percussion: mild dullness to percussion noted in bases • Activity evaluation: patient was evaluated in supine-to-sit position only; patient could not tolerate standing due to increased pain in left lower extremity and dizziness • Vital signs: heart rate 100 (supine), 120 (sitting); blood pressure 110/70 (supine), 90/66 (sitting) These findings from the cardiopulmonary assessment demonstrate an elderly female with a long-term history of smoking and signs of COPD in addition to the hip fracture. Pulmonary function in individuals with a history of poliomyelitis. "I get by with a few beers every night," he says. Knowledge of diseasespecific differences is important to help determine appropriate physical therapy interventions and the best sequence of intervention application to help individuals attain their maximal functional potential and reduce their symptoms of shortness of breath. 1995;18:275–281. Approximately 10% to 20% of patients with pericardial effusion develop tamponade and require pericardiocentesis.328 Interferons (IFNs: -α, -β, -γ) are used in a wide variety of malignant, idiopathic, infectious, and inflammatory conditions, and their administration is associated with a variety of pulmonary reactions: severe exacerbation of bronchospasm in patients with preexisting asthma and a granulomatous reaction similar to sarcoidosis occur with IFN-α therapy; interstitial lung disease, possibly cryptogenic organizing pneumonia, develops weeks to months after initiation of IFN therapy; and severe radiation pneumonitis can develop with multimodality therapy when IFN-γ is used.322,324,325 Adverse CV effects are sometimes noted with IFNs: acute toxicity may be manifested as hypotension with compensatory tachycardia or, more rarely, as HTN, and in severe cases, as angina and MI, and there are rare reports of cardiomyopathy.328,329 Table 7-21 Cardiotoxicity associated with cancer treatments CAD, coronary artery disease; CHF, congestive heart failure; DVT, deep vein thrombosis; HSCT, hematopoietic stem cell transplantation; LV, left ventricular; MI, myocardial infarction. Insurance coverage is often an integral part of decision making, as is discussion with the patient on what items will be most appropriate. They cause restrictive dysfunction because the tumor can compress the surrounding lung tissue and cause atelectasis and pneumonia, both of which decrease the ventilation–perfusion matching and impair gas exchange. Normal excursion is 3 to 5 cm but may be extremely decreased in the patient with chronic obstructive lung disease because of hyperinflation of the chest and a flattened diaphragm (Fig. Diuretics and β-blockers may impair thermoregulation during exercise, particularly when it is hot and humid. 1986;112(1):194–196. Ott S.M, LaCroix A.Z, Ichikawa L.E, et al. Other abnormalities may exist on the ECG, including pacemaker functioning (Figs. Such a relationship clearly identifies the important roles nutrition and proper biochemical functions have in cardiovascular disease. Sodium nitroprusside (Nipride) is both a venous and arterial dilator. Essentials of Critical Care Pharmacology. Fifty percent of patients with atrial or ventricular septal defects have pectus carinatum. Inflammation with perivascular exudative infiltration and fibrin deposition in the pulmonary arteries and veins causes focal destruction. Jette A, Davies A, Cleary P, et al. One method that can be utilized easily for the patient achieving tidal volumes of 500 mL or better is resisted inhalation. The physical therapist must also know the amount of oxygen being delivered (e.g., 60% via mask or 2 L via cannula). Pfeffer M.A, Pfeffer J.M. Ventricular enlargement and reduced survival after myocardial infarction. Patient able to ambulate 300 ft independently on room air with acceptable hemodynamic response to exercise. Therefore when lung secretions are retained in the small airways, postural drainage with percussion and/or vibration should be utilized to mobilize the secretions centrally, before suctioning. Bautista J, Rafel E, Marunez A, et al. Exercise is commonly the culprit in the production of arrhythmias (Box 141). Most commonly, these conditions occur in combination, with proportions varying from individual to individual.22 However, in some cases, either emphysema or chronic bronchitis is clearly dominant. A medication prescribed to inhibit arrhythmias can in fact become arrhythmogenic if therapeutic serum levels are exceeded. 22-4). Monti F, Lupi R, Gobbi F, Agostini F, Miano A, Gee L, Abbott J. 2004;10(1):41–49. 132. 0.4 or less = may indicate tissue necrosis Source: Vascular Disease Foundation. The patient is positioned standing diagonally (at an angle of 45 to 60 degrees to the film) with either the left or right anterior, or the left or right posterior, chest against the film cassette (anterior or posterior oblique views, respectively). Myotonic dystrophy is associated with cardiac involvement, especially electrocardiogram (ECG) abnormalities and arrhythmias, in at least two-thirds of patients; high-grade heart block or ventricular tachycardia may cause sudden death.281,284,285 Occasionally, there is acute LV failure or CHF. Reduction of trial and error in the equilibrium rebreathing cardiac output method. FIGURE 1-6 Musculature of the chest wall. Biochem Res Int. Risk factors for venous insufficiency include, but are not limited to, advancing age, genetics, obesity, prolonged standing, sedentary lifestyle, smoking, and female hormones. Familial hypertrophic cardiomyopathy and muscle carnitine deficiency. Innervation of the Lungs The lungs are invested with a rich supply of afferent and efferent nerve fibers and specialized receptors. Less than 5% of cases progress to complicated CWP.31 Complicated CWP results in large confluent zones of dense fibrosis that are usually present in apical segments in one or both lungs. Temperature Monitoring A rectal thermometer may be used invasively in patients whose body temperature cannot be measured orally, such as comatose, intubated, or confused patients. Spironolactone (Aldactone, Alatone) is a comparatively weak diuretic compared with Lasix. The mechanism of action is complex, and in low concentrations, it can cause pulmonary vessel dilation.58 Non–Autonomic Nervous System Vasodilator and Inotropic Agents In addition to manipulating the autonomic nervous system with drugs to manage arterial blood pressure in critical care, physicians can prescribe other antihypertensive and/or vasodilating agents. Combined physical therapy for lymphedema evaluated by fluorescence microlymphography and lymph capillary pressure measurements. Patients who perform exercise during dialysis benefit from improved dialysis efficacy (by 10% to 15%), with greater removal of waste products produced by augmented flux between the blood and the dialyzer because of increased cardiac output, as well as expanded capillary blood flow as a result of exerciseinduced vasodilation in the exercise muscle bed.218 Because of the prevalence of DM in patients with CKD, the clinical implications previously discussed for diabetics should be noted when appropriate. Leukotriene Inhibitors Leukotrienes are strong inflammatory mediators that promote neutrophil–endothelial interactions, induce bronchoconstriction, and increase airway hyperresponsiveness. In two-dimensional echocardiography (upper panel), the probe rapidly rotates between the two extremes (broken lines), producing an image of a slice through the heart at one instant in time. These thrombolytic agents are most commonly administered intravenously but can also be injected directly into the coronary arteries. 2003;51(3):340–347. The chart review revealed the following: • A 54-year history of smoking approximately 1.5 to 2 packs per day • No history of hypertension, family history of heart disease, or other major medical problems (patient had been ambulatory with wheeled tripod walker and lives alone) • Laboratory study results within normal limits • Chest radiograph demonstrates hyperinflated chest with few patchy areas of infiltrate in both bases In the interview, the patient reported that she is in a lot of pain. Compensation addresses the presence of the classic signs and symptoms of HF such as pulmonary/peripheral edema, and elevated biomarkers brain natriuretic peptide (BNP) and its amino-terminal fragment N-terminal pro-B-type natriuretic peptide NT-proBNP (NT-proBNP) (see Chapter 4). Body posture and position should also be assessed to determine their impact on the pulmonary system. However, because bronchoconstriction is an inflammatory response, corticosteroids reduce the inflammatory response, decrease mucosal swelling, and increase bronchial lumen and airflow.43,44 The following effects of corticosteroids result in an increase in bronchial intraluminal diameter:5,22,32,41,43,44 ■ Inhibition of the migration of lymphocytes, eosinophils, and mast cells ■ Reduction of stickiness and margination of polymorphonuclear leukocytes ■ Potentiation of β-receptor activity with increase in cAMP ■ Suppression of kinin activity, resulting in constriction of the vasculature within the bronchial mucosa ■ Inhibition of IgE action and stabilization of mast cell membranes with decreased release of histamine and other bronchoconstrictor mediators ■ Reduction of PDE activity with increased cAMP activity Because of their profound antiinflammatory actions, corticosteroids are considered the drugs of first choice for both the long-term and quick relief of asthma. Thus death of cells from an infarction or a cardiomyopathy may result in a significant reduction in contractile function. J Gerontol Med Sci. This can be performed manually by the therapist. 1983;84:370. Auscultation of heart sounds usually reveals a systolic murmur or click. This ECG sign is extremely significant, because it indicates that a transmural (also called STEMI or Q-wave) infarction could be pending. Goodman J.M, McLaughlin P.R, Plyley M.J, et al. When an individual is performing endurance exercise of greater than 3 to 5 minutes in duration, a continuous rise in systolic blood pressure is considered an abnormal response. Venodilators are especially effective in the treatment of diastolic hypertension because they reduce cardiac preload and end-diastolic pressure (see Table 14-11). B, The right ventricular pressure waveform normally is observed only when the catheter is initially being inserted. 1988;6:859–865. 2012;96(4):735–747. 217. Cell Immunol. 2013;17(1):34–40. The fingers should be stretched upward and over the trapezius, and the thumbs should be placed together along the midline of the chest. 2009;119(14):1977–2016. The prone position in ARDS patients. Methylprednisolone may be used to treat pulmonary hemorrhage. 2000;136:311–317. (Modified from Fletcher C, Peto R: The natural history of chronic airflow obstruction, Br Med J 1:1645–1648, 1977.) FIGURE 6-5 Lung volumes in chronic obstructive pulmonary disease compared with normal values. Cardiac risk factors include a positive family history and a 30-year history of tobacco use. A, Fastresponse AP (black line) begins with a relatively greater negativity and has a rapid rate of depolarization and a plateaued repolarization. These act on the cortical ascending limb of Henle loop and the distal tubule. 2013;34:1–29. It must be remembered at this point that the most important member of the health care team is the patient. In addition, airway walls become perforated, and in the absence of repair, the walls become obliterated and small distinct airspaces appear, changing into larger abnormal airspaces.24 Three types of emphysema are named for the location of airspace enlargement within the acinus. It is the transmural or transpulmonary pressure that allows changes in lung volume to parallel changes in thoracic excursion during inspiration and expiration. See Fig. National Heart, Lung, and Blood Institute; 1995. Magnetic Resonance Angiogram A magnetic resonance angiogram (MRA) is a type of MRI that uses magnetic and radio wave energy to obtain images of the blood vessels inside the body. Readers interested in additional information regarding drugs used in critical care are encouraged to refer to the Textbook of Advanced Cardiac Life Support published by the American Heart Association. 1991;4(3Pt 1):271–273. 2014;62(1):12–21. 1995;25:333–341. The learner 's perceptual needs must be considered in order to ensure the ability to receive input and comprehend the material presented. Franca E1 La, Iacona R, Ajello L, Sansone A, Caruso M, Assennato P. The capillaries in the visceral pleura receive blood via the low-pressure pulmonary circulation. Appearance of Extremities Observation of the fingers and toes and the calves of the legs should indicate whether long-term problems with circulation and oxygenation are present. The sensitivity of a tool refers to its ability to statistically detect change over in a given patient population, and responsiveness refers to the detection of clinically relevant change. The test is routinely used to identify possible coronary disease or monitor the cardiac capabilities of individuals with multiple risk factors for CAD. Inflammatory Myopathies The inflammatory myopathies are often included in the CTDs. Two types, polymyositis and dermatomyositis, are particularly likely to be associated with cardiopulmonary complications. Postgrad Med 29(Spec No). Peripheral vascular resistance is determined by the arterioles. Philadelphia: Elsevier Saunders; 2004. The effect of dobutamine can be reversed with β-blockers. It was completed in less than 15 minutes and showed improved visualization of wall segments and left ventricular function compared with the echocardiography results.105,106 Magnetic resonance imaging is also being used in conjunction with pharmacologic stress testing to determine significant coronary atherosclerotic plaques.107 If an individual has a pacemaker, artificial joint, stent, surgical clips, heart valve, or any other metallic device, he or she might not be a candidate for an MRI. AACN's Clinical Reference for Critical Care Nursing. (From Marchiori DM: Clinical Imaging with Skeletal, Chest, and Ab dominal Pattern Differentials, ed 3, St. Louis, 2014, Mosby.) Hemothorax The definitive treatment for hemothorax is to evacuate the blood from the pleural space by placement of a dependent chest tube. Impaired performance in tests that require a drawing task, such as producing a clock, or other complex goal-directed cognitive tasks, indicates problems with judgment and complexity18 and has been proposed to be prognostic in patients with hypoxemic COPD.19 A few other psychological concerns that should also be taken into consideration are coping, stress, motivation, and chemical dependency issues such as smoking. 1982;306:557–564. 1999;53:230–234. A third person is recommended for pushing intravenous poles and watching for adequate slack on IV lines. The length of the muscle affects the force output, as demonstrated in the length–tension curve. Scholte A.J.H.A, Schuijf J.D, Kharagjitsingh A.V, et al. Ann Chir Gynaecol. Verify accuracy by checking the pulse manually. Kannel W.B. Contributions of the Framingham Study to the conquest of coronary artery disease. The test is again a measure of lower extremity strength and can quantify functional progress in sit-to-stand transitions. Table 7-17 Pulmonary and cardiac complications of the common infiltrative diseases CHF, congestive heart failure; CM, cardiomyopathy. The elevated troponin could be related to underlying coronary artery disease (CAD) or the release of toxins in sepsis (such as tumor necrosis factor) that can injure the heart and cause increased troponin levels.10 Other patient groups that show elevated troponin include patients with renal failure. Hoendermis E.S. Pulmonary arterial hypertension: An update. Philadelphia: JB Lippincott; 1989. Patients commonly identify dyspnea and fatigue as their primary discomforts. Dechman G, Wilson C.R. Evidence underlying cardiopulmonary physical therapy in stable COPD. Deboeck G, Van Muylem A, Vachiéry J.L, Naeije R. On rare occasions, CKD can develop as a complication of overuse of some common drugs, such as aspirin, ibuprofen, acetaminophen, and cocaine. The distance between the lines is the distance of diaphragmatic excursion. Parameswaran K, Todd D.C, Soth M. Treatment Biological aging is a process of change affecting tissues and organs. 5-25). In the acute care setting, the presence of incisions, lines, and drains may prohibit the use of manual facilitation techniques. 145. Crackles are more commonly heard during inspiration and may be associated with restrictive or obstructive respiratory disorders because they can be produced via several mechanisms.17-19 They may result from the sudden opening of closed airways15-21 (Fig. 1981;59(13):453–461. 1994;20:581– 584. The sympathetic input to the plexus arises from the sympathetic trunk in the neck. J Appl Psychol. Chapter 8 previously discussed the testing protocols, safety procedures, and some interpretation of the results. 1992;30(5):42–49. Helical CT was introduced in the 1990s to diagnose for pulmonary embolism (PE) and, since that time, advances in CT technology (faster scanners and thinner slices) have improved sensitivity and specificity (reported as 90% sensitivity and 96% specificity).6,7 FIGURE 10-8 Computed tomography showing ground glass appearance in ILD. Worthy of particular mention based on prevalence are the benefits of exercise for patients with cancer. Shafig S.A, Sande M.A, Carruthers R.R, et al. Wells P.S, Anderson D.R, Rodger M, et al. In: Kalant H, Oschlau W, Sellers E, eds. The heart rate of a heart transplant recipient will not increase linearly with activity progression secondary to denervation. In addition, chronically elevated BG levels and other associated abnormalities result in damage to the arteries, heart, kidneys, eyes, and peripheral and autonomic nerves. 2004;11:369–378. ■ The major problem associated with insulin therapy is hypoglycemia, which occurs when the level of circulating insulin exceeds need, such as during the hour or so immediately before mealtime or when there is persistent increased insulin sensitivity and mandatory repletion of muscle and liver glycogen stores after exercise. 1990;20:133–145. The compliance of the lung is reduced by factors that produce a resistance to distension. Hypertrophy of the left ventricle creates enlarged QRS complexes in the chest leads in both height of the QRS (R wave) and depth of the QRS (S wave). This abnormal sensation and appearance are a result of the increased sympathetic nervous system activation of CHF, which increases peripheral vascular vasoconstriction and decreases peripheral blood flow.124,125 Weight Gain As fluid is retained, total body fluid volume increases, as does total body weight. This often results in less volume of blood reaching the lungs for gas exchange and subsequently less volume returning to the left heart to be sent out to the periphery. Obesity and primary graft dysfunction after lung transplantation: The Lung Transplant Outcomes Group Obesity Study. However, if a cell is devoid of oxygen, each molecule of glucose undergoes anaerobic metabolism, yielding only 2 ATP. Several studies have documented the efficacy of exercise training in the management of patients with AOD. Lancet March. The signal is picked up by a small receiver implanted permanently inside the heart and converts it into an electrical signal that regulates the heart (Fig. Cardiorespiratory fitness and adiposity as mortality predictors in older adults. Assisted airway clearance and supplemental oxygen are usually no longer necessary at the time of discharge. Seventeen percent of patients have ocular involvement, which can lead to blindness.25 The most common ocular presentation is granulomatous uveitis, which causes redness and watering of the eyes, cloudy vision, and photophobia.32 Five percent of patients have neurologic involvement, which can include encephalopathy, granulomatous meningitis, or involvement of the cranial nerves.25 Other organ systems that can be involved are the liver (60% to 80%), the lymphatics (50% to 75%), the heart (30%), the skin (30%), the spleen (15%), the kidney, muscles, joints, and the immune system.3,8,25,26,31,33 The progression of this disease is extremely variable. 2012;144(4):951–955 Epub 2012 Apr 20. 1994;26(6):678–681. Monitoring and life support Monitoring Equipment Temperature Monitoring Intracranial Pressure Monitoring Life Support Equipment Summary Section 5. Available at www.cancer.org/cancer/lungcancer. Werner R.S, McCormick B, Petrek J, et al. These differences are summarized in Table 5-2. Alpha-1 adrenergic receptors in the nonfailing and failing human heart. The right coronary artery is the primary supply route for blood to the majority of the right ventricle and the inferior and posterior portions of the left ventricle. Superko H.R, Fogelman A. source=machineLearning&search=Overview+of+homocysteine&selectedTitle=1~15 July 14, 2015). Magnetic Resonance Imaging Magnetic resonance imaging (MRI) involves the interaction of stimulated hydrogen nuclei and a strong magnetic field. Recruitment and discharge frequency of phrenic motoneurons during inspiration. "Coughing to clear your lungs is another very important responsibility to prevent the opportunity for pneumonia to develop. Lefebvre K.M. Outcomes measures in cardiopulmonary physical therapy: Focus on the ankle brachial index (ABI). These tumors may arise as a solitary nodule and may involve the pleura, causing a carcinogenic pleural effusion. 1994;26:838–843. J Cardiopulm Rehabil. (From Fraser RG, Paré JAP: Diagnosis of Diseases of the Chest, vol 1, ed 2, Philadelphia, 1977, Saunders, pp 172-173.) FIGURE 10-3 A, Normal chest radiograph, lateral view. ■ Oxygen is considered a drug when it is administered in concentrations higher than those found in the atmospheric air. Patrono C. 1998;83:2843–2860. Configuration, regulation, mechanism of action. The right hemidiaphragm meets more resistance than the left during its descent, because the liver underlies the right hemidiaphragm and the stomach underlies the left; it is therefore more substantial than the left. 6-1). Under normal conditions, the SvO2 is in the range of 60% to 80%.18,19 SvO2 demonstrates the balance between oxygen delivery and oxygen demand. So, in reality, the heart rate does not decrease with exercise, but the palpated heart rate may appear to decrease if the number of arrhythmias increases. Other Potential Clinical Laboratory Risk Factors for CAD Homocysteine, which is a type of amino acid found in the blood, has been linked to increased risk of development of cardiovascular diseases when the levels in the blood are elevated. Direct damage to the heart, such as from blunt cardiac trauma, is another cause of elevated troponin levels. This chapter provides an overview of outcome measures specific to the

Diabetologia. When an S3 is heard in healthy children or young adults, it is considered normal and is called a physiologic third heart sound. Transthoracic aspiration biopsy of the fluids in the pleural space may be used to confirm hemothorax. Resp Phys. 2005;36:916. Peripheral tumors are often large, lobulated, and bulky, causing compression of the normal lung tissue. Thoracoplasty is another surgical procedure that results in restrictive dysfunction. Communication between therapist, patient, and clinical care team is critical to the success of the weaning process for patients. Pri-Med Institute Winter, 2008: 11. According to the American Heart Association (AHA), assessment for cardiovascular risk factors should begin at age 20 and be repeated every few years (more frequently for those at higher risk).10 Box 18-1 presents the guidelines for risk assessment as determined by the AHA's guidelines for primary prevention of CVD.10,11 Many resources also can be found online to help compile risk factors and determine overall risk of developing CVD. Pulmonary function tests show a classic restrictive impairment. This treatment aims to reduce fetal conduction system inflammation that is believed to be due to maternal autoimmune disease.76 Digoxin (Lanoxin), a commonly used inotrope, is better tolerated in infants and young children than in adults, and usually achieves a satisfactory response at lower doses (normalized for weight and size). Surgical Procedures An understanding of specific surgical approaches and procedures, as well as knowledge of the anatomy of the chest wall, is integral to the chart review process. Skinner E.H, Berney S, Warrillow S, Denehy L. A Companion to Braunwald's Heart Disease. Accessed July 9, 2014 The care provided for heart and lung transplant patients is also evolving at a rapid pace. With a deep inspiration, the hands should travel equally apart, total circumferential diameter increasing by at least 2 to 3 inches. Acute chest syndrome of sickle cell disease. Fuster V, Rydén L.E, Cannom D.S, et al. Curioni C.C, Lourenco P.M. Long-term weight loss after diet and exercise: A systematic review. Richards M, Hardy R, Wadsworth M.E.J. Does active leisure protect cognition? Nesiritide (Natrecor)37 is used intravenously to decrease pulmonary capillary wedge pressure (PCWP) with the goal of improving hemodynamics and increasing cardiac output. With cell necrosis, there is a release of the troponins into the circulation. Myocardial cells are unique, as they demonstrate three important traits: automaticity (the ability to contract in the absence of stimuli); rhythmicity (the ability to contract in a rhythmic manner); and conductivity (the ability to transmit nerve impulses).17 Myocardial cells may be categorized into two groups based on their function: mechanical cells contributing to mechanical contraction and conductive cells contributing to electrical conduction.1,17 Mechanical cells, also termed myocytes, are large cells containing a larger number of actin and myosin myofilaments, enabling a greater capacity for mechanical shortening needed for pump action. Clin Epidemiol. Cancer Invest. Splitting of the S1 is best heard over the tricuspid region, whereas splitting of the S2 is heard more readily over the pulmonary region. The use of α-agonist–containing nasal sprays should be limited to a few days only, as long-term use can lead to a "rebound" effect, where nasal congestion gets progressively worse, and can also cause nasal ulcers. Therapeutic Indications Cardiac conditions in pediatric populations that warrant pharmacologic intervention usually include HF, blood pressure and lipid abnormalities, and arrhythmias. Grapefruit juice and several herbal products can increase their hypotensive effects. Minimal Detectable Change In considering the type of outcome measure to use with your given patient population, it is important to consider the error measurement of the tool. BMC Pulm Med. Exercise during hemodialysis. Although the 2MWT, 3MWT, and 12MWT are valid and reliable for use with the cardiopulmonary population,144,145 most commonly, the 6MWT, a middle distance, is used for patient examination and objective measurement of outcomes. Continuous tests utilize incrementally progressive workloads until the test is terminated because of patient symptoms or a defined end point. Both types of cells are nonciliated, although both exhibit filamentous surface projections. 1991;37(6):548–556. During episodes of severe bronchoconstriction, corticosteroids are usually administered intravenously. There is a vast amount of individual variability in the circle of Willis, and some individuals do not even have a complete circle. Guidelines offered by agencies such as the AACVPR and the American Heart Association (AHA) can give general direction to the selection of such measures. A more severe course affects the peripheral joints, and hip involvement is a prognostic marker for long-term severity of the disease.21,54 Clinical Manifestation The clinical manifestation of AS can be found in Table 5-28. Other Symptoms of Cardiovascular Inadequacy The other symptoms associated with cardiovascular inadequacy are more difficult to interpret and therefore more difficult to treat. Rev Esp Cardiol. Roger N, Barbera J.A, Roca J, et al. I would like to especially thank the contributors for their ability to work under my constant nagging to achieve their deadlines and for providing great material including figures, tables, and clinical notes. Renin reacts to form angiotensin I, and in the presence of a converting enzyme (ACE), angiotensin I forms angiotensin II (Fig. Other views that can be obtained include the following: ■ Decubitus views are taken to confirm the presence of an air–fluid level in the lungs or a small pleural effusion. During the modified shuttle walk test, patients are required to walk up and down a 10meter course (Box 22-6). (From Linton A: Introduction to Medical Surgical Nursing, ed 5, St. Louis, 2012, Mosby.) 6. Wei J.Y, Spurgeon H.A, Lakatta K.G. Excitation-contraction in rat myocardium: Alterations with adult aging. Chronic drug treatment requires the administration of the drug at the half-life intervals so that a drug with a short half-life has to be given more frequently than a drug with a long half-life. Use of radiography, ultrasound, and MRI are often used to visualize the joints.54 Clinical Manifestation The clinical manifestation of RA can be found in Table 5-29. Managing insulin therapy during exercise in type 1 diabetes mellitus. Percutaneous techniques for placing IABPs in the left axilla/subclavian artery have been described.51,52,54,55 These techniques were developed to allow patients who required extended periods of support to be mobilized.51,52 (IABP is also discussed in Chapter 4.) When activated, the balloon is inflated during diastole as soon as the aortic valve closes. ■ The most common hematologic abnormality is a secondary polycythemia, which is caused by either a reduction in oxygen transport or an increase in erythropoietin production. Patient and family responses to the critical care environment. 204. 1993;71(8 Suppl):S134–S136. Positive inotropes, such as digitalis, and antihypertensive agents, such as diuretics, can be particularly dangerous. Acute Respiratory Failure. However, approximately 10% to 30% of pulmonary embolisms result in the patient's death within 1 month of diagnosis.32 About one-third of the deaths occur within 1 hour of the acute event, and more than half of these fatalities occur in patients in whom the diagnosis was not clinically suspect.32,43 In more than 95% of the cases, the thrombi that caused the pulmonary emboli were formed in the lower extremities.3,43 In the remaining 5% of the cases, the thrombi may be formed in the pelvis, the arms, or the right side of the heart. The statements within this section vary from question to question.84 Purpose The purpose of the SAQ is to quantify the emotional and physical impact of angina. ■ Conservative methods for treating lymphedema have been called by many different names, including complex decongestive physiotherapy (CDT) or combined physical therapy. FIGURE 17-11 Nezzie walker. An FEV1% of more than 80% or 90% indicates restrictive disease, whereas a reduced FEV1% indicates airway obstruction. The questionnaire is divided into two distinct sections. 1980;46(2):292–300. J Gen Intern Med. Acta Biomed. 1990;65:1–5. Hillerdal G, Löfdahl C, Ström K, et al. The evaluation is terminated at any time during the assessment that an abnormal response is identified if such response makes continuing the evaluation inappropriate or unsafe. Improvement in exercise capacity of candidates awaiting heart transplant. Exercise enhances metabolism systemically and/or locally. Sethi S. Sympatholytic Agents or Adrenergic Antagonists Because α-receptor stimulation produces both vasoconstriction and bronchoconstriction, the pharmacologic reduction of α-adrenergic activity in the bronchi through αadrenoceptor antagonists can be useful for patients with pulmonary disease. Here it is the duty of the pharmacist to explain carefully that it is indeed the correct drug, just manufactured by different pharmaceutical producers. Swarbrick J. Ventilatory failure can only be diagnosed on the basis of the PaCO2 level, but its severity is determined from the extent of the accompanying acidemia and the rapidity of the change in pH. Prog Cardiovasc Dis. In this situation, the blood pressure may rise slightly or may remain flat. Physiology and Pharmacology of Cardio-respiratory Control. These patients lose the normal response to breathing, resulting in altered ventilatory rates and volumes. Type I patients need insulin. Relationship between physical activity and HDL-cholesterol in healthy older men and women: A cross-sectional and exercise intervention study. Taheri S, Lin L, Austin D, et al. To effectively perform the test, the examiner needs a 100-foot hallway marked by two cones or a straight path with 50-foot intervals, a clipboard, lap counter, timer, chair, vital signs monitor, Borg scale, oxygen source, and access to emergency assistance as needed. Lund L.H, Edwards L.B, Kucheryavaya A.Y, et al. The therapist is often responsible for interpreting information from the patient's performance and the family support system as part of the discharge plan. Turesson C, Matteson E.L. Cardiovascular risk factors, fitness, and physical activity in rheumatic diseases. Half-life reflects the rate at which the drug is eliminated from the body. Nelson H.S, Weiss S.T, Bleecker E.R, et al. 10-12 depicts the typical bronchoscopic appearance of the segmental origins within each lobe. The goal of endurance training in acute care is to maximize the independence and efficiency by which the patient performs activities of daily living (ADLs) and functional mobility. Eligible professionals, including physical therapists who do not satisfactorily report data on quality measures for the January 1, 2015–December 31, 2015 reporting period are subject to the 2.0% adjustment in their fee schedule amount in 2017.32 The quality outcome measures that are included in this initiative are accessible online at . Assessment of Quality of Life in Clinical Trials of Cardiovascular Therapies. Pathophysiology, and new therapeutic approaches. The ECG is used to define previous and current myocardial injury, hypertrophy of the heart muscle, pericardial involvement, or delays in the generation of the depolarization impulse. Although corticosteroids have been used, there are no current data that show corticosteroids improve the morbidity or mortality rates in these patients.28 Deep breathing exercises, positioning, and coughing are also used to assist in clearing infiltrates and to decrease the incidence of pneumonia.32 Penetrating Wounds Penetrating wounds to the thorax are usually caused by shooting or stabbing and result in pathologic damage, particularly pneumothorax, hemothorax, pulmonary laceration, tracheal or bronchial disruption, diaphragmatic injury, esophageal perforation, or cardiac laceration. No. 87131. Symptoms may be more pronounced when standing compared with sitting or lying down. Epidemiol Rev. Rumberger used EBCT on older populations; however, recently O'Malley used the procedure for screening for CAD in asymptomatic active-duty U.S. Army personnel.83,87 A typical EBCT scanning protocol involves a 10-minute scan of 40 slices through the heart every 3 to 6 mm.88 Intravenous contrast medium is not used, so radiation exposure is minimal (approximately one half the radiation exposure to the average person living in the United States in 1 year).83 Electron beam computed tomography detects the presence of calcium in the coronary arteries, as well as the location, extent, and density of the deposits, and provides a calcium-scoring system. Patients receiving mechanical ventilatory assistance can perform these activities while still on the ventilator. Patients who take one of these drugs for months or years may develop clinical SLE, and of these, 50% develop pleuropulmonary involvement, including interstitial lung disease. 42. Instead, these patients may exhibit increased fatigue, difficulty sleeping, impaired concentration, and more subtle variants of poor performance.245 Cardiac abnormalities found in this population include cardiomyopathy associated with neuromuscular diseases, arrhythmias, and conduction disturbances. 38. Exercise testing has shown that individuals with mild-to-moderate PD who regularly exercise can maintain normal exercise tolerance; more involved patients exhibit significantly lower exercise capacity.267 Moreover, it is possible to improve exercise capacity in patients with mild-to-moderate PD with exercise training. Ninety-day mortality and major complications are not affected by use of lung allocation score. ACC/AHA 2005 Guideline for the diagnosis and management of chronic heart failure in the adult: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (writing committee to update the 2001 guidelines for the evaluation and management of heart failure): Developed in collaboration with the American College of Chest Physicians and the International Society for Heart and Lung Transplantation: endorsed by the Heart Rhythm Society. The pressure on the thorax exerted during vibration on expiration often causes a volume of air to be expired that is greater than what is expired during tidal breathing. Surfactants' role is to reduce surface tension and prevent alveolar collapse (atelectasis). 1990;28:1056–1072. For example, anemia shifts the curve to the right, representing a lower concentration of arterial oxygen, which moves the critical point of oxygen saturation to 70 mm Hg (therefore to the right). 75. Connect the vent end of the catheter to the suction tubing. The therapist has the patient assume a comfortable position as described earlier to promote diaphragmatic excursion. Baltimore: Williams & Wilkins; 2005. Arch Opthal. After these lines are drawn, the therapist asks the patient to take a maximal inspiration and to hold this breath. Chronic inflammation starts the process by causing structural changes and narrowing of the small airways within an individual's lungs. 1986;59(3):297–309. Tanoue L.T. Pulmonary involvement in collagen vascular disease: A review of the pulmonary manifestations of the Marfan syndrome, ankylosing spondylitis, Sjogren's syndrome, and relapsing polychondritis. 14-10). The ABI should be used in any patient with multiple risk factors for cardiovascular disease (e.g., obesity, diabetes, high LDL, hypertension, past coronary events, smoking, female gender, higher age). 1999;353(9169):2001–2007. Talc granulomatosis is characterized by granulomas in the arterioles and the pulmonary interstitium. All rights reserved. Single-lead monitoring is employed for evaluating heart rate or rhythm. The inhaler consists of three major components: the canister, where the drug is stored; the metering valve, which allows a metered quantity of the drug to be dispensed with each actuation; and a mouthpiece that allows the patient to operate the device and directs the aerosol into the patient's lungs. Finally, oculopharyngeal muscular dystrophy is associated with swallowing dysfunction, complicated by repeated aspiration, which may improve after cricopharyngeal myotomy. Pravastatin in elderly individuals at risk of vascular disease (PROSPER): a randomised controlled trial. The Minnesota Living with Heart Failure Questionnaire has been used in several recent studies investigating the effects of various pharmacologic agents in persons with CHF, as well as exercise training in CHF, and appears useful for measuring quality of life and changes in the quality of life.146–149 These areas are two very important issues for clinical practice and research, and the information provided by this questionnaire is therefore highly desirable. FIGURE 2-4 A-C, Ventilation: Changes in pressure with inspiration and expiration. 8-8). 188. Level of patient acuity can vary from day to day or hour to hour in the hospital setting. 1997;87:559–569. 2005;99:1205–1213. Due to its relative safety, cost effectiveness, and rare instances of hypoglycemia, metformin should be considered as first-line monotherapy for treatment of type II diabetes mellitus.80 If these fail to control glucose levels, insulin might have to be added.81 Table 14-19 Oral hypoglycemic agents used in diabetic management Adapted from Rakel R: Conn's Current Therapy, Philadelphia, 1999, WB Saunders; and Nathan DM: Finding new treatments for diabetes—how many, how fast, how good? Therefore auscultation of all lobes should be performed in a systematic manner, allowing for bilateral comparison. ■ The physiologic monitoring equipment commonly found in critical care units primarily addresses the cardiovascular, pulmonary, and neurologic systems. This is known as the first-pass effect. It is the physiologic link that establishes a relationship between the pressure exerted by the chest wall or the lungs and the volume of air that can be contained within the lungs.2 With RLD, chest wall or lung compliance, or both, is decreased. Alveolar patterns are sometimes described as "fluffy infiltrates"; they represent pathologic changes within the distal airways, for example, pulmonary edema or alveolar pneumonia (Fig. The murmur heard is a high-pitched murmur, best heard at the right sternal border, second intercostal space, frequently radiating to the neck and the carotid arteries. The PT assessment reveals a lethargic-appearing 76year-old woman with obvious right facial paresis, severe dysarthria, flaccid right upper extremity, decreasing tone right lower extremity through positive clonus of right ankle. A serious problem exists when a patient develops symptoms because of an arrhythmia or when the arrhythmia changes in character to become life threatening. Because of persistent abdominal pain and distension, an exploratory laparotomy was performed on August 28, 2010, resulting in resection of the small bowel. Clinical Manifestation The clinical manifestation of surgery on the lungs can be found in Table 5-39. 2008;19(3):94–97. This accommodation occurs in the warm-up by an increase in stroke volume provided by the contracting muscles and increases in catecholamine release. Antibodies are generally grouped into five major classes: immunoglobulin (Ig) A, IgE, IgG, IgM, and IgD; the first four of these have been identified in respiratory secretions.19 Sensitized lymphocytes (also called lymphokines) are produced through the interaction of antigens with T lymphocytes in a process referred to as cell-mediated immunity. 149. … This inflammation is attended, from the commencement, with a secretion of mucus more abundant than natural … it obstructs, more or less completely, the bronchial tubes, especially those of small calibre … and the impeded transmission of air … produces the sound usually denominated the rattles."23 Today, chronic bronchitis is defined in clinical terms, as the presence of a chronic productive cough for 3 months in each of 2 successive years, provided that other causes of chronic mucus production (cystic fibrosis [CF], bronchiectasis, and tuberculosis [TB]) have been ruled out.25 Hypersecretion of mucus begins in the large airways and is not associated with airway obstruction (simple bronchitis). Rales (Crackles) Pulmonary rales, sometimes referred to as crackles, are abnormal breath sounds that, if associated with CHF, occur during inspiration and represent the movement of fluid in the alveoli and subsequent opening of alveoli that previously were closed because of excessive fluid.5 This sound is produced in the body with the opening of alveoli and airways that previously had no air; after the sound associated with such an opening is transmitted through the tissues overlying the lungs, the characteristic sound of rales is identical to that of hair near the ears being rubbed between two fingers. These may include dry mouth, tachycardia, blurred vision and constipation.32,33 Methylxanthines Another mechanism to enhance the intracellular level of cAMP is through the inhibition of the enzyme phosphodiesterase (PDE), which is responsible for the degradation of cAMP. (From Goodman CC, Snyder TE: Differential Diagnosis for Physical Therapists: Screening for Referral, ed 4, St. Louis, 2006, Saunders.) Chronic Obstructive Pulmonary Disease: The Combination Disease Etiology Cigarette smoking is the most common risk factor worldwide contributing to the development of COPD, although in many countries, air pollution from the burning of wood and other biomass fuels has also been identified as a risk factor.22 Chronic obstructive pulmonary disease is a term that describes obstructive airway disease caused by a combination of emphysema and chronic bronchitis (including small-airway disease). Each digital image is an array (matrix) of numbers; each number represents a single element of the picture (pixel) and the value of the number defining the degree of brightness or darkness of that particular point in the image. National Emphysema Treatment Trial Research Group. Moreover, it must do so almost in anticipation of diminishing alveolar size. The number of the various structures is reported for two lungs. The Chinese translation of COPD assessment test (CAT) provides a valid and reliable measurement of COPD health status in Chinese COPD patients. Effects of aerobic and resistance exercise in breast cancer patients receiving adjuvant chemotherapy: A multicenter randomized controlled trial. Blood Gas Analysis Blood gas analysis is crucial to the assessment of problems related to acid–base balance, ventilation, and oxygenation. Clinical tip Positioning for AP views (supine or semirecumbent) often result in a poor inspiratory effort, especially when the patient is critically ill. Hakim M.G, Gill S.S. Heart transplantation: Operative techniques and postoperative management. New York, 2015, McGrawHill.) Bioavailability The route of administration affects the bioavailability of the drug, the onset of drug action, and its duration of action. 1996;334(17):1095–1099. Complications of acute stroke. 2004;34(6):371– 418. lung, 386–418 Thirty-Second Chair Stand Test, 684t–687t Thoracic and cardiac interventions, 364–385 angiogenesis stimulation via gene therapy, 375 automatic implantable cardioverter defibrillators (AICDs), 381–382, 381b cardiothoracic interventions, 368–375 advances in, 371–372 coronary artery bypass graft (CABG), 369–372, 370f–371f, 371b minimally-invasive direct coronary artery bypass (MIDCAB), 371 off-pump coronary artery bypass (OPCAB), 371, 371b percutaneous coronary interventions (PCIs), 369–370, 370f percutaneous myocardial revascularization (PMR), 371–372 percutaneous revascularization procedures, 369–370, 370f percutaneous transluminal coronary angioplasty (PTCA), 368–369, 368b, 369f robotic techniques, 372, 372f totally endoscopic coronary artery bypass (TECAB), 372 transcatheter aortic valve replacement (TAVR), 374–375, 374b, 375f trans-myocardial laser revascularization (TMR), 371–372 valvular repair and replacement, 372–375, 373f–374f case studies of, 381b–382b chest tube placement, 375–379, 377b abdominal aortic aneurysmectomy, 377–378 minimally-invasive endovascular repair (EVAR), 378, 379f thoracic organ transplantation, 377–378 clinical tips for, 364b, 368b, 371b–372b, 377b–379b, 381b implantable cardioverter defibrillators (ICDs), 381–382, 381b intracoronary radiation (brachytherapy), 375 overviews of, 364, 382 pacemaker implantation, 379–381, 380f, 381b peripheral vascular interventions, 375, 378b–379b resources for, 382 surgical procedures, 364–375 cardiothoracic approaches, 364–368, 364b, 365f–366f complications of, 365–367 minimally-invasive approaches, 367–368, 367f pain and, 366–367, 367f sternotomy, median, 365, 366f thoracotomy, axillary, 365 thoracotomy, lateral, 365 thoracotomy, posterolateral, 364–365 video-assisted thoracoscopic surgery (VATS), 367–368, 367f, 368b Thoracic cage, 1, 2f Thoracic erector spinae, 6f, 7 Thoracic mobilization techniques, 552 Thoracic organ transplantation, 386–418 alternative therapies, 395–399, 396t–397t, 398f–399f, 398b heart, 399 lung, 397–399 lung volume reduction surgery (LVRS), 397–399, 399f case studies of, 413b–414b donor selection and matching criteria, 399 evaluations, 388–393 candidacy, 388–389 contraindicatios, 389, 390t indications, 389t medical aspects of, 389–393, 391t, 391b physical therapy examinations, 393, 394t United Network of Organ Sharing (UNOS) database, 391–392, 392t, 393b future trends in, 412–414 historical perspectives of, 386–388, 388f medications for, 402–403, 404t immunosuppressive maintenance agents, 402–403, 404t induction agents, 402–403, 404t rejection treatment agents, 402–403, 404t Thoracotomy anterolateral, 365 axillary, 365 lateral, 365 posterolateral, 364–365 Thorax, 1–3, 2f ribs, 2–3, 2f sternum, 1–2, 2f–3f thoracic cage, 1, 2f Three-Minute Walk Test (3MWT), 683–690 Thymoglobulin, See Antithymocyte globulin (Thymoglobulin) TIAs, See Transient ischemic attacks (TIAs) Tidal volume (TV), 23, 43 Timed tests 2-Minute Step Test, 684t–687t, 688 2-Minute Walk Test (2MWT), 683–690 3-Minute Walk Test (3MWT), 683–690 6-Minute Walk Test (6MWT), 372b, 683–690, 684t–687t, 689f 12-Minute Walk Test (12MWT), 279t, 683–690, 684t–687t, 688b, 689f 30-Second Chair Stand Test, 684t–687t Timed Up and Go (TUG) tests, 684t–687t TLC, See Total lung capacity (TLC) TLV, See Total lung volume (TLV) TMR, See Trans-myocardial laser revascularization (TMR) Tomography See also Imaging modalities computed (CT), 277–278 positron emission (PET), 277 TOR inhibitors, See Target-of-rapamycin (TOR) inhibitors Total anomalous pulmonary venous return (TAPVR), 632, 632f Total daily energy expenditure (TDEE), 215, 215t Total lung capacity (TLC), 683 Total lung volume (TLV), 23–24 Totally endoscopic coronary artery bypass (TECAB), 372 Toxicity, cancer treatment-associated, 244t, 253–256, 254t Trachea, 13, 13b Tracheobronchial tree, 13, 13f Transcatheter aortic valve replacement (TAVR), 374b, 374–375, 375f Transcutaneous neuromuscular electrical stimulation (TENS), 616 Transfers, 557b, 560, 563f Transient ischemic attacks (TIAs), 62 Transitional Dyspnea Index, 684t–687t Transitional myocytes, 305 Transmural pressure, 27 See also Pressure Trans-myocardial laser revascularization (TMR), 371–372 Transplantation, heart vs. It is the sign of pericardial inflammation (pericarditis). FIGURE 10-10 Lung ventilation and perfusion scintigraphy. Placing a towel roll vertically down the thoracic spine while the patient is in a supine position can improve anterior chest wall mobility. J Thorac Cardiovasc Surg. FIGURE 10-12 Typical bronchoscopic appearance of the segmental bronchi of each lung. 2008;122(6):763–773. Of note, physical therapists should recognize the importance of monitoring the resting pulse for a full minute when an irregular rhythm is noted. The resultant reduced intrathoracic pressure generated is below atmospheric pressure, forcing air into the lungs to help normalize pressure differences. Some medications must be taken four times a day to be most effective; others may be taken only once, twice, or three times a day. 2002;143:339–342. Because the force is greater, flail chest is often associated with lung contusion.5,28,32 Long-term pulmonary disability following flail chest is common; 60% of these patients have chest wall pain, chest wall deformity, dyspnea on exertion, and mild restrictive pulmonary dysfunction for months to years following the injury.28 FIGURE 5-28 Forces producing disordered chest wall motion in flail chest. Oppenheimer S, Hachinski V. For individuals with hypertension associated with: ■ Heart failure: diuretics, β-blockers, ACE inhibitors, ARBs, and aldosterone antagonists are recommended. Hofstad H, Ohm O.J, Mork S.J, et al. 1984;25(4):287–295. 2008;40(6):2010–2012. ■ Injury to the pericardium can cause acute pericarditis, which may progress to pericardial effusion. For this reason, when appropriate to initiate, early mobility is crucial. The x-ray source is lowered and angled upward, and the patient may or may not be tipped slightly backward. Cardiovascular disease and chronic kidney disease: Insights and updates. Respiratory rates vary by age and condition of the patient (Table 13-3). www.apta.org/PQRS. Then the therapist continues with positioning using these steps: • One person is positioned at the patient's head, another at the shoulders, and the third at the hip level. Some people with chronic obstructive pulmonary disease (COPD) sleep better at night or find they need to use their "reliever " medication less frequently because of this benefit. Epstein A.E, DiMarco J.P, Ellenbogen K.A, et al. Schwartz D.M, Thompson M.G. Do anorectics get well? Terminating the Testing Session The person administering the exercise test must continuously observe the patient and the ECG monitor during the test to decide when the test should be terminated. During forced or labored breathing, additional accessory muscles need to be used to increase the inspiratory maneuver. Report whether the outc ome measure was c ompared to a "gold standard." 3. The ECG can often also be observed at a central monitoring console, where the ECGs of all patients in the ICU can be observed simultaneously. HDL scavenges cholesterol from extrahepatic tissue and transports it back to the liver for processing. An example of a functional educational goal for exercise with a cardiopulmonary patient might be "Patient independently monitors self with exercise by accurately monitoring his RPE." The accuracy of the patient's reported RPE level can be assessed by correlation with the HR taken by the therapist during the peak activity period. As the infant develops, changes in body composition and plasma protein-binding capacity affect the distribution of a drug. An individual is to walk (using assistive devices and/or oxygen if necessary) at his or her normal speed, and the speed is measured after the individual crosses the first meter marker on the floor (1 meter is used for acceleration and 1 meter is used for deceleration), and speed measurement is concluded after the patient crosses the 5-meter marker on the floor. management Goal: If weight risk identified: energy defic it of 500 to 1000 kc al/day with diet and exerc ise to reduc e weight by at least 10% (1 to 2 lb/wk). • Pulmonary: Crackles present in bilateral lower lobes. 13-22 for a picture of ECMO in the internal jugular vein. Proc Nutr Soc. Top, Paradoxical breathing when the diaphragm is strong, but the accessory muscles are absent. 2013;187(5):527– 534. Physiology and pathology of the mucociliary system. Diaphragmatic excursion can also be assessed by percussion. Mohr J.P, Thompson J.L.P, Lazar R.M, et al. They serve to hold the medication that is sprayed by the inhaler. Heart failure due to impaired ejection (systolic impairment) usually presents with a decreased ejection fraction and is abbreviated HFrEF: heart failure with reduced ejection fraction. The therapist should inquire about the patient and caregiver expectations for learning and tailor the education to the learner 's needs and abilities in several domains.95 These domains include the following: ■ Perceptual. 1987;56:615–649. Mehta S, Jay G.D, Woolard R.H, et al. Treatment in the pediatric population is directed at problems that arise from developmental abnormalities, prematurity, infection, immunologic deficiencies, trauma, and diseases associated with childhood. The implantation of an LVAD can aid in restoring adequate CO and help the patient recover from secondary organ dysfunction. Exercise rehabilitation and skeletal muscle benefits in hemodialysis patients. Two summary scores were also developed, including a functional status score and a clinical summary score. The airways outside the mediastinum are not usually visible on a chest radiograph because of their thin walls and air-filled lumens. The literature supports that this is predictive of mortality. 276. The SAQ also shows high reproducibility. Approximately 80 of these drugs adversely affect the lung parenchyma directly, causing drug-induced interstitial lung disease.25 Other drugs affect the ventilatory pump, ventilatory drive, or chest wall compliance.1 Most drug-induced interstitial lung disease is reversible if it is recognized early and the drug is discontinued. In: Opie L.H, ed. The physiologic importance for pulmonary surfactant is also discussed. Buyse B, Demedts M, Meekers J, et al. Thus far, no combination of drugs satisfies this goal. One study reported that lipolymphedema occurs, on average, 17 years after the initial onset of lipedema in patients who do not receive proper treatment for their lipedema.1 Thus it is important that the therapist be able to clearly identify lipedema and lymphedema so as to assist in proper patient education and to develop realistic treatment plans and goals. 14-7 and Table 14-11). Regadenoson requires a simple rapid bolus administration and has a short duration of hyperemic effect, which is advantageous for a pharmacologic test. Quality of life among patients post myocardial infarction at baseline in the Survival and Ventricular Enlargement (SAVE) Trial. The dyspnea measure was again lower, with a p value of 0.73.182 Finally, Molken found that the minimally important difference for the questionnaire to be an improvement or deterioration of 0.5.181 Suggested Usage The importance of establishing a gold standard for cardiopulmonary evaluation and intervention is crucial in identifying problems that may not have been caught by a general health questionnaire. The therapist must be present to score the patient, and the test typically takes about 15 to 20 min to perform. Howell B.A, Tepley C. Controlled trial of two formulations of cromolyn sodium in the treatment of asthmatic patients > or = 12, years of age. New York: Churchstone Livingston/Elsevier; 2010 pp 90–97. Philadelphia: Saunders; 1991. J Palliat Care. Lastly, ankylosing hyperostosis of the cervical spine can cause dysphagia, foreign-body sensation, and aspiration. St. Louis: CV Mosby; 1985:386–389. Mason R.J, Broaddus V.C, Murray J.F, et al. FIGURE 2-3 Ventilatory response during exercise. Jones P.W, Harding G, Wiklund I, Berry P, Tabberer M, Yu R, Nl Leidy. When this occurs, encourage the patient to reproduce this breathing pattern and progressively release pressure on the upper chest with each breathing cycle while continuing to facilitate diaphragm movement with the other arm.30 FIGURE 17-8 Positioning for application of lateral costal breathing and chest wall stretching. 2002;21:1505–1513. Many different preparations of nitrates are available. tPA triggers the transformation of the protein plasminogen into plasmin. What lifestyle changes should this patient make to keep his remaining grafts patent? Relationship between leptin and C-reactive protein with cardiovascular disease in the adult general population. Patients with PPS benefit from supervised muscular training that avoids muscular overuse, as well as recognition of respiratory impairment, use of respiratory muscle training, and early introduction of noninvasive ventilatory aids.286 No specific CV complications are associated with PPS. 1988;12(3):588. Treatment consists of discontinuation of the drug and in some cases the use of corticosteroids.25 Poisons Paraquat Paraquat is used as a weed killer. He denies smoking and reports occasional alcohol use. Add Accessed June 10, 2014. Although it may be more likely that the clinician will have access to a radiologist's report rather than the actual radiograph, many clinical settings offer the therapist direct access to a patient's chest radiographs and with electronic medical records CXRs are now readily accessible in the chart. The Modified Shuttle Test In contrast to the self-paced 2MWT, 3MWT, 6MWT, and 12MWT, Singh and colleagues developed an incremental modified shuttle test that allows for assessment and clinical management of patient performance through evaluation of the patient during incremental and progressive exercise stress. 1999;116(1):65–72. Curr Sports Med Rep. 2001;344:431. As it enters the thorax, it passes behind the left brachiocephalic vein and artery and the arch of the aorta. In UpToDate: . 1989;79(1):1–7. Results of the OASIS (Organization to Assess Strategies for Ischemic Syndromes) Registry. The patient remained on bed rest for 3 days, after which she began ambulating with nursing. Kirklin J.W, Blackstone E.H, Kirklin J.K. Cardiac surgery. Bilateral opacities consistent with pulmonary edema are the defining criteria (Fig. What questions should be asked to help differentiate the type of chest discomfort she is experiencing? Accessed June 26, 2015. Miller M, Mead L.A, Kwiterovich Jr. P.O, Pearson T.A. Dyslipidemias with desirable plasma total cholesterol levels and angiographically demonstrated coronary artery disease. Several groups of drugs with vasodilating properties have been used in acute management of pulmonary hypertension and with critically ill patients. 2002;82(2):128–137. (From Boron WF and Boulpaep: Medical Physiology: A Cellular and Molecular Approach, updated edition, Philadelphia, 2005, Saunders.) ■ Idiopathic congestive cardiomyopathy ■ Hypertrophic cardiomyopathy ■ Mitral valve regurgitation ■ Mitral valve prolapse ■ Aortic regurgitation ■ Aortic stenosis ■ Vegetation on the valves ■ Intracardiac masses ■ Ischemic heart muscle ■ Left ventricular aneurysm ■ Ventricular thrombi ■ Proximal coronary disease ■ Congenital heart disease ■ Interventricular thickness ■ Pericarditis ■ Aortic dissection ■ Patency of internal mammary coronary artery bypass graft (determined with Doppler technique) Problems exist with the image quality of standard echocardiograms due to such confounding factors as pulmonary disease, obesity, and chest deformities. Oxygen Therapy and Other Respiratory Treatment The use of supplemental oxygen should be noted, along with its method of delivery (e.g., nasal cannula, face mask, tracheostomy collar, blow-by ventilator, or mechanical ventilator), as well as the actual breathing performed by the patient with the oxygen in use. Baltimore: APTA; 2003. A second group of antiplatelet agents interferes with the adenosine diphosphate (ADP) activator, decreasing the available energy source for platelet aggregation processes. Bergner M, Bobbitt R, Carter W, et al. Sabate M, Gonzalez I, Ruperez F, et al. Predictors of perceived coping effectiveness in patients awaiting a heart transplant. 1989;64:348– 353. Chierchia S, Brunelli C, Simonetti I, et al. In comparison, the Balke protocol (Fig. FIGURE 1-15 View of heart showing all four chambers and forward blood flow through right and left sides. 5-25 and 5-26). Those that inhibit adrenergic receptors are referred to as sympatholytics or adrenergic antagonists. Przybosewki J.Z, Hoffman H.D, Graff A.S, et al. Anesthesia also depresses the respiratory control centers so that ventilatory response to hypercapnia and hypoxia is decreased.28 Placement of an endotracheal tube increases airway resistance.32 Placing the patient in a supine position reduces the functional residual capacity by 20%.28 During surgery, the shape and configuration of the thorax change. Coagulation Profiles Coagulation profiles have become an important component of the patient's medical record because of the use of thrombolytic agents to dissolve clots in the early stages of MI. In general, testing demonstrates greater sensitivity and specificity in males over the age of 40 than in females. Cardiovasc Surg. 1988;94:103–107. 1988;27:667–670. 1955;12(4):557–566. 2012;18:2382–2390. The tendency was to describe the test results as normal because the patients in Ellestad's study did not demonstrate ischemic ST-segment changes. Franciosa J.A, Park M, Levine T.B. Lack of correlation between exercise capacity and indexes of resting left ventricular performance in heart failure. Although the description of angina may vary from individual to individual, the description remains constant for each individual. Copenhagen, Denmark, August 15– 16, 1992. Dialysis also allows for control of fluid and electrolyte balances. PubMed PMID: 24630690. Normal blood pressure in the aorta and arteries is defined as less than 120 mm Hg. Table 16-13 includes guidelines from the National Heart, Lung, and Blood Institute for normal, prehypertension, and stage I and II hypertension. The MCID can be reported numerically or in percent change. pneumophila accounts for 7% to 15% of all community-acquired pneumonias.32 It is found commonly in patients who are on dialysis; in persons who have a malignancy, a chronic obstructive pulmonary disease (COPD), a smoking history, or are older than 50 years; and in persons who are alcoholics or diabetics. Diabetic cardiovascular autonomic neuropathy. Intervention is discontinued when the goals have been met or the patient can independently perform his or her own airway clearance techniques. Quickly and gently insert the catheter into the tracheal tube without applying suction (Fig. Wenger N, Mattson M, Furberg C. Földi E, Földi M, Clodius L. A chronotropic (increased heart rate response) and possibly an inotropic (force of myocardial contraction) incompetence (resulting in an inability to increase the heart rate or force of myocardial contraction) during exercise in patients with severe coronary artery disease and multisystem disease that may be partially caused by an autonomic nervous system dysfunction Data from Deboeck G, Van Muylem A, Vachiéry JL, Naeije R: Physiological response to the 6-minute walk test in chronic heart failure patients versus healthy control subjects, Eur J Prev Cardiol 21(8):997-1003, 2014. Approximately 350 to 500 mL of air is inhaled or exhaled at rest with each breath and is termed the tidal volume (TV or VT). Copeland J. 1989;35(3):295–303. New York: Marcel Dekker; 1995. 1986;74(6):1290– 1302. USRDS 2009 Annual Data Report: Atlas of End-Stage Renal Disease in the United States. 124. Fascioscapulohumeral dystrophy affects the pelvic girdle and trunk muscles in approximately 20% of patients, and this involvement may be associated with impairment of pulmonary function, which tends to be mild and complicated by an increased incidence of obstructive sleep apneas related to upper airway muscle weakness. Abelmann W.H. Classification and natural history of primary myocardial disease. Boston: Brown, Little; 1985. Overall effects are an increase in cardiac output, reduction in preload, and decrease in afterload. Diabetes group warns vascular complication is underdiagnosed and undertreated. Green C.P, Porter C

Y, Wilson R.F, Segal J.B, Kim M.T, Wang Y. Follow-up of normotensive men with exaggerated blood pressure response to exercise. 205. These procedures have been largely abandoned due to lack of evidence for clinical benefit.204–207 Cardiac Transplantation Cardiac transplantation is the last treatment effort for a patient with CHF and CMD because “potential recipients of cardiac transplants must have end-stage heart disease with severe heart failure and a life expectancy of less than 1 year.”159 Heart transplantation can be heterologous (or xenograft, from a nonhuman primate) or, more commonly, homologous (or allograft, from another human).159 Orthotopic homologous cardiac transplantation is performed by removing the recipient’s heart and leaving the posterior walls of the atria with their venous connections on which the donor ’s atria are sutured. It is the central compartment of the thoracic cavity and contains the heart, the great vessels of the heart, esophagus, trachea, phrenic nerve, cardiac nerve, thoracic duct, thymus, and lymph nodes of the central chest.8,13 A shifting of the structures within the mediastinum (mediastinal shift) is appropriate to consider and examine on the chest radiograph in patients who have air trapped in the pleural space (pneumothorax) or after removal of a lung (pneumonectomy).3 In a tension pneumothorax or pneumonectomy, the mediastinum shift away from the affected or operated side. Most individuals metabolize within a narrow range, but some can be high or low metabolizers, which can affect the therapeutic and toxic responses of drugs, and the doses must be adjusted accordingly either higher or lower. 2006;13:53–62. The hemodynamic instability caused by an underlying pathologic condition often requires quick responsiveness by the medical staff. On the other hand, skeletal involvement may be subtle, and the first symptom of a neuromuscular disorder may be the occurrence of heart failure, conduction disorders or ventricular arrhythmias due to cardiomyopathy.… Early screening with ECG and echocardiogram and eventually, a more detailed cardiovascular evaluation should be performed to diagnose early cardiac involvement in patients with skeletal muscle weakness.”91 Skeletal muscle abnormalities caused by dilated and hypertrophic cardiomyopathies have been reported previously and have consistently revealed type I and type II muscle fiber atrophy.92–99 Patients with CHF and cardiomyopathy have been found to have three distinct skeletal muscle abnormalities: selective atrophy of type II fibers, pronounced nonselective myopathy, and hypotrophy of type I fibers.89 Isometric maximal muscle strength of persons with CHF appears to be reduced to nearly 50% of the value for age-, sex-, and weight-matched control subjects. 2-6. Perloff J.K, Stevenson W.G, Roberts N.K, et al. Reviewing the patient’s symptoms on admission and during hospitalization provides the therapist with an awareness of those symptoms that are to be assessed as cardiac or noncardiac. Though radiogenic cancer is controversial, efforts have been made to reduce radiation exposure through both technology and utilization protocols.10 Low-dose radiation CT can be achieved through manipulating testing parameters, exposing patients to a radiation level similar to a chest radiograph. Go A.S, Chertow G.M, Fan D, et al. Chapter 17, Interventions for Acute Cardiopulmonary Conditions added a greater emphasis on early mobility and Chapter 18, Interventions and Prevention Measures for Individuals with Cardiovascular Disease, or Risk of Disease had major updating and revision, new clinical notes and many new figures and tables. Pressure generated within the abdominal cavity is transmitted to the thoracic cage to assist in emptying the lungs. 14-6). Compared with arteries, veins have larger lumens and, in most peripheral veins, their endothelium have one-way valves; these properties contribute to the ability of veins to hold a greater capacity of blood volume. Collins E, Langbein W, Dilan-Koetje J, et al. When blood flow is not adequate to meet the demand of the peripheral tissues (i.e., during activity), the patient may experience symptoms of ischemia, such as intermittent claudication of a lower extremity. J Consult Psychol. Moskowitz W.B, Mosteller M, Schieken R.M, et al. Kahan A, Allanore Y. ■ Do you retain fluid? Interstitial lung disease induced by drugs and radiation. Montelukast (Singulair) and Zafirlukast (Accolate) inhibit leukotriene B4 (LTB4) from binding to its receptor on target tissues. Flaps of tissue called leaflets or cusps guard the heart valve openings. Readers are encouraged to consult specific texts and positional papers on expired gas analysis for a thorough explanation of the vast array of data acquired in this test. ■ Airway pressure release ventilation (APRV): Involves the application of CPAP with regular release of this pressure at a defined respiratory rate to permit ventilation. ■ The clinical manifestations of anemia depend on the cause of anemia, its extent, the rapidity of onset, and the presence of any other medical problems that compromise the individual’s health. Duncan B.B, Heiss G. 1986;15:595–601. Nimura Y, Kitasaka T, Honma H, et al. Antihistamines are frequently combined with other ingredients, such as α-adrenergic sympathomimetics or α agonists. During a visual inspection of the patient’s legs, what signs of PAD can be expected? Rampello A, Franceschini M, Piepoli M, et al. 9-42). The chest radiograph can show lobar consolidation, usually in the upper lobes, with lung abscesses, cavities, scarring, and fibrosis. Because their energy expenditure is up and their caloric intake is down, they are very often in a continual weight loss cycle, which becomes more severe as the RLD progresses. Sudden death: Lessons from subsets in population studies. Posttransplantation Period MA received a double-lung transplant 2 years and 7 months after being placed on the list. 1997;18:702–708. COPD. Semin Cardiothorac Vasc Anesth. Given a normal PaCO2 value of 40 mm Hg, alveolar hyperventilation is indicated by a PaCO2 that is less than normal, and alveolar hypoventilation is indicated by a greater-than-normal PaCO2. 1993;104:130–135. The survey was designed to assess the severity of limitations in everyday life because of angina, chest pain, and discomfort using a series of 11 questions.84 Time to complete this survey will vary from person to person, but it is expected to only take about 5 minutes per individual. Responses to arm exercise in patients with compensated heart failure. A, A normal expiratory and inspiratory flow-volume loop. Disconnect the patient from the ventilator or oxygen source. Several characteristics of the cough are essential to evaluate, including the effectiveness of the cough (strength, depth, and length of cough). ATS/ERS/JRS/ALAT Committee on Idiopathic Pulmonary Fibrosis, An official ATS/ERS/JRS/ALAT statement: idiopathic pulmonary fibrosis: evidence-based guidelines for diagnosis and management. Increased work is placed on the right ventricle, leading to right ventricular dysfunction or failure. Exercise for intermittent claudication. FIGURE 13-20 The intraaortic balloon counterpulsation device is positioned in the descending aorta just below the orifice of the left subclavian artery. Greater than 2.5 mph workload caused the systolic blood pressure to decrease continually, demonstrating a failure of the heart muscle to meet the demands. In the third stage, the abdominal and intercostal muscles contract, producing positive intrathoracic pressure. ■ Future trends in transplant care include EVLP, xenograft transplantations, cadaver organ transplantations, and advances in pharmacologic management. Psyc hosoc ial Assess: Psyc hologic al distress (depression, anxiety, hostility, etc .); refer patients with c linic ally signific ant distress to appropriate mental management health spec ialists for further evaluation and treatment. Patients with hypertensive heart disease and compensated heart failure may also demonstrate this abnormal response. Phys Ther March. 1981;34:455–462. As the abnormality progresses, the heart begins to fail to function effectively to meet the demands of the system, and heart failure begins. A large R in V1 indicates R ventricular hypertrophy, and a deep S in V1 with a large R in V5 indicates left ventricular hypertrophy. However, exposure to noxious gases often results in surfactant inactivation and chemical pneumonitis.12,64,65 Later in the clinical course, the lungs may develop an OB (see Figure 5-30). Hildner F.J. Pulmonary edema associated with low, left ventricular filling pressures. This occurs mostly by the drugs or metabolites being filtered by glomerular filtration from the blood into the nephron. 2001;56(2):89–94. Chronic fibrosis of the lung does not seem to respond to corticosteroids. In other words, decreased pulmonary compliance requires an increase in pressure just to maintain adequate lung expansion and ventilation. Reexamination begins, implementing the process of performing tests and measures to evaluate the patient’s progress with subsequent modifications to the intervention. Compared with veins, arteries have larger and more developed media due to increased smooth muscle and therefore greater vasoconstriction and vasodilation properties. Cough Techniques and Assists In the acute care setting, patients generally initiate a cough one of two ways: voluntarily or reflexively. Reliability and Validity The SPPB has been shown to be very reliable and valid.170–173 Most of these studies examined older community-dwelling adults, but there have been a wide range of clinical and functional presentations within those subject populations. Lunetta M, Barbagallo A, Attardo T, et al. 1997;7(6):566–571. Quality-of-life issues are often related to when the expected level of function is severely compromised.21 Systemic Lupus Erythematosus Systemic lupus erythematosus (SLE) is a chronic inflammatory connective tissue disorder.2,35,53 Etiology The etiology is unknown, although the immune system seems to be involved.2,23 Ninety percent of cases occur in women, and SLE is more common in black women.9 It usually occurs between the ages of 15 and 45, most frequently in the second and third decades of life.8 It is interesting that certain drugs (procainamide hydrochloride, phenytoin, hydralazine hydrochloride, penicillamine, isoniazid) can evoke a clinical syndrome indistinguishable from spontaneous SLE.25 Pathophysiology This disorder involves the autoimmune system and is characterized by a variety of antigen–antibody reactions.2 Systemic lupus erythematosus can involve the skin, joints, kidneys, lung, nervous tissue, and heart. Oncology (Williston Park). Table 12–14 Recognizing rejection: signs, symptoms, and histologic grading References: Stewart S, Fishbein MC, et al: Revision of the 1996 working formulation for the standardization of nomenclature in the diagnosis of lung rejection, J Heart Lung Transplant 26(12):1229–1242, 2007. Physical activity and survival after breast cancer diagnosis. Also, the pattern of breathing should be noted: paradoxical breathing occurs because of an impairment of the respiratory center ’s control over breathing (often found in chronic respiratory disease or neurologic insult). Crasto W, Jarvis J, Khunti K, et al. Vascular diseases are categorized as arterial vascular or venous vascular disease. Estep J.D, Cordero-Reyes A.M, Bhimaraj A, et al. no medications), and that this effect on cardiovascular mortality is especially significant in secondary prevention in the elderly with known cardiovascular disease.70,71 Results from additional randomization in the Heart Protection Study revealed no cardiovascular benefit from vitamins E or C or βcarotene in the elderly. 13-24 can be used as a helpful guide to decision making regarding the use of supplemental oxygen BO X 13- 2 Ina ccura cie s in pulse ox im e t ry re a dings Inaccuracies in the pulse oximetry readings may be seen in: • Low perfusion states, such as low cardiac output, vasoconstriction, and hypothermia; may impair peripheral perfusion and may make it difficult for a sensor to distinguish a true signal from background noise • Anemia • Abnormal Hb • Jaundice • Arrhythmias, including atrial fibrillation • Intravascular dyes such as methylene blue • Dark nail polish • Fluorescent light • Motion artifact • Dark skin pigmentation Data from Jubran A: Pulse oximetry, Crit Care 3(2):R11-R17, 1999; and Frownfelter D: Arterial blood gases. Repeat Steps 6 through 9 until the airway is cleared of secretions, the patient is too fatigued to continue, or intolerance develops. 1976;54:64. Other side effects include agitation, sweating, headache, and nausea. The mechanisms of bronchospasm are most clearly demonstrated when asthma is used as a model. Endocrinol Metab Clin North Am. 2008;37:559– 579. 1990;284:1541–1545. One-half of the deaths were due to pulmonary hemorrhage and the other half to renal failure.9,32,33 Currently, however, it has been recognized that there can be milder forms of the disease and that the disease’s responsiveness to treatment can be variable. Clin Pulm Med. The greatest disadvantage of the stationary bicycle, however, is that bicycling is not a daily functional activity for most persons. Sudden cardiac death in hypertrophic cardiomyopathy. Stemmer R.A. Ein klinisches Zeichen zur Fruh—und Differential—diagnose des Lymphödems. Available at (Accessed October 21, 2015.) 287. Villareal D.T, Chode S, Parimi N, et al. However, absence of these effects does not imply a lack of efficacy of the adenosine with respect to coronary vasodilation. Dunhill M.S. Pulmonary Pathology. Simply stated, activation and inactivation “gates” exist that control the flow of sodium, calcium, potassium, and chloride ions depending on stimulation. In addition, some patients may exhibit allergic reactions similar to those of the penicillins. If an individual has a pacemaker, artificial joint, stent, surgical clips, heart valve, or any other metallic device, he or she might not be a candidate for an MRA. New York: Marcel Dekker; 1990. • Patients are on strict bed rest but they can usually participate in therapeutic activities with an IABP catheter in place. 5-30).54 Clinical Manifestation The clinical manifestation of pneumo- or hemothorax can be found in Table 5-37. Systolic hypertension can be treated effectively with arterial dilators. They are most abundant in the peripheral vascular smooth muscles. Administered intravenously, its use serves to prevent a rise in partial pressure of arterial carbon dioxide (PaCO2) with oxygen therapy in acute ventilatory failure.60 It is also used to prevent respiratory depression in high-risk postoperative patients.61,62 Some drugs (e.g., sedatives, tranquilizers, narcotic analgesics) are, to varying degrees, respiratory depressants. Generally, with increased work, the cardiac output increases and the peripheral vascular resistance decreases as a result of (1) the hypothalamic response to increased body temperature and (2) the local effects of hydrogen ions, heat, decreased availability of oxygen, and increased carbon dioxide production on the arterioles. Chronic alcohol consumption is associated with numerous pulmonary and CV complications, some of which cause serious dysfunction and death; alcoholic cardiomyopathy (or alcoholic heart muscle disease) is the leading cause of dilated cardiomyopathy in the Western world. Additional evidence suggests that patients with pulmonary fibrosis undergoing lung transplantation have favorable long-term survival compared with other disease indications.18 However, this surgical therapeutic intervention is not without risks (see Chapter 12), including restrictive lung dysfunction, namely, bronchiolitis obliterans. 1992;145:1321–1327. 240. ■ Metabolic syndrome refers to a cluster of interrelated risk factors, including abdominal obesity, atherogenic dyslipidemia, HTN, insulin resistance, and impaired glucose tolerance, that is associated with increased risk of CVD events and death, type 2 DM, and chronic kidney disease. It is present at birth, but rapidly progresses during the years of bone growth in the early teenage years. Treatment should focus on resistance exercise training at least 2 days/wk beginning with 50% of 1 repetition of maximum performance for 10 to 15 repetitions. Curr Opin Hematol. It is not unusual for these patients to have lost three or four times their body weight over their lifetime, only to regain the lost weight and more. As the rib cage changes shape, the diaphragm begins to flatten, there is a loss of sarcomeres, and there is a change in the length–tension relationship of the muscle. Leukocytic (e.g., neutrophils, monocytes, eosinophils, lymphocytes, and basophils) exudation 4. Beginning with intermittent bouts of functional exercises lasting 3 to 5 minutes is recommended. When selecting an outcome measure, it is important to know that it consistently measures change, regardless of the individual using the tool or the patient being measured. Chest. Hagberg J.M, Brown M.D. Does exercise training play a role in the treatment of essential hypertension? Increasing frequency of arrhythmias or more serious (life-threatening) arrhythmias developing with activity also require further evaluation by the physician.49 Patients with abnormal Holter monitor results may be referred for treadmill exercise testing to assess arrhythmias during an assessment of increased work on the heart or may be referred for echocardiography to assess valve functioning. The vertebral aspect contacts the respective sides of the thoracic vertebrae and their intervertebral disks, the posterior intercostal vessels, and nerves. The examiner should not say “ready, set, go!” In addition, it is important that the examiner use limited and neutral encouragement once a minute (giving the patient an update on the time that has passed), in addition to not walking with the patient during the exam. Frequent complications that occur as an outpatient include the following: chronic rejection (30% to 50% at 5 years), cytomegalovirus (CMV) infection, renal dysfunction (25.5% at 1 year, 37.8% at 5 years), hypertension (50% to 60% at 1 year, 85.6% at 5 years) neuromuscular dysfunction (5% in first 6 weeks), steroid myopathy, pleural effusion (85% in 1 year), type 2 diabetes (24.3% at 1 year, 33.5% at 5 years), osteoporosis (18% to 35% fracture rate reported in patients after heart transplantation within 1 year),152 hyperlipidemia (20.5% at 1 year and 52.2% at 5 years), anemia, malignancy (3.7% in 1 year, 12.4% in 5 years, and 25% in 10 years), and gastrointestinal complications (43%).28,30,43,136,142 In heart transplant recipients, chronic rejection, also known as transplant allograft vasculopathy, develops as a form of coronary atherosclerosis.43,142,152 This form of coronary atherosclerosis is different from atherosclerosis in a native heart, as transplant allograft vasculopathy is defined angiographically to be a diameter stenosis greater than 50%. The pathogenesis and prevention of atherosclerosis. Int J Chron Obstruct Pulmon Dis. Kurella M, Lo J.C, Chertow G.M. Metabolic syndrome and the risk for chronic kidney disease among nondiabetic adults. Khaw K.T, Barrett-Connor E. 16-1): ■ Examination: A comprehensive patient screening of history and a systems review, as well as specific tests and measures to collect data on the patient. As consistent with the World Health Organization definition of health, physical therapists attempt to achieve for their patients not only the “absence of infirmity and disease, but also a state of physical, mental and social well-being.”1 Thus in addressing the health of their patient, physical therapists consider not only physiologic and biologic wellness, but also acknowledge the importance the variables of functional status and quality of life. On conclusion of the examination, the therapist should be able to interpret the evaluative findings appropriately to make a decision regarding therapeutic interventions. Table 22-9 Benefits of generic and disease-specific instruments Generic quality-of-life instruments Apply to heterogeneous population Allow c ross-population c omparisons (c ompare with other c hronic diseases) Address multiple issues related to limitations in health status (e.g., c omorbidities, age) Disease-specific quality-of-life instruments Responsive to a spec ific population with same disease or c ondition Foc us on problematic areas for a given population Address issues related to c linic al manifestations of a disorder The Seattle Angina Questionnaire Background and Administration The SAQ is designed to specifically assess the impact of chest pain or angina within the previous 4 weeks on a patient’s quality of life. 316. According to the most recent statement on outcomes measures for cardiac rehabilitation programs, the AACVPR recommends use of an outcomes matrix as a conceptual framework for assessing patient and program outcomes that address the behavioral, clinical, and health domains.34 According to the matrix suggested by AACVPR, clinical factors, such as risk factor profile, symptoms, hemodynamic status, functional capacity, exercise response (heart rate, blood pressure, RPE, O2 saturation), lipid levels, blood pressure, glycosylated hemoglobin (Hb A1c) or diabetes management, weight/body mass index (BMI), physical activity, nutrition, psychosocial management, and smoking cessation, should all be considered when measuring patient outcomes (Tables 22-2 and 22-3).33 These outcomes can all be addressed if measures selected encompass a measurement of biologic/physiologic variables, functional variables, and HRQL variables. 1997;131:229–236. Cardiac rehabilitation issues for heart transplantation patients. DOI 11/19/2013. Jpn Circ J. (From Armstrong P, Wilson AG, Dee P, et al: Imaging of diseases of the chest, ed 3, St. Louis, 2000, Mosby.) Pulmonary Emboli Pulmonary emboli are a complication of venous thrombosis in which blood clots or thrombi travel from a systemic vein through the right side of the heart and into the pulmonary circulation, where they lodge in branches of the pulmonary artery (Fig. This type of pneumonia usually has a subacute course of fever, dyspnea, cough, chest pain, malaise, fatigue, weight loss, and night sweats, but the symptoms can progress to include tachypnea, reduced PaO2, and cyanosis.10 Treatment is with trimethoprimsulfamethoxazole. Recommend physical therapy for monitored therapeutic exercise progression, functional mobility training, ambulation, and patient education. 1992;85(1 Suppl):I57–I63. obesity, 668–669, 669b staging of, 668–669, 669f surgical interventions for, 669–670 treatments for, 669–670 lymphedema, 650–673 breast cancer and, 658 cellulitis and, 659–660, 669t combined physical therapy, 663 complete decongestive therapy (CDT), 663–668, 665t, 666f conservative therapies, 662–663 debulking, 661 development of, 656 diagnosis of, 658–659 excess weight and, 656 exercise and, 667–668, 667b–668b external compression, 664–667 garment selection for, 667b imaging methods for, 658, 661b intermittent pneumatic compression, 662 lymphatic filariasis, 658 lymphedema praecox, 658 manual lymph drainage (MLD), 663 medical management of, 657–668, 657b medications for, 660 meticulous skin care, 668 Milroy disease, 658 pathophysiology of, 655–656 prevention and risk reduction, 658, 659b primary, 658 risk factors, 656 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Maximal insufflation-exsufflation (MI-E) Milrinone, 107 Minimally-invasive direct coronary artery bypass (MIDCAB), 371 Minimally-invasive endovascular repair (EVAR), 378, 379f Minnesota Living with Heart Failure Questionnaire (LHFQ), 103t, 684t–687t Minnesota Multiphasic Personality Inventory (MMPI), 684t–687t Minnesota Outcomes Institute Angina Type Specification (MOS-Angina), 684t–687t Mitomycin (Mutamycin), 244t, 253–256, 254t Mitoxantrone (Novantrone), 244t, 253–256, 254t Mitral valve dysfunction, 536 Mixed connective tissue disease (mixed CTD), 246 See also Connective tissue diseases (CTDs) MMPI, See Minnesota Multiphasic Personality Inventory (MMPI) Mobility functional training, 559–560 ambulation, 560–561, 561f bed mobility, 559–560 timing of, 559 transfers, 557b, 560, 563f Mobility Forms, 6-Clicks, 684t–687t, 691 Mobilization techniques, thoracic, 552 Modified Shuttle Test, 684t–687t, 689–690, 689b, 690f Monitoring measures and equipment, 419–444 clinical tips for, 419b–420b, 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In addition, elevated levels of hs-CRP in the blood seem to predict prognosis and recurrent events in patients with stroke or peripheral arterial disease. Induction of PDGF-responsive genes in vascular smooth muscle. b DHD Healthcare, Wampsville, NY. Wilkins R.L, Stoller J.K, Kacmarek R.M. Review of Cardiopulmonary Disease. Hemoglobin plays a major role in the transport of oxygen throughout the body, and the hematocrit (the amount of the blood that is cells) is a significant indicator of the viscosity of the blood. 21. With our increased understanding of mechanisms leading to various pulmonary diseases, more effective medical and physical therapy interventions are available to improve the quality of life for affected individuals. Through this type of assessment, progress or deterioration can be documented and appropriate therapy implemented. 16-11), and they attach to the vertebrae at approximately 45-degree angles. Leff A.R. Endogenous regulation of bronchomotor tone. However, often, a prescription will read “Titrate O2 to maintain SpO2 >90%,” in which case the physical therapist could adjust the O2 according to the patient’s need. A reexamination is the formal process of selecting tests and measures to evaluate progress and modify or redirect the interventions. 1985;71(1):57–62. Effect of captopril on progressive ventricular dilatation after anterior myocardial infarction. Dizziness Dizziness can have several origins, including the vestibular system, vision, medications, blood pressure, and cardiac output. MI-E often eliminates the need for deep airway suctioning. By contrast, cachectic patients may also demonstrate a decreased exercise tolerance and an increased work of breathing with exercise because of weakness from muscle wasting. 1972;45(3):583– 591. The predictive value of the six-minute walk test and lung transplant survival. Studenski S, Perera S, Wallace D, et al. Heart failure is a chronic disease with systemic effects requiring dynamic, ongoing reevaluation and aggressive pharmacologic intervention as determined by the amount of hemodynamic compromise. 312. Each of the lobar bronchi gives off two or more segmental bronchi; an understanding of their anatomy is essential to the appropriate assessment and treatment of pulmonary disorders (Fig. However, RRT fails to adequately provide the regulatory and endocrine functions normally afforded by the kidneys and is associated with renal osteodystrophy, anemia, vascular access infections and thromboses, pericarditis, and ascites. 1997;17(4):261–267. Musculoskeletal Causes Diaphragmatic Paralysis or Paresis Diaphragmatic paralysis or paresis is the loss or impairment of motor function of the diaphragm because of a lesion in the neurologic or muscular system. I would also like to acknowledge and thank Angela Campbell and Meryl Cohen, who kept pressing me to get this edition going and make it interactive, as it was their comments that pushed me to finally initiate the fourth edition. Hepatomegaly 9. Lymphology. Troponins I (cTnI) and T (cTnT) are cardiac tissue specific, but troponin C (cTnC) is not.8 Injured cardiac muscle releases troponin into the bloodstream. Haudenschild C.C. Pathogenesis of atherosclerosis: State of the art. The sudden acceleration of blood below the cuff produces vibrations that are audible through a stethoscope. 2007;11:163–178. Reversibility of tachycardia-induced cardiomyopathy after cure of incessant supraventricular tachycardia. Because most primary prevention programs are not reimbursed from medical insurance, individual fee-for-service or monthly payment plans may motivate participation. Congestive heart failure from left ventricular diastolic dysfunction in systemic hypertension. (From Frownfelter D, Dean E: Cardiovascular and Pulmonary Physical Therapy: Evidence and Practice, ed 4. Arterioles empty into capillary beds. 1987;153:1–16. The American Heart Association frequently summarizes and publishes updates of best evidence recommendations resulting from comprehensive analysis of these studies, and the interested reader is encouraged to review these updates.43,46,47 Diuretics Alterations in intravascular blood volume have a significant effect on blood pressure. Atrial natriuretic peptides predict mortality in the elderly. Endocardium The innermost layer of the heart is termed the endocardium. Langsjoen P.H, Folkers K. Eur J Epidemiol 13(5):491–502, 1997. Level I cardiac rehabilitation exercise HR guidelines are 20 to 30 bpm above the resting HR, unless the patient is taking βadrenergic blocking medications.78 With these medications, HRs do not increase as expected during exercise. Inspiratory muscle training, which is a strengthening exercise, would increase the demand for oxygen delivery in the diseased lungs. (From Urden L, Stacy K, Lough M: Priorities in Critical Care Nursing, ed 6, Mosby, St. Louis, 2011.) The basic components of an LVAD include a prosthetic left ventricle, an inflow cannula, an outflow cannula, and an external source of power. Once a patient has developed the disease, the tetanus antitoxin can be used to neutralize non-fixed toxin in the system. Generally, stimulation of the vagus nerve results in bronchial constriction, dilation of pulmonary arterial smooth muscle, and increased glandular secretion.17 Stimulation of the sympathetic nerves causes bronchial relaxation, constriction of pulmonary arterial smooth muscle, and decreased glandular secretion.17 Bronchodilators enhance sympathetic stimulation to the lungs to cause relaxation of bronchial smooth muscle cells and reduce secretions. McParland C, Krishnan B, Wang E, et al. Treatment modalities of obesity. Data from NCEP Expert Panel. It increases the risk of developing pulmonary tuberculosis, chronic bronchitis, aspiration pneumonitis, lung abscess, and the pulmonary complications of alcoholic cirrhosis and alcoholic cardiomyopathy.308 Acute respiratory distress syndrome (ARDS) also occurs more frequently in patients with a history of alcohol abuse. Usually, no treatment is indicated because the deformity is only cosmetic, with no functional deficits.2,32,35 Table 5-28 Clinical manifestation of ankylosing spondylitis FRC, functional residual capacity; IC, inspiratory capacity; RV, residual volume; VC, vital capacity. Skorecki K.L, Brenner B.M. Body fluid homeostasis in congestive heart failure and cirrhosis with ascites. Ann Behav Med. 1996;11:92–108. ■ Determine whether the results are indicative of obstructive or restrictive disease. J Pharmacol Exp Ther. The monitor may be slung around the neck or buckled around the waist. Vichinsky E.P, Neumayr L.D, Earles A.N, et al. B, Anterior view; mediastinal drains. Lipoprotein and oxygen transport alterations in passive smoking preadolescent children. Abratt R.P, Morgan G.W, Silvestr G, et al. Treatment is to discontinue the drug. Casper R.C. The pathophysiology of anorexia nervosa and bulimia nervosa. Rosenson R.S, Kang D.S. Overview of homocysteine UpToDate. However, the pulmonary arteries and veins can frequently be seen as they branch and taper outward toward the periphery until they disappear in the outer third of the lung fields. Cavitation is frequent. The purpose of the Rehabilitation Measures Database is to facilitate identification of reliable and valid outcomes measure instruments that can be used to assess patient outcomes during all phases of rehabilitation. Insulin resistance: Central and peripheral mechanisms The 2007 Stock Conference Report. Hyperreactivity to the constrictor effects of acetylcholine and the dilator effects of nitroglycerin. It does not appear to affect already converted lymphoblasts. 92. 13-17 shows a typical chest tube drainage and collection system. 2014;12:CD001484. Elevated troponin levels have also been found to be prognostic in the ACS patient. This combination drug is called Entresto and has demonstrated an ability to reduce cardiovascular death and hospitalization in patients with heart failure. Crit Care Nurse. This time frame lasts up to 6 weeks and is very similar to phase II cardiac rehabilitation.136,145 Research promotes the use of formal supervised exercise programs versus the patient utilizing only a home exercise program to improve exercise and functional capacity and quality of life.149,150 Discharge from the supervised exercise program should occur when the patient’s functional capacity has improved to allow him or her to return to normal activities, such as work or school. History and physical examination are important, as SLE can mimic many other diseases and symptoms are often vague. In: Gibson G.J, Geddes D.M, Costabel U, et al., eds. Daughton D, Fix A, Kass I, et al. Although some drugs are receptor selective, most act on multiple receptor sites. (Data from Lin SJ1, McElfresh J, Hall B, et al: Inspiratory muscle training in patients with heart failure: a systematic review. However, this may lead to decreased expansion on the respective side and prevent full alveolar ventilation. Foulsmelling breath may indicate an anaerobic infection of the mouth or respiratory tract, whereas an acetone breath may indicate diabetic ketoacidosis. Chemotherapy is often complicated by pulmonary toxicity, as indicated in Table 720.322–327 Despite a variety of mechanisms by which chemotherapeutic agents can injure the lungs, the clinical presentations are often similar, with dyspnea, nonproductive cough, and frequently fever, which develop weeks to years after treatment. These β2-specific agents produce bronchiolar dilation by relaxing the bronchial smooth muscle through facilitation of increased cAMP levels. Philadelphia: FA Davis; 1995. 2004;53:1044–1047. The normal range for the BUN is 8 to 23 mg/dL; an elevated BUN can be an indication of heart failure or renal failure. Study Questions What type of pain is most likely in her case? Biochim Biophys Acta. Another major change in the course of care is the length of the hospital stay after transplantation. Once produced, NO diffuses to the vascular smooth muscle cells where it activates the enzyme guanylate cyclase, which synthesizes more cGMP and causes vascular smooth muscle relaxation. ed 21. Jet nebulizers are connected by tubing to a compressed air source that causes oxygen to blast at high velocity through a liquid medicine to turn it into an aerosol, which is then inhaled by the patient over the course of 10 minutes. The functional basis of pulmonary sounds. See Table 16-17 for a summary of abnormal responses to activity. Surgical Interventions, Monitoring, and Support 11. Third Joint Task Force of European and Other Societies on Cardiovascular Disease Prevention in Clinical Practice. Postmenopausal estrogen and progestin use and the risk of cardiovascular disease. Loss of surface area has been identified as the primary factor. When this baseline blood pressure level is pathologically elevated, another of the remaining three anatomic sites of blood pressure regulation warrants blocking. Aminoglycosides, carbenicillin, and aztreonam are used to overcome this bacterium.42 Staphylococcus aureus S. 1996;201:90– 103. Braith R.W, Magyari P.M, Fulton M.N, Aranda J, Walker T, Hill J.A. 2003 Resistance exercise training and alendronate reverse glucocorticoid-induced osteoporosis in heart transplant recipients. In the case of physical dependence, the drug should never be discontinued suddenly because this can lead to a withdrawal syndrome that can range from unpleasant to outright dangerous. Bones and Soft Tissues The size, shape, and symmetry of the bony thorax should be considered; the vertebral bodies should be faintly visible through the mediastinal shadow, and all of the other bones of the thorax should be included on the radiograph. The pulmonary artery catheter permits: ■ Direct measurement of RAP ■ Direct measurement of pulmonary arterial pressure (PAP) and pulmonary capillary wedge pressure (PCWP) ■ Indirect measurement of left atrial pressure (LAP) ■ Determination of mixed venous oxygen saturation (SvO2) and cardiac output (CO) ■ Calculation of systemic and pulmonary vascular resistance (PVR) ■ Pacing of the atrium and ventricles There are two ports in the catheter toward its tip that are placed distal and proximal to a small balloon, which can be inflated with air. Morphologic aspects of muscle breakdown and lysosomal activation. Second, some patients seem to have a genetic predisposition to react adversely to certain drugs, but this is not well understood. However, oxygen therapy is usually beneficial when concomitant hypoxemia exists.57 Pulmonary edema, often a finding with CHF, can hinder oxygen diffusion in the lung, thereby decreasing arterial oxygen content. Neaton J.D, Wentworth D. 13-18). 1996;76:448–455. Seated Step and Chair Rise Tests Although most of our patients will be ambulatory, some may not be able to tolerate the demands of a GXT; 2, 6, or 12MWT; or other tests of aerobic capacity. (From Kacmarek R, Stoller J, Heuer A: Egan’s Fundamentals of Respiratory Care, ed 10, St. Louis, 2013, Mosby.) Clinical Manifestation Chest radiograph may show opacification of the atelectatic segment or lobe, or with significant lung collapse, the radiograph will show elevation of the hemidiaphragm on the affected side, shift of the mediastinum toward the affected side, and a decrease in size of the rib interspaces over the affected hemithorax. 1997;241(4):269–275. Ventilation and Perfusion Scans Several different tests can be used to measure the gas distribution in the lungs. Spielberger C, Gonsuch R, Luschene R. Infants born with a gestational age less than 36 weeks often exhibit respiratory distress and may develop the full complement of signs and symptoms associated with RDS.9 Etiology Insufficient maturation of the lungs is the cause of RDS, and it is usually linked directly to the gestational age of the fetus at birth. 286. gram-positive or gram-negative bacteria). Cheng Y.J, Gregg E.W, Narayan K.M.V, et al. Phys Ther Pract. A distending force is needed to overcome the inward recoil forces of the lung. Clinical tip Injured myocardial cells cannot be replaced, as the myocardium is unable to undergo mitotic activity. ACC/AHA 2005 practice guidelines for the management of patients with peripheral arterial disease (l

B.L, Howard E, et al. 300. The pharynx consists of three parts: the nasopharynx, the oropharynx, and the laryngopharynx. Anaesth Intensive Care. Stratford P.W, Gill C, Westaway M, Binkley J. Static measurements assess the lung volumes and capacities (e.g., tidal volume, vital capacity, inspiratory reserve volume) and determine mechanical abnormalities, whereas dynamic measurements provide data on the flow rates of air moving in and out of the lungs. Taraboanta C, Wu E, Lear S, et al. Respiratory Disorders: Nurse's Clinical Library. Venoocclusion can cause MI. Inadequate oxygen supply either at rest or during muscular activity increases the frequency of breathing (respiratory rate) or the amount of air exchanged (tidal volume) or both.117 For this reason, subjects with CHF characteristically complain of easily provoked dyspnea or, in severe cases of CHF, dyspnea at rest. The therapist should be mindful of proper body mechanics during this stage of functional mobility. ed 13. Crackles occurring in the early half of inspiration often result from the popping open of more proximal airways.21 The closure of proximal airways may result from the weakening of bronchial and bronchiolar support structures as occurs in the latter stages of chronic obstructive pathologic diseases such as bronchitis or emphysema. J Cardiovasc Surg (Torino). The actual measurement of the ABI involves a comparison of an average of the systolic blood pressure of the lower extremity with an average of the systolic blood pressure of the upper extremity (see Fig. Therefore increases in cardiac output may depend on drug-induced increases in heart rate. Reliability, validity and responsiveness of a two-minute walk test to assess exercise capacity of COPD patients. In: Wenger N.K, ed. Indications for a reexamination include a failure of the patient to respond the interventions or when new clinical findings or problems develop. 2008;52(8):587–598. 1991;21:29–45. Table 4-13 Boston and NHANES-1 clinical scoring systems for heart failure Diagnosis of heart failure Boston criteria: Definite (8–12 points); Possible (5–7 points); Unlikely (≤4 points). However, if the response is unsuccessful, antihypertensive drug therapy is indicated.78 Normal blood pressure values in children are calculated according to age and gender, and are standardized to height percentiles. Patient examination, which leads to the physical therapist's evaluation, is covered in Chapter 16. The patient experienced no angina and demonstrated no ECG changes consistent with myocardial ischemia. The date of the primary event or diagnosis is often documented in the physician's history and physical examination report; however, reviewing the physician's progress notes or orders may discover the date of the secondary diagnosis or subsequent events. 249. 2004;27:2518–2539. Lavage, or instillation of sterile saline solution to the airway, can be used in an attempt to stimulate a reflexive cough. In the future, reimbursement for physical therapy practice will be dependent on therapist knowledge of the objective measures available and their consistent use in physical therapy practice across a variety of settings. ■ Idiopathic pulmonary fibrosis is the pulmonary disease entity most commonly associated with RLD. UpTo for-the-diagnosis-of-acute-myocardial-infarction? The chest radiograph shows a diffuse bronchopneumonia, with bilateral infiltrates, cavitary lung abscesses, pneumatoceles, and pleural effusions. Long-term ambient air pollution and respiratory symptoms in adults (SAPALDIA study). Stemmer sign is positive in the right hand (negative in the left hand), with nonpitting edema present throughout the right upper extremity, most noticeable in the hand dorsum, wrist, and forearm. Drug interactions occur with other antihypertensive medications that enhance their hypotensive effects. Philadelphia: Saunders; 2004:708–716. Sports Med. The normal range of the ICP is 0 to 10 mm Hg for adults and 0 to 5 mm Hg for patients younger than 6 years of age. As a result, PTS symptoms may develop, including chronic, aching pain; edema; limb heaviness; and leg ulcers.304 In summary, anticoagulation, ambulation, and even mechanical compression have been shown to decrease the incidence of progression of DVT, as well as development of PTS. During exercise, a twofold increase in minute ventilation is noted—an initial abrupt increase in ventilation followed by a secondary gradual increase in ventilation (Fig. Clarke M.J, Hopewell S, Juszczak E, et al. vol. (3) Adhesive atelectasis may occur when there is a surfactant deficiency. Health-related quality of life measures outcomes from the patient's point of view and provides insight into the patient's perception of how his or her illness impacts on ADLS. The preparalytic stage is characterized by fever, headache, malaise, and symptoms in the gastrointestinal (GI) and upper respiratory tracts. ■ Are you losing or gaining weight? They are procainamide hydrochloride, hydralazine hydrochloride, practolol, penicillamine, isoniazid, and hydantoins. The results of this therapeutic intervention are immediate reduction in oxygen requirements, a major decrease in pulmonary complications such as pneumothoraces or pulmonary interstitial emphysema, and rapid weaning from mechanical ventilation, often within 12 to 24 hours.10 FIGURE 5-4 Radiopaque appearance of severe respiratory distress syndrome. Although the tests and procedures described in this chapter may not necessarily be performed by physical therapists, they nonetheless provide physical therapists with invaluable information. The work done by the diaphragm is up to nine times normal in lower cervical and high thoracic injuries, which is due in large part to the work required to displace the abdominal viscera, and dyspnea on exertion is common.239,242 The major problems with weakness of the expiratory muscles (internal intercostals and abdominals) are poor cough and impaired clearance of airway secretions. Connor S, Gustafson J, Sexton G, et al. In: Chernow B, ed. The procedure begins when the patient begins to swallow the specialized probe. ■ Lymph nodes are concentrated in the neck, axilla, chest, abdomen, and groin and drain specific lymph regions called lymphotomes. Hainer V, Toplak H, Mitrakou A. The ex vivo approach is also being trialed in donated hearts as an alternative to cold static storage. Jandl J.H. Blood: Textbook of Hematology. Rales (crackles) 11. Gauthier A.P, Yan S, Sliwinski P, et al. Weiner P, Azgad Y, Ganam R, et al. Long-term digitalis therapy improves left ventricular function in heart failure. For most patients, ambulation may be the most effective and functional mode of exercise to administer and prescribe, beginning with frequent short walks and progressing to less frequent, longer bouts of exercise. 1981;13:137–141. The National Heart, Blood, and Lung Institute also has a tool to assess a person's 10-year risk of having a heart attack ( ). Systematic review: Cardiac resynchronization in patients with symptomatic heart failure. Consequently, therapists should be familiar with the manner in which chest radiographs are assessed. 1966;2:553–559. For example, an attempt to increase the activity level of a patient with a history of rheumatoid arthritis may be limited by an orthopedic (joint) dysfunction rather than by a cardiovascular or pulmonary condition. 2006;31:1127– 1130. If albumin levels are elevated in the CSF with 10 or fewer mononuclear leukocytes, Guillain–Barré is suspected. Gallagher E.J, LeRoith D, Karnieli E. 2006;130:119–125. Gesell R, Atkinson A.K, Brown R.C. The gradation of the intensity of inspiratory contractions. Nicholas P, Hefford C, Tumilty S. In patients with left axillary/subclavian artery insertion, it is safe, feasible, and beneficial to perform functional activities, including mobility, as long as hemodynamic parameters are monitored when: • Mobilizing the patient in bed • Sitting at the edge of the bed • Ambulating as tolerated when appropriate 54,55 Other percutaneous ventricular assist devices include the Impella and the Tandem Heart. Because antiarrhythmic agents act as cardiodepressants and often have proarrhythmic effects, they are not usually indicated in individuals with CHF.23 Renal Insufficiency Acute or chronic renal insufficiency tends to produce a fluid overload, which frequently progresses to CMD and CHF that can often be reversed if it is the only underlying pathophysiologic process. ■ The majority of the risk factors for CAD are modifiable. Lloyd-Jones D, Adams R, Carnethon M, et al. Although Chapter 16 provides cardiopulmonary assessment in detail and Chapter 18 provides detailed interventions, a brief overview of assessment and interventions for individuals with CHF is provided here. Nitroglycerin is perhaps the most widely used sublingual medication for cardiovascular conditions. The pulmonary impairment is restrictive, in that the volumes are decreased even though the lung compliance may be normal. Second-generation cephalosporins are similar in effectiveness against gram-positive cocci and are generally thought to be more effective against gram-negative bacteria. 1991;10(3):482–487. Magnetic resonance imaging is used to rule out other causes of neurologic symptoms.54 Clinical Manifestation The clinical manifestation of SLE can be found in Table 5-30. 2007;32:567–575. Light R.W, George R.B. Serial pulmonary function in patients with acute heart failure. The patient is instructed to breathe out when leaning forward to stand and then to inhale when extending into the standing position. AACN Clin Issues Crit Care Nurs. Scand J Rehab Med. 1995;107:967–972. Such monitoring is especially needed when working with patients who have undergone amputation, which implies severe disease. Philadelphia: Saunders; 2009. Hemochromatosis Hemochromatosis is a common inherited disorder of iron metabolism that leads to iron deposition in various organs, including the liver, heart, pancreas, joints, skin, and endocrine organs. Angiotensin-receptor blockers that inhibit the action of angiotensin II at the vasoconstrictor receptor are an alternative drug for those who are not able to tolerate ACE inhibitors. In this chapter, the examination procedures used to provide information regarding specific cardiopulmonary-system diseases are described. Simple, open-ended questions using language easily understood by the patient and family should elicit the answers needed. 1996;58(Taipei):309–316. 1983;51:570–575. In patients who experience no shock and are treated medically, the mortality rate is 10% to 20%.28 Patients who have pulmonary embolism and a simultaneous cardiac arrest have a 45% mortality rate. Schmeller W, MeierVollrath I. The database also includes evidence-based summaries, descriptions of the outcome measures' psychometric properties, instructions for administering and scoring each assessment, and a list of citations linked to PubMed abstracts. A test with a high specificity will have a low falsepositive rate. Lung-volume reduction surgery as an alternative or bridging procedure to lung transplantation. The major discrepancy may exist in the diagnosis for which this treatment is prescribed. Increased levels of physical activity do not appear to have adverse effects on subsequent cardiac mortality or on ventricular function in patients with ventricular dysfunction. NLM Gateway: A service of the U.S. National Institutes of Health, . Data from Parillo JE, Dellinger JE: Critical Care Medicine: Principles of Diagnosis and Management in the Adult, ed 3, Philadelphia, 2008, Mosby. The interstitial space can accommodate a small amount of excess fluid, approximately 500 mL.32 The lymphatic drainage can be enhanced to move some excess fluid out of the thorax. This test is used to classify anemias as microcytic (RBC size smaller than normal), normocytic, or macrocytic (larger than normal). Treatment Asymptomatic patients with radiologic abnormalities do not require treatment.10 Corticosteroids are used to treat acute radiation pneumonitis and may produce dramatic results. Monobactams are a new class of synthetic antibiotics. Passive range-of-motion exercise is begun immediately. However, in a very small subset of patients with COPD, oxygen may reduce the hypoxic drive in patients and the PCO2 may increase. If a patient cannot participate, then passive ROM is performed. Care must be taken to place the bell lightly on the skin and not to press firmly because increased pressure causes the skin to act like a diaphragm so that low-frequency sounds cannot be heard. Table 14-4 Nitrate preparations Adapted from Opie LH: Drugs for the Heart, ed 2, Philadelphia, 1987, Saunders; Hahn AB, Barkin RL, Oestrrich, SJK: Pharmacology in Nursing, ed 15, St. Louis, 1982, Mosby. Rimmer J.H, Wang E. Over the past 20 years, the male–female ratio of lung cancer deaths has dropped from 5.7:1 to 1.4:1 as a result of the striking increase in lung cancer among women, which began about 1965.10 It is now the leading cause of death from cancer in both men and women, surpassing breast cancer. Development and evaluation of the Kansas City Cardiomyopathy Questionnaire: A new health status measure for heart failure. Coronary Artery Disease (Myocardial Infarction/Ischemia) Coronary artery disease is the second most common cause of CMD,3 which occurs because of dysfunction of the left or right ventricle or both as a result of injury.13–15 Besides the ischemic injury from disease restricting blood flow to the cardiac muscle, there could be actual injury from infarction resulting in scar formation and decreased contractility, as well as reduced relaxation. Anticipating the patient's discharge needs must often be included in the initial physical therapy visit. Viral pneumonias in the debilitated elderly are most commonly caused by the influenza virus. 2008;5:418–425. 91. The other cause of COPD is genetic and involves inheriting an α1-antitrypsin deficiency. Interpretation of Basic Pulmonary Function Test Results Pulmonary function test results are almost universally formatted to present data in columns of predicted, observed, and percentage of predicted values. 2007;2:976–983. 5-25. Poorer outcome is associated with diagnosis at an older age, a longer time before recovery begins, and the need for mechanical ventilation. ■ Hypertension and coronary artery disease are the most common causes of CMD. In the body, NO is derived from l-arginine in a reaction catalyzed by NO synthase. 2008;121:748–757. Campbell N.C, Thain J, Deans H.G, et al. Validation of a vertical visual analogue scale as a measure of clinical dyspnea. Breathing retraining, focusing on lower costal breathing and decreased use of accessory muscles of ventilation, should also be included. 2009;21:156–159. Most of the veins of the heart drain into the coronary sinus, which runs into the posterior aspect of the coronary sulcus and empties through the valve of the coronary sinus, a semilunar flap, into the right atrium between the opening of the inferior vena cava and the tricuspid valve. Symptom-limited stress test results (just before discharge): Patient achieved 6 METs on modified Bruce protocol, stopped as a result of shortness of breath. 1989;40:5–10. New York: Marcel Dekker; 1986. Serjeant G.R. Sickle-cell disease. The majority of patients are diagnosed between 30 and 50 years of age.63 Pathophysiology Within the lung, scleroderma appears as progressive diffuse interstitial fibrosis, in which collagen replaces the normal connective tissue framework of the lung. Although this complication is uncommon, when it occurs, it causes significant RLD.10 Direct burn injuries to the thorax cause pulmonary dysfunction in five ways: ■ The pain of the burn decreases chest wall mobility. Free Radic Biol Med. 2012;141(2 Suppl):e195S–226S. Palpation proceeds with the tip of the index finger being placed in the suprasternal notch, first medially to the left sternoclavicular joint and pushed inward toward the cervical spine. In addition, the heart rate achieved with activity should be compared with the predicted maximal heart rate. Other devices that may provide reduced energy demand and safety include canes, front-wheeled walkers, dynamic orthoses, sliding boards, mechanical lifts, and power wheelchairs. Pharmacologic stimulation of both β1- and β2-agonist receptors in a failing heart therefore increases contractility and decreases afterload by its peripheral arterial vasodilatory effect. 17-12). Information will be presented on the appropriate patient groups (including the special considerations for each patient group), the settings where rehabilitation may be provided, the components and goals that should be considered in rehabilitation as well as the outcomes that should be measured, the administrative concerns involved in specific cardiac rehabilitation programs, and the justification for rehabilitation of these individuals. The thallium scan demonstrated moderately severe stress-induced ischemic change in the inferior and septal areas. 9-51, which demonstrates a large R wave in V1 or V2 and ST-segment depression. ■ Distal acinar (subpleural) emphysema describes dilation of airspaces underneath the apical pleura, associated with apical bullae (large air collection contained within a thin outer wall), which can lead to spontaneous pneumothorax. Other CV abnormalities that occur as complications of CKD and CRF include coronary microvascular dysfunction (producing myocardial ischemia), cardiac autonomic neuropathy (CAN) (~75% of patients show reduced HR variability),193 and uremiainduced pericarditis and pericardial effusion (which occasionally leads to cardiac tamponade). Accessory Muscles Fig. This lobe extends to the level of the fourth rib anteriorly and is adjacent to ribs three to five posteriorly. 2b. Many patients require preoperative treatment, including deep breathing and coughing exercises and practice with an incentive spirometer. It also functions with ANP to promote diuresis. The second rib, although longer than the first, is similarly curved. Blood pressure within arteries, arterial pressure, is greater than blood pressure within veins, venous pressure. The inspiratory portion of the curve is more sensitive to central airway obstruction, whereas the expiratory portion of the curve is more sensitive to peripheral airway obstruction. 1997;2:317–322. Organ donation after cardiac death. Shill H, Stacy M. Two major problems inherent in a primary prevention program are compliance (especially long term) and lack of payment for services by medical insurance companies. Primary prevention of ischemic stroke: A guideline from the American Heart Association/American Stroke Association Stroke Council. Clinical tip Abnormal laboratory values found in heart failure include increased BUN, increased LDH, increased BNP, normal CPK-MB, and possibly increased creatinine levels due to renal dysfunction. It does not act on the autonomic nervous system; it is a hormone (also known as antidiuretic hormone) that is synthesized in the hypothalamus. ■ For conservative treatment to be successful, patients with lymphedema or lipedema must remain highly motivated during the self-management phase II treatment, which lasts for a lifetime. In addition, many ICU patients have weakness and decreased coordination associated with critical illness, which precludes the use of written communication. Hemodynamic responses to exercise after lung transplantation. Later, as this complication develops and becomes more chronic, the fibrosis is more acellular, and the terminal bronchioles are completely obliterated.67 This decreases the surface area for gas exchange. Low levels of CO2 can cause an alkalotic state, muscle weakness, and dizziness.22 Blood Urea Nitrogen and Creatinine and B-type Natriuretic Peptide The BUN and creatinine values can be found on the same laboratory form as that reporting the electrolytes and cholesterol. 2008;9(2):84–95. A long-acting agent, botulinum toxin, is used to treat localized muscle spasms and cosmetically to remove wrinkles. Infectious exacerbations of chronic bronchitis: Diagnosis and management [see comments]. Venous Insufficiency Approximately 65% to 70% of the blood is housed in the veins at one time, thus the term capacitance vessels for veins. A cardiac rehabilitation program in the outpatient setting is defined as a multidisciplinary program of exercise, education, and lifestyle modification and is a covered service under the Centers for Medicare and Medicaid (CMS) and outlined in a National Coverage Determination (NCD), including a description of patient diagnoses, program components, etc. 1984;85:751–758. Characteristically, if pulsus alternans exists, a 20 mm Hg or greater decrease in systolic blood pressure occurs during breath holding because of increased resistance to left ventricular ejection. The left and right upper lobes and the right middle lobe lie superiorly and anteriorly within the thoracic cavity, while the lower lobes occupy the posteroinferior aspects. J Vasc Med Biol. Hafidh S, Senkottaiyan N, Villarreal D, et al. The acute pneumonitis is characterized by fever, dyspnea, cough, and rales; approximately 35% of patients experience pleuritic pain. Normally, the pleurae are in intimate contact during all phases of the ventilatory cycle, being separated only by a thin serous film. 10-14, A), although others necessitate the equipment found in a pulmonary function laboratory (see Fig. J Vasc Surg. Larsen O.A, Lassen N.A. Effect of daily muscular exercise in patients with intermittent claudication. He has become a friend and the best editor ever! Thanks, Brian! SECT ION 1 Anatomy and Physiology OUT LINE 1. Sadeghi A.M, Guthaner D.F, Wexter L, et al. 1999;143(37):1861–1863. It could be used to assist the right ventricle, left ventricle, or both ventricles. 191. This ratio is an indicator of rapid shallow breathing and has been found to be the most accurate predictor of weaning failure.58 ■ Minute ventilation (VE = respiratory rate × tidal volume) less than 15 L/minute. From Cottrell GP, Surkin HB: Pharmacology for Respiratory Care Practitioners. Novitzky D, Coooper D.K, Rose A. Prognosis of congestive heart failure and predictors of mortality. Which risk factors did he not modify after his surgery? The dyspnea portion of the questionnaire can be used to track patient outcomes as they pertain to their ADLs. Reliability and Validity The CRQ demonstrates high reliability and validity for both COPD and asthma patients. Mild sedation and analgesia may be used to decrease anxiety and pain. Electrocardiography is a separate diagnostic evaluation that is covered in Chapter 9. strength training, 557 frequency of, 559 goals of, 557–558 indications for, 557b intensity of, 558–559 metabolic equivalent of energy expenditure (MET) and, 558 modes of, 559 oxygen saturation, 558, 558b, 560f positioning for, 559b strength training for, 557 blood flow and, 39–40, 40b breathing exercises, 549–554, 550t, 554b butterfly technique, 552 counterrotation, 552 diaphragmatic controlled breathing, 550–551 indications for, 550t inspiratory hold technique, 550 inspiratory muscle training (IMT), 552–554 lateral costal breathing, 551, 554f outcomes of, 550t paced breathing, 550 pursed-lip breathing, 549–550 scoop technique, 551 sniffing technique, 551 stacked breathing, 550 thoracic mobilization techniques, 552 upper chest inhibiting technique, 551–552 chronic kidney disease (CKD) and, 240 See also Chronic kidney disease (CKD) decreased tolerance, 100–101 diabetes mellitus (DM) and, 230–231, 231b, 237t hypertension (HTN) and, 60–61, 61b See also Hypertension (HTN) obesity and, 224–225 See also Obesity peripheral artery disease (PAD) and, 63, 65b See also Peripheral artery disease (PAD) testing, 279–288, 279t, 279b contraindications for, 280b, 282, 283b equipment for, 282, 284f heart rate recover (HRR), 285 imaging with, 286–287 See also Imaging modalities indications for, 279b–280b interpretation of, 283b, 284, 285f–286f low-level, 279, 280b prognostic values of, 284–285 protocols for, 283–284, 284t safety in, 281–282 stress testing, maximal vs. Chicago: Year Book Medical Publishers; 1979. The factors that influence stroke volume are preload, afterload, and contractility (Table 14-8). ST-segment depression in the absence of suspected ischemia or angina may be caused by digitalis toxicity (see Chapter 14 for discussion of digitalis toxicity). Arauz-Pacheco C, Parrott M.A, Raskin P. Sensory examination should be performed before providing an exercise prescription because of the possibility of peripheral neuropathy. Evidence-based content reflects the latest research in the field and incorporates the use of ICF. The parietal pleura is frequently described with reference to the anatomic surfaces it covers: the portion lining the ribs and vertebrae is named the costovertebral pleura; the portion over the diaphragm is the diaphragmatic pleura; the portion covering the uppermost aspect of the lung in the neck is the cervical pleura; and that overlying the mediastinum is called the mediastinal pleura.8 Parietal and visceral pleurae blend with one another where they come together to enclose the root of the lung. In addition, reactivation of cytomegalovirus (CMV) may occur in conjunction with PCP and is a marker of poor prognosis. Uncommon but potentially lethal complications of SLE include pulmonary HTN due to either vasoconstriction or recurrent thromboembolism, diffuse alveolar hemorrhage, and chronic lupus pneumonitis. Lung Transplantation Rehabilitation of the lung transplant patient also begins when the patient is medically stable, usually on the first postoperative day in the ICU. If the patient can tolerate only two or three positions in a session, it is recommended that the clinician vary the PD positions in subsequent sessions in order to drain all affected lung segments. Table 7-18 Cardiac and pulmonary manifestations of some neurologic and neuromuscular diseases AV, atrioventricular; Bulb, bulbar muscle involvement; CA, coronary arteries; CHF, chronic heart failure; Cond, conduction system; ECG, electrocardiogram; Mm, respiratory muscle weakness or paralysis; RLD, restrictive lung dysfunction; Sleep, sleep-disordered breathing. Interpretation of the ABI includes a measurement of 0.90 to 1.10, which is considered a normal finding (Box 22-3). 50. One-year outcomes in survivors of the acute respiratory distress syndrome. Obstructive pathologies are routinely diagnosed by forced expiratory volume in 1 second (FEV1) and forced vital capacity (FVC). Loss of muscle strength will result in each muscle fiber operating nearer to its maximal capacity for a given absolute power output. Clinical signs that may be helpful in predicting respiratory muscle impairment are weak cough and inability to clear secretions, limited ability to count to 10 on a single breath, and upper extremity involvement. In addition, they provide clear definitions of normal exercise response as it relates to heart rate and blood pressure changes during exercise. Winkelmann E.R, Chiappa G.R, Lima C.O.C, et al. 334. An area without thallium uptake (cold spot) immediately after exercise as well as 4 hours afterward is considered irreversibly damaged (scarred). St. Louis: Mosby; 1974. Describing mood state and dyspnea in mechanically ventilated patients prior to weaning (abstract). This decrease is the result of "a paradoxical diminution in the function of the RGC complex,"75 which alters the receptor–effector coupling and "limits the ability of both endogenous and exogenous adrenergic agonists to augment cardiac contractility."75 The inability of endogenous (produced in the body) or exogenous (medications) adrenergic agonists to increase the force of myocardial contraction is frequently seen in patients with CHF, and may be a contributing factor in CMD.75,82 Neurohumoral Alterations in the Failing Human Heart Abnormalities in Sympathetic Neural Function The sympathetic neural function of the heart is profoundly affected in CHF. Vraciu J.K, Vraciu R.A. Effectiveness of breathing exercises in preventing pulmonary complications following open heart surgery. Sarcoidosis is a multisystem disease, and although the pulmonary system is the most commonly involved (90%), other systems are affected also. I have enjoyed being a mentor to many rising cardiopulmonary specialists as well as all my students, and have especially enjoyed being a resident mentor to my first resident, Erica Colclough, and my current residents Tiffany Haney and Stephen Ramsey. Limb girdle dystrophy may be accompanied by chronic hypoventilation, but rarely requires assisted ventilation. In: American College of Sports Medicine. The role of obesity in the pathogenesis of hypertension. Classically it is more obvious in lead II than in leads I or III. Inspiratory positive airway pressure (IPAP) is a high amount of pressure applied when the patient inhales, and expiratory positive airway pressure (EPAP) is a low pressure during exhalation. The principal objects shown on a chest radiograph are air, fat, water, tissue, and bone. Renal disorders and heart disease. Bengel F, Ueberfuhr P, Schiepel N, et al. 1986;314:1140–1145. I have saved comments and suggestions along the way as well as attended conferences regularly to stay current with new developments in the field. The other changes in the skeletal muscle include fiber atrophy, loss of oxidative type I fibers, and an increase in glycolytic type IIB fibers.126,127 The methods of measuring exercise tolerance in patients with CHF have improved significantly in the past few years, but many investigators still use the criteria set forth by the New York Heart Association (NYHA) in 1964.128 These criteria categorize patients into one of four classes, depending on the development of symptoms and the amount of effort required to provoke them. Are you ready to do that? Analysis of fluids assists with differential diagnosis and often includes pH analysis, specific gravity protein, eosinophilia count, glucose concentrations, and stains and cultures for bacteria, tuberculosis and fungi (Fig. Gemcitabine (Gemzar) causes dyspnea, which can be severe, in up to 10% of patients, and there have been reports of acute hypersensitivity reaction with bronchospasm, diffuse alveolar damage, and ARDS, and a rare severe idiosyncratic reaction with pulmonary infiltrates and marked dyspnea that may progress to life-threatening respiratory insufficiency. (From Marchiori DM: Clinical Imaging with Skeletal, Chest, and Ab dominal Pattern Differentials, ed 3, St. Louis, 2014, Mosby.) Clinical Manifestation The clinical manifestation of diaphragmatic paralysis or paresis can be found in Table 526. 1995;310(Suppl 1):S37–S41. 2006;37:577. Dahllof A.G, Holm J, Schersten T. The vena cavae have no valves. The troponin elevation in PE resolves in 40 hours or less.7 The amount of cardiac troponin in the blood initially rises in about 4 to 6 hours. Tutic M, Lardinois D, Imfeld S, et al. (From Costanzo LS: Physiology, ed 3, St. Louis, 2007, Saunders.) Tracheobronchial tree or conducting airways. Speed and assist levels should be documented, and it is not required that the patient be independent with transfers to perform the test.112 The seated step test is a test in which endurance can be measured in the patient who is unable to attain a standing position. 1976;85(5):566–572. This amount of assistance can vary from weekly help with shopping and laundry to 24-hour maximal assistance. Vena Cava and Cardiac Veins The superior vena cava is approximately 3 inches long from its termination in the upper part of the right atrium opposite the third right costal cartilage to the junction of the two brachiocephalic veins. 1997;3:53–60. Donation harvesting from a non–heart-beating organ donor is one such technique. 1999;282:1554–1560. 1998;65:200–208. The patient's physical appearance may change slightly as the clinical state changes. I am here to talk with you about your upcoming surgery. You should continue to walk until you feel that you are unable to maintain the required speed without becoming unduly breathless." Singh S, Morgan M, Scott S, et al: Development of a shuttle walking test of disability in patients with chronic airways obstruction, Thorax 47:1019–1024, 1992. Blood Press Suppl. An increase in intracellular sodium results in an ionic exchange of intracellular sodium for extracellular calcium (Ca^{2+}). The patient's ECG is continuously monitored during the test. New York: Churchill Livingston; 1989. An additional advantage is that simultaneous low-level exercise allows for immediate imaging, as would be performed with exercise stress testing. In the future, our knowledge and understanding of a variety of medical conditions will result in necessary changes to current treatment approaches. Doyle A.E. Does hypertension predispose to coronary disease? 14-7 for a discussion of the site of action and the effect of specific drugs. Dysphagia and aspiration problems are common. Candesartan improved outcomes in patients with preserved LVEF who were intolerant of ACE inhibitors in the Candesartan in Heart Failure Assessment of Reduction in Mortality and Morbidity (CHARM) Alternative trial.33 Candesartan and valsartan are FDA approved for HFrEF and are the most commonly used ARBs. In July 2015 the FDA approved a new drug for the treatment of heart failure that combines valsartan (an ARB) with Sacubitril (another antihypertensive that inhibits the enzyme neprilysin which degrades ANP and BNP). Thoracic surgery. Patients may need assistance with treating the posterior lung fields; however, some mechanical percussor devices do percuss the posterior lung fields (see Table 17-3). This often creates a situation of denial or "it won't happen to me" attitude, which can interfere with continual motivation. Intraclass correlations at the first and second trials displayed very high Pearson r values for all sections of the questionnaire (symptoms, activity, impacts). An elevated serum glucose value may also be found in a patient with diabetes who is not well controlled on oral or injectable insulin. If c urrent or rec ent: stage of c hange, amount of tobac c o/day (or other c essation nic otine). The clot gradually dissolves and is reabsorbed by the body as healing occurs. This procedure removes portions of several ribs so that the soft tissue of the chest wall can be used to collapse underlying lung parenchyma. Secondary parkinsonism may develop following some cases of encephalitis and as a result of drug abuse and repeated brain trauma. In addition, the patient who experiences complications (such as a perioperative myocardial infarction or stroke) during or after the surgery usually has a slower recovery and may require increased activity supervision and may make slower progress. The patent ductus arteriosus increases pulmonary pressures and blood flow and could allow plasma proteins to leak into the alveolar space, causing pulmonary edema and further interfering with surfactant function. When the balloon is deflated during left ventricular systole, it lowers the left ventricular systolic pressure and the afterload by forcing the blood to move from an area of higher pressure to one of lower pressure and enhances the CO.53 The alteration in the systolic and diastolic arterial pressure is accompanied with little change in the MAP. 1985;55(8):1037–1042. Appl Human Sci. Castillo-Garzón M.J, Ruiz J.R, Ortega F.B, et al. This is an excellent opportunity to assess cough strength. Systematic review of long-term weight loss studies in obese adults: Clinical significance and applicability to clinical practice. 1997;278:1749–1754. Peripheral Arterial Disease Peripheral arterial disease, or more specifically atherosclerotic occlusive disease (AOD), involves atheromatous plaque obstruction of the large- or medium-size arteries supplying blood to one or more of the extremities (usually lower). 168). Exercise training in patients with heart failure: A randomized, controlled trial. Assess risk for coronary disease in these patients. Increased fluid volume eventually leads to hepatic venous congestion, which prevents adequate perfusion of oxygen to hepatic tissues. A, Blood pressure measured from the dorsalis pedis artery. Heart failure with preserved EF usually results from a volume overload. Compr Ther. Other causative organisms include Haemophilus influenzae, Staphylococcus aureus, and gram-negative bacilli, each accounting for 3% to 10% of cases. Decreased renal perfusion stimulates the release of renin from the afferent arteriole of the glomerulus. De JA Paz, Lasierra J, Villa J.G, et al. The method of detection may be invasive or noninvasive. A self-administered quality of life questionnaire after acute myocardial infarction. Jette D, Stilphen M, Ranganathan V, Passek S, Frost F, Jette A. A. Reentry requires two conduction pathways that may be anatomically or physiologically distinct, such as an AV node and an accessory pathway (AP). 2000;55A:M221–M231. Although histologically the immune system and hypersensitivity reactions seem to be involved, the disease appears clinically as an infectious process due to some unknown pathogen. 2009;53(3):272–274. This muscle assists with ventilation by helping to elevate the thoracic cage. The right atrioventricular valve has three cusps and therefore is termed tricuspid, whereas the left atrioventricular valve has only two cusps and hence is termed bicuspid. Heart disease and stroke statistics—2014 update: A report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. If the patient is being ventilated mechanically, the mode of ventilator assistance, the set rate, the set volume, the peak inspiratory pressure, the fraction of inspired oxygen, the spontaneous rate, and the like should be identified. Arrold S.B, Byrd R.C, Meister W, et al. Philadelphia: WB Saunders; 2010:212–214. Earlier in the day, this fluid is shunted to the lower extremities and the lower portions of the lungs because upright positions and activities permit more effective minute ventilation (V) and perfusion (Q) of the lungs (correcting the V/Q mismatch) and the effects of gravity keep the lungs relatively fluid free. Pharmacologic management of arrhythmias is most successful when approached in a systematic fashion.42 First, adequate documentation of the arrhythmia is made by clinical evaluation, electrocardiogram, Holter monitor, or electrophysiologic study. Ott and colleagues were able to demonstrate that diuretic use in the elderly had no negative effect on blood lipids.72 Although not specifically considered cardiovascular pharmacologic therapy, it is important to address the role of hormone replacement therapy in the prevention of cardiovascular disease in women. 2009;7:109–112. Aliabadi A, Zuckermann A, Grimm M. After a high-risk patient is identified, the decision for optimal medical management or surgical intervention is more easily made. Assessment of oxygen uptake during the six-minute walk test in patients with heart failure [letter]. Decreased fremitus indicates an increase in air in the particular area. These physical changes can significantly affect the individual's activity tolerance not just with exercise but also with his or her daily life. Therefore it is important to note the date of the radiograph (particularly if the patient's status is fluctuating). Each section discusses the pathology that would apply to each condition. Effects of exercise training on cardiac performance, exercise capacity and quality of life in patients with heart failure: A meta-analysis. Contrast enhancement with CT has allowed the assessment of vasculature and lung perfusion. 1985;36:171–180. • Do the tasks that require the most energy at times that you have the most energy. Progressive pulmonary fibrosis is the most common cause of death.32 Clinical Manifestation The clinical manifestation of sarcoidosis can be found in Table 5-5. It has been reported that a late complication of radiation fibrosis may be the rapid development of adenocarcinoma of the lung. The information can be used to assess the patient's ability to perform or sustain a desired level of activity. However, because the intensity is lower with intradialytic exercise, the effects are less pronounced.210,218,219 In patients with chronic renal insufficiency, resistance training has been reported to improve muscle strength and mass, functional performance (6-minute walk test, normal and maximal gait speed, sit-to-stand test), peak exercise capacity, and possibly GFR; it also reduces inflammation, maintains body weight, and increases protein utilization and nitrogen retention to counteract the catabolic effects of protein restriction, low energy intake, and uremia.215,220 In dialysis patients, resistance exercise produces additional benefits as well, including enhanced cardiac vagal tone at rest, leading to lower resting HR and reduction in the incidence of cardiac arrhythmias, increased body weight, and improved quality of life.205,214,221–223 Combined aerobic exercise and resistance training appear to provide augmented benefits, increasing VO2max by 41% to 48% (more accurately referred to as VO2peak because most patients cannot exercise intensely enough to reach their true maximum), augmenting HR variability, and reducing risk of arrhythmia.224,225 More randomized clinical trials are needed to identify optimal training regimens according to patient characteristics and the effects on specific outcomes in patients with CKD. Lim L.-Y, Valenti L, Knapp J, et al. Airway clearance (postural drainage and percussion) is performed by the physical therapist after exercise sessions, but patient admits to being noncompliant with additional airway clearance techniques at home other than coughing. August 19, 1996. Positive inotropes, primarily the sympathomimetics and bipyridines, delivered intravenously along with vasodilators and morphine, are most often used for Stage D HF and critical care management of the decompensated patient. 10-16 shows a normal flow-volume loop. 1985;88(5):663–668. At rest, the minute ventilation is approximately 5 L/min, whereas at maximum exercise, it increases to a level between 70 and 125 L/min.2 Additional Lung Volumes Before considering the mechanical properties of the lungs during ventilation or breathing, it is helpful to consider the static volumes of the lungs measured via spirometry studies (Fig. Table 16-11 Activity evaluation For patients recently recovering from a myocardial infarction, the evaluation discussed previously should be performed as soon as the patient is able to get out of bed. 1997;96:3436– 3442. FIGURE 16-20 A, B, Surface anatomy of lungs with underlying lobes. ■ The middle scalene muscle arises from the transverse processes of all the cervical vertebrae to insert onto the first rib (posteromedially to the anterior scalene, the brachial plexus and subclavian artery pass between the anterior scalene and middle scalene). Leon A.S, Casal D, Jacobs Jr. D. Peak cough flows are increased by manually assisted coughing. In: Gilman A.G, Goodman L.S, Rall T.W, et al., eds. The right marginal vein runs along the right border of the heart and usually opens directly into the right atrium. A comprehensive assessment of HRQL encompasses an evaluation of the patient from the perspective of perceived symptoms, functional status, mental well-being, social functioning, satisfaction with treatment protocol, and overall life satisfaction.178 Although many HRQL assessment measures are available, the more specific the tool to the individual being studied, the more sensitive it will be to change. You may lean against the wall while resting, but resume walking as soon as you are able. In the adult, bronchiolitis obliterans may be caused by toxic fume inhalation (nitrogen dioxide) or by viral, bacterial, or mycobacterial infectious agents, particularly Mycoplasma pneumoniae. Such measurements include the maximal inspiratory pressure (MIP) and the maximal expiratory pressure (MEP), which are frequently measured with a manometer in centimeters of water. 2000;36:2098. Drug regimens should be simplified whenever possible, with small initial doses and progressive titration until a therapeutic response is reached. This interaction is either brief, as in most cases, or can be irreversible. 1989;139:303–307. Drugs that Decrease Myocardial Oxygen Demand Current medications used to decrease MVO2 are β-blockers, which decrease heart rate and contractility; calcium-channel blockers, which inhibit coronary vasospasm and dilate coronary blood vessels; nitrates, which decrease both peripheral vascular resistance and venous return or preload; and ranolazine, which is used as an antianginal agent that limits intracellular calcium and thereby re

controlled, and feelings of depression following binge eating. The anaerobic index: Uses and limitations in the assessment of heart failure. 10-15 shows a normal spirographic tracing of an FVC. In the case of severe HF warranting parenterally delivered vasopressors and positive inotropes to maintain an appropriate cardiac output at rest, progressive exercise is not recommended until the patient is hemodynamically stable. The apex of each lung is situated in the root of the neck, its highest point being approximately 1 inch above the middle third of each clavicle. Scand J Med Sci Sports. Current recommendations. The international normalized ratio, or INR, was developed to standardize prothrombin time values so that test results from different thromboplastins and coagulation analyzers become equivalent. Patients may get confused and forget a dose. 1973;225(3):651–658. 1997;95:1683–1685. According to Massery and Frownfelter, an effective cough should maximize the function of each of the preceding four stages.11 Therefore the patient should exhibit a deep inspiration combined with trunk extension, a momentary hold, and then a series of sharp expirations while the trunk moves into flexion. With the exception of bariatric surgery, the goal is usually set at a 10% reduction in body weight, which is associated with significant health benefits; however, this goal is hard to achieve and even more difficult to maintain. 1997;111(4):1146. To prepare for the 6MWT, the patient should be placed in a seated position at the start line and vital sign/Borg scale/contraindication information collected. Eur Heart J. Acute Care Perspect. Curr Hypertens Rep. Both the diaphragm and intercostal muscles may be affected, resulting in a respiratory muscle weakness that can progress to respiratory failure. The patient agreed to attend pulmonary rehabilitation three times a week and to perform airway clearance techniques at least twice daily. ASCM's Resource Manual for Guidelines for Exercise Testing and Prescription. The chest wall pain or tightness often changes with breathing, which is a sign that it is not angina. 2006;14:227–231. Gait Speed Gait speed (walking speed) is another functional performance measure that, due to its ease of use and psychometric properties, has been utilized as a predictor and an outcome measure across multiple diagnoses, including older adults, frail elderly, and stroke.152–156 Measurements of gait speed are highly reliable, regardless of the method of measurement and the patient populations.106,157 Gait speed has also been determined to predict future health status152,153 as well as functional decline158 and rehospitalization.159 Low gait speeds also are predictors of the type of location an individual would be optimally functional following hospitalization.160 Table 22-6 The shuttle walk protocols From Singh S, Morgan M, Scott S, et al: Development of a shuttle walking test of disability in patients with chronic airways obstruction, Thorax 47:1019–1024, 1992. 39. 1986;292:653–655. Anatomy of the cardiovascular and pulmonary systems 2. The α-blocking component causes vasodilation and thus results in decreased SVR, which is typically accompanied by a compensatory increase in heart rate. In many acute care settings a discharge planner, often a nurse or a social worker, has the role of arranging a variety of health support services needed after discharge and coordinating the discharge process. Wills-Karp M. Positive inotropes, such as dopamine, dobutamine, amiodarone, and digitalis, may be given to improve cardiac contractility and increase cardiac output. c Especially verapamil and diltiazem. ■ Pulmonary complications are the leading cause of morbidity and mortality in patients with HIV and AIDS; CV complications also occur in many patients and are sometimes fatal. 2011;22(1):5–15. 1982;35(7):521–529. Di Pasquale G, Andreoli A, Pinelli G, et al. Health-related quality of life and stages of heart failure. 274. Interventions for individuals with cardiovascular disorders will be the main focus of this chapter. Kannel W.B. Framingham study insights into hypertensive risk of cardiovascular disease. At low doses, dopamine (via its D-1 receptors) causes selective vasodilation and therefore increased blood flow to the renal, cerebral, coronary, and mesenteric arterial beds. However, further investigation is needed in this area. 2002;25:134–147. Blood leaks from the damaged pulmonary capillaries into the interstitium and the alveolar spaces, which over time can lead to significant and widespread pulmonary fibrosis. Philadelphia: Saunders; 1989. Edinburgh, Scotland: Scottish Intercollegiate Guidelines Network; 2013. 1986;7(4):599–618. Exercise In the acute care setting, patients often have limitations in strength and endurance that prevent optimal functional mobility and efficient breathing patterns. Evaluation of Circulation Pulses throughout the extremities should be palpated during the initial evaluation because of the diffuse nature of atherosclerotic disease (see Chapter 3) (Fig. (From Mettler FA: Essentials of Radiology, ed 2, Philadelphia, 2005, Saunders.) Computed Tomography Computed tomography (CT), or digital chest radiography, involves a narrow beam of xrays moving across the field of examination in such a way as to define successive adjacent columns of tissue, a process called translation. ■ AutoPEEP or intrinsic PEEP (PEEPi): When alveolar pressure remains positive at the end of expiration, causing a dynamic hyperinflation or air trapping. Gambrell M. Caregivers may also reduce their own fatigue by using a mechanical percussor. He underwent five-vessel coronary artery bypass grafting, which relieved his angina. Diabetes Metab Res Rev. Complications common in infants with RDS include intracranial hemorrhage, sepsis, pneumonia, pneumothorax, pulmonary hemorrhage, and pulmonary interstitial emphysema. 1992;41:286–291. Treatment Traditional treatment for RDS entails continuous positive airway pressure (CPAP) and positive end expiratory pressure (PEEP). Friedman M, Rosenman R.H. Association of specific overt behavior pattern with blood and cardiovascular findings. 2000;35:1245–1255. Pulmonary medications Physiology Bronchomotor Tone Rationale for Bronchodilators Bronchodilators New Drug Development New Antifibrotic Medications (for the Treatment of Idiopathic Pulmonary Fibrosis) Pulmonary Arterial Hypertension Medications Ancillary Pulmonary Medications Summary Section 6. "Three major mechanisms … (of side effects) … are through (1) central nervous penetration (sedation), (2) smooth muscle spasm (bronchospasm and cold extremities), and (3) exaggeration of the cardiac therapeutic actions (bradycardia, orthostatic hypotension, heart block, excess negative inotropic effect with heart failure)."11 β1-Selective drugs such as atenolol (Tenormin) should have fewer peripheral side effects of bronchospasm, cold extremities, worsening claudication, and sexual dysfunction than nonselective drugs like propranolol (Inderal). Other pretest procedures include assessment of the patient's risk factor history for CAD (see Chapter 3; Box 3-2); assessment of the patient's symptom history; and assessment of the patient's resting blood pressure, heart rate, and heart and lung auscultation. Certain facial expressions or gestures may have specific meanings for the child. The measurement is expressed as a percentage of oxygen that is bound to hemoglobin. Gami A.S, Witt B.J, Howard D.E, et al. Mycoplasma pneumonias account for 20% of all community-acquired pneumonias.32 This infection is common year round, but usually the incidence increases in the fall and winter. Weissleder H, Schuchhardt C, eds. 1992;232:397–404. ATP, Adenosine triphosphate; cAMP, cyclic adenosine monophosphate; Gs, G-stimulatory protein; G1, G-inhibitory protein; IBMX, isobutyl methylxanthine; PDE, phosphodiesterase. Greenberg G, Peterson R, Heilbronner R. Generally, type I reactions are treated with antihistamines or corticosteroids, whereas the type IV reactions are treated only with corticosteroids. Other causes of CHF in individuals with CKD include HTN, CAD, DM and increased insulin resistance, anemia, and hypervolemia between renal replacement treatments. Furthermore, a dysfunction of any of these clearance routes caused by diseases or an inadequate circulatory system to distribute the drug can also interfere with the normal clearance of the drug from the body. An understanding of normal physiology helps the reader better appreciate pathophysiologic changes associated with diseases and dysfunction of these systems that will be discussed in subsequent chapters. Additional medications are used to combat the side effects of immunosuppressive medication. 1998;128:439S–443S. The lung architecture becomes distorted, showing dense fibrosis that can lead to bronchiectasis and repeated pulmonary infections and an obstructive pulmonary deficit superimposed on the RLD.8,31 Apical pleural thickening is invariably present.10 Less than 1% of patients affected by AS have complete remission, and 80% of patients that are ill for 20 years face daily pain. 1987;59:669–674. Evaluation of Oxygen Saturation Patients with heart failure, pulmonary hypertension, or pulmonary disease should be evaluated for activity tolerance by monitoring heart rate, blood pressure, symptoms, and oxygen saturation. 2013;13(3):377–385. The interpretation also provides valuable information regarding safety during exercise for the patient. Patients with autoimmune diseases or cancer, as well as other infectious diseases, often have elevated CRP levels. The importance of the presence and magnitude of rales was addressed in 1967 and provided data for the Killip and Kimball classification of patients with acute myocardial infarction.119 Table 4-7 defines classes I through IV, each of which is associated with an approximate mortality rate.120 Individuals with rales extending over more than 50% of the lung fields were observed to have a very poor prognosis. Philadelphia: Saunders; 2007. BO X 13- 3 C a use s of t a chypne a a nd bra dypne a Tachypnea Exerc ise Atelec tasis Fever Hypoxemia Anxiety Pain Bradypnea Head injuries S edation Drug overdose BO X 13- 4 Indica t ions of re spira t ory dist re ss • Increased respiratory rate • Nasal flaring • Intercostal and sternal retractions • Visible expression of distress • Increased use of neck accessories • Paradoxical breathing FIGURE 13-3 Typical transducer for continuous monitoring of arterial blood pressure. Weaning using this method gradually reduces the amount of pressure provided to assist the patient during spontaneous breathing. Lu C.C. Bronchodilator therapy for chronic obstructive pulmonary disease. It extends from the base of the skull to the esophagus that corresponds with a line extending from the sixth cervical vertebra to the lower border of the cricoid cartilage. Although the Scottish physician John Cheyne and the Irish physician William Stokes first observed this breathing pattern in asthmatics and thus coined the term Cheyne–Stokes respiration, it has been observed in individuals who are suffering central nervous system damage (particularly those in comas) and in individuals with CMD.5 Clinical tip Patients with CHF often demonstrate breathing impairments, including tachypnea, resting dyspnea, dyspnea with exertion, occasional dyspnea with positional change (with or without orthostatic hypotension), and/or waxing and waning depth of breathing (Cheyne–Stokes respiration). Farbu E, Gilhus N.E, Barnes M.P, et al. Lipid alterations and decline in the incidence of coronary heart disease in the Helsinki Heart Study. Obesity is characterized by fatty tissue located either in the trunk or over the entire body in normal proportions, is not painful, does not bruise easily, and is present in both men and women.53,84 Unfortunately with lipedema, diet and exercise are ineffective in reducing the size of the extremity(ies) affected by lipedema (although they can reduce the size of the unaffected extremities), and these women may become emotionally distraught because, despite their best efforts, their affected extremities may remain large and unattractive.1,53,84,86 Surgical Methods There has been considerable discussion concerning the appropriateness of removing the fat deposits in patients with lipedema using liposuction. The normal resting value is 4 to 8 L/min. Management and outcome of severe GuillainBarré syndrome. You are permitted to slow down, stop, and to rest as necessary. Philadelphia: Saunders; 1990. 295. 1989;9(1 Suppl):I19–I32. DeLLITE Depression in late life: An intervention trial of exercise. 2007;56(4):260–268. In addition, I dedicate this edition: To my colleagues who keep me informed, give me moral and intellectual support, and who keep me inspired to maintain my passion for the field of cardiovascular and pulmonary physical therapy. In the alveoli with surfactant, Tsml is reduced in proportion to the radius of the alveolus, which permits Psml to equal Pbig. Edinburgh: Saunders; 2003. The physical therapist is a crucial member of the interdisciplinary team caring for acutely ill, hospitalized patients. Summit: CIBA Pharmaceutical Company; 1980. 2011;184(9):1055–1061. The responsibility of the physical therapist in treating any individual is to understand the effects and potential side effects of the individual's drug regimen, as well as the drugs' influence on the outcome of the physical therapy intervention. ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities. Mannarino E, Pasqualini L, Menna M, et al. 111. Therefore this text was developed for entrylevel physical therapists, as well as individuals in practice who need more in-depth knowledge of cardiopulmonary content. 154. The normal filling pressure of the left ventricle is between 4 and 12 mm Hg. Oxygenated blood is ejected out of the left atrium through the mitral atrioventricular (bicuspid) valve to enter the left ventricle. Morphine reduces anxiety and discomfort associated with pulmonary edema, but also has a vasodilatation effect reducing preload. Orthopedic, neurologic, and psychiatric disorders must be ruled out; therefore polio is largely a diagnosis of exclusion.54 Clinical Manifestation The clinical manifestation of polio with respiratory involvement can be found in Table 522. (From Sainani GS: Manual of Clinical and Practical Medicine, St. Louis, 2010, Elsevier.) With multidetector CT, the entire chest is able to be scanned in 4 to 8 seconds with resultant good visualization and without respiratory movement. 1997;29:551–559. Clinical tip An ECG monitors two things: heart rate and heart rhythm. Comparative effects of therapy with captopril and digoxin in patients with mild to moderate heart failure. Hosp Pract [Off]. Cohn J, Rector T. Adipokines: the missing link between insulin resistance and obesity. Diaphragmatic dysfunction also can occur after thoracic surgery, particularly if the phrenic nerve experiences hypothermic damage because of external cardiac cooling. Oxygen delivery devices. The most common of these include Marfan syndrome, Ehlers–Danlos syndrome, and osteogenesis imperfecta. Blood in the pleural space is termed a hemothorax, whereas air in the pleural space from a collapsed lung is termed a pneumothorax. These agents are especially effective against T cells but can also block humoral immune responses. 5-25, B).28,32 In severe kyphoscoliosis, the lungs are compressed and the alveoli are restricted from full expansion; this causes hypoventilation and atelectasis.43 FIGURE 5-25 Kyphoscoliosis. These drug reactions are divided into phase I and II reactions and include oxidations, reductions, hydrolysis, and conjugation. Gordon B.A, Benson A.C, Bird S.R, et al. ■ The presence of significant Q waves in II, III, and aVF indicates an inferior infarction and probable involvement of the right coronary artery. 1994;13:297–305. ■ Individualized, comprehensive patient and family or caregiver education and outpatient counseling ■ Optimization of medical therapy ■ Vigilant follow-up ■ Increased access to health care professionals ■ Early attention to fluid overload ■ Coordination with other agencies as appropriate ■ Physician-directed care (and/or use of nurse coordinators or nurse-managed care) ■ Specific content for patient and family education and counseling should include: • Discussion of limitation of dietary sodium to 1500 mg/day • Adherence to medication regimen • Regular flu and pneumococcal immunizations • Importance of daily weighing and monitoring of symptoms (shortness of breath, dizziness, or swelling) • Instruction in signs/symptoms of decompensation (excessive shortness of breath, fatigue, peripheral swelling, waking at night with dyspnea or cough, etc.) • Instruction in importance of seeking assistance when necessary • Adherence to regular exercise program • Limitation of alcohol intake • Control of comorbid conditions (diabetes, elevated blood pressure, elevated lipids) This educational content is much better received and remembered if given when the patient is in an outpatient versus an inpatient setting. Cerri S, Spagnolo P, Luppi F, Richeldi L. The evaluation and preparation of the patient for lung volume reduction surgery. 7, St. Louis, 2007, Mosby; Bottom image: Used with permission of Respironics, Inc., Murrysville, PA. Because of the high incidence of anxiety and depression in cardiac populations, the AACVPR recommends screening for depression for all populations. Scheidt S. The patient's cardiovascular response will help determine the desired duration of activity during the inpatient exercise or mobility session. Shortness of breath may be due to several different physiologic mechanisms, including the equivalent of angina in individuals who cannot perceive chest pain or discomfort, as in the diabetic with peripheral neuropathy. Can J Cardiol. There are three major openings to enable various vessels to traverse the diaphragm. 1987;5:227–244. Jubran A. Airway obstruction is generally said to be reversible when there is 12% or greater increase in the postbronchodilator values for at least two of the following three parameters: FVC, FEV1, and FEF25–75.23 However, the definition of obstruction and reversibility in clinical trials is not uniform. Opening and closing of each valve depends on pressure gradient changes within the heart created during each cardiac cycle. Table 4-16 lists specific exercise training guidelines, which include the attainment of a cardiac index of 2.0 L/min/m2 or greater (for invasively monitored patients in the hospital) before aerobic exercise training is implemented and the maintenance of an adequate pulse pressure (not less than a 10 mm Hg difference between the systolic and diastolic blood pressure) during exercise. Restrictive lung dysfunction due to "shrinking lung syndrome" is a well-recognized complication of SLE that is thought to result from limited thoracic compliance. Within the twenty-first century, the ongoing roles of pharmacogenetics and stem cell research in understanding an individual's cellular and genetic makeup will help to streamline and identify the best treatment options for the individual. Empyema involves pockets of pus enclosed in fibrous adhesions. (Accessed June 17, 2014.) 60. If a patient develops drug tolerance, drug substitution or a change in dosage will occur. Generally, however, if the etiologic factors that are causing RLD are permanent (spinal cord injury) or progressive (idiopathic pulmonary fibrosis), the treatment consists primarily of supportive measures (Box 5-1). Philadelphia: F. ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; EF, ejection fraction; FHx CM, family history of cardiomyopathy; LV, left ventricular; LVH, left ventricular hypertrophy; MI, myocardial infarction. 2004;122:552–563. A normal length–tension relationship within the diaphragm is the key to achieving the pressure changes needed for ventilation. Intra-aortic balloon pump inserted through the subclavian artery: a minimally invasive approach to mechanical support in the ambulatory end-stage heart failure patient. Esprit Study Group, , Halkes P.H, van Gijn J, et al. Zhao X. At the opposite extreme is bone, which, because it is denser, allows fewer x-rays to penetrate and results in a white image on a radiograph (radiopacity). Physical and Occupational Therapy: Drug Implications for Practice. Egan T.M, Cooper J.D. Surgical aspects of single lung transplantation. 184. 2002;40:946–953. Hemodynamic effects of intravenous digoxin in patients with severe heart failure initially treated with diuretics and vasodilators. Anteroposterior (A) and lateral (B) radiographs show diffuse hazy appearance with low lung volumes and air bronchograms that extend into the periphery. Albarran-Sotelo R, et al. These sounds are most frequently heard on exhalation and are associated with airway obstruction. FIGURE 17-3 Patient supporting incision site with a pillow to maximize comfort. Bristow M.R, Hershberger R.E, Port D, et al. The intended population is individuals with CAD who have experienced chest pain and tightness in the 4 weeks before the survey was completed. The tunneled catheters can last for months if working properly. Intended population Key aspects to address Identify the purpose of the test. 293. The arterial blood pressure is defined as the systolic pressure (pressure exerted against the arteries during the ejection cycle) and diastolic pressure (pressure exerted against the arteries during rest). A sample 6MWT form is found in Fig. ■ Premature or early coronary disease is defined as men older than age 50 years and women older than age 60 years, but the AHA defines family history as significant if either parent (genetic linked parents) had a diagnosis of heart disease (first event of MI, angina, CABG, or PTCA) at an age earlier than 60 years. Ernst E.E, Matrai A. Epinephrine has a short duration of action, demonstrating moderate α receptor activity, strong β1 receptor activity, and moderate β2-receptor activity.2,5,22 Ephedrine has a long duration of action, exhibiting mild α-receptor activity and moderate β1 and β2 activity. Chair Stand Test: number that can be performed in 30 seconds 7. Used in the treatment of congestive heart failure, digitalis "poisons" (inhibits) the sodium–potassium pump (review previous section on HF in this chapter). Inhaled bronchodilator medications given before airway clearance procedures enhance the overall intervention outcome. Management of heart failure. Cigarette smoking potentiates endothelial dysfunction of forearm resistance vessels in patients with hypercholesterolemia. Major changes made by the Criteria Committee of the New York Heart Association. (From Applegate E: The Anatomy and Physiology Learning System, ed 3, St. Louis, 2007, Saunders.) Myocardium The middle layer of the heart is termed the myocardium. Sullivan M.J, Green H.J, Cobb F.R. Skeletal muscle biochemistry and histology in ambulatory patients with long-term heart failure. 2005;16:2134–2140. 16-11). 2009;28:469–478. 1981;59:586– 592. FIGURE 1-11 Structure of the airways. Miller N.E, La Ville A, Crook D. • TUG cognitive-complete the task while counting backwards from a randomly selected number between 20 and 100. ■ Exercise should only be performed when the affected limb(s) are compressed by bandages or garments so as to facilitate lymphatic flow. The diastolic blood pressure should change very little (±10 mm Hg) with an increase in workload. The methods of measuring MIP and MEP and implementing a ventilatory muscle training program are provided.253,254 Facilitation of diaphragmatic breathing and inhibition of excessive accessory muscle use may decrease the work of breathing for a person with CHF and in conjunction with pursed-lip breathing may improve respiratory performance and, possibly, cardiac performance. The measurement of WC provides a simple index of disease risk, with commonly accepted cutoff points of 40 inches (102 cm) for men and 35 inches (88 cm) for women to define central obesity. Maul S.M, Devine J.A, Wincer C.R. Development of a framework for pneumatic device selection for lymphedema treatment. If BG levels are high, there is a risk of further aggravation of hyperglycemia during exercise, particularly with higher-intensity or longer-duration exercise. Pediatric patients also require very close monitoring because of their decreased tolerance for hemodynamic changes and limitations in communicating distress. In general, individuals with COPD show larger-than-normal total lung capacities (TLCs) and larger residual volumes (RVs) compared with individuals of the same age, height, gender, and race (Fig. Teaching Conference in Clinical Cardiology. 16-31). The fifth classic sign is the decreased diffusing capacity of lung for carbon monoxide (DLCO). Wayzata, MN, 1990, DCI Publishing, pp 112–113. Before treating a patient in the ICU, however, the therapist should become familiar with the emergency procedures of each individual unit in addition to alarms from ventilators and monitoring devices. The paralysis or paresis may be temporary or permanent.32,35 Etiology Unilateral paralysis or paresis of the diaphragm is most commonly caused by invasion of the phrenic nerve by bronchogenic carcinoma.32 Another very common cause is thoracic surgery. Clinicians should become thoroughly familiar with the equipment utilized by their patients. 2007;50:1435–1441. Oral milrinone and digoxin in heart failure: Results of a placebo-controlled, prospective trial of each agent and the combination [abstract]. Depending on the arterial blood gas or oxygen saturation information, the therapist may need to use oxygen or increase the amount of oxygen while exercising the patient (e.g., during formal exercise, activities of daily living [ADLs], gait). Deep vein thrombosis (DVT)/pulmonary embolism (PE)—blood clot forming in a vein, 2014. Fatigue Fatigue may also have several origins, including depression, general deconditioning, pharmacologic management and side effects, and physiologic limitation, as seen in the individual with cardiac muscle dysfunction. Table 16-9 provides a summary of heart sounds. 2003;72:1470–1478. 1998;190(1):43–50. They are described as vesicular and are soft, lowpitched sounds heard primarily during inspiration. Rumsfeld J.S, Havranek E, Masoudi F.A, et al. There is intimal fibrosis in the pulmonary arterioles.8,33 Obliterative bronchiolitis is rare; however, the onset is usually acute and progresses within 2 years to a fatal outcome. Mucoactive Agents Drugs that promote the mobilization and removal of secretions from the respiratory tract are called mucoactive drugs. The substance of the lung— the parenchyma—is normally porous and spongy in nature. In addition, an individual with bronchospasm may have a very long, drawn-out spasmodic cough that is just as ineffective. Cardiac glycosides and other drugs used in congestive heart failure. This mismatching may be due to changes in the collagenous framework of the lung, scarring of capillary channels, distortion or narrowing of the small airways, compression from tumors within the lung or bony abnormalities of the chest wall, or a variety of other causes. The test is made up of 15 items in seven categories. Physical therapists must be able to identify and interpret the results of these medical tests and procedures in order to assess the status of their patients' cardiovascular systems. Franzeck U.K, Spiegel I, Fischer M, et al. 307. McTiernan A. Sleep-disordered breathing is often an indication of chronic respiratory muscle fatigue and increased risk of ventilatory failure, which can be ameliorated with the use of nocturnal ventilatory assistance. Effects on quality of life with comprehensive rehabilitation after acute myocardial infarction. 2009;373(9678):1874–1882. Cardiac output is directly affected by stroke volume (the amount the LV pumps out with each heart beat) and the heart rate (the number of heart beats per minute). This reaction is manifested by redness, itching, and hives within 10 to 20 minutes. It can also be used to increase the blood pressure of a hypotensive patient, but is contraindicated for patients with congestive heart failure or cardiomyopathy. Risk factors for CKD include DM, HTN, CVD, and obesity.196 Other less common but important etiologies include primary glomerulonephritis, lupus, and polycystic kidney disease. These are not to be confused with medical diagnoses. Drugs that Affect the Autonomic Nervous System The autonomic nervous system exerts significant control over cardiovascular function. The tool doesn't only examine physical function or disease-related physical complications. The simplest method for assessment is a yes–no question: Are you short of breath? The skin is then drawn medially until the tips of the thumbs meet at the spinal column. American College of CP & ATS Joint Committee on Pulmonary Nomenclature. 2005;118:939–947. Arterial blood gases. Question: 1. Parsons T.L, King-VanVlack C.E. Exercise and end-stage kidney disease: Functional exercise capacity and cardiovascular outcomes. 258. Nyberg G. The extent of movement is an important part of the assessment of diaphragmatic excursion. Clinical manifestations may include dyspnea, exercise intolerance, chest pain, dizziness, syncope, and signs of right HF. It was a common biochemical marker for acute MI in 1954. However, a progressively increasing workload from 2 to approximately 6 METs (Metabolic Equivalent Tables—a multiple of the resting metabolic rate) is often used. Evidence from a national birth cohort. The olfactory region of the nasal cavity is distinguished by specialized mucosa. A recent meta-analysis found that exercise training improved functional capacity and quality of life in patients with HFpEF.228 An overview of Cochrane systematic reviews also found that quality of life does appear to be improved after exercise training in persons with CHF.229 Exercise Training During Continuous Intravenous Dobutamine Infusion Many patients with severe CHF are hospitalized for prolonged periods, receiving continuous IV dobutamine infusion for inotropic support (to improve cardiac muscle contraction) while awaiting cardiac transplantation.230 Also, it is becoming common practice for patients with severe CHF to be occasionally hospitalized for IV dobutamine infusion ("dobutamine holiday") to transiently improve myocardial performance.231 Many patients are also being sent home on portable IV dobutamine pumps; their physical activity is less restricted when the large IV pumps are not used.232 However, exercise training during continuous IV dobutamine infusion has received little attention.233 Individuals receiving inotropic support have only recently been prescribed exercise training programs.234 Kataoka and associates233 presented the results of a single case study in which a 53-year-old man with CHF was prescribed an exercise training program while receiving 10 μg/kg/min IV dobutamine (which he had been prescribed for 10 months before exercise training). 16-18). Home Healthcare Nurse. Minimal detec table c hange (MDC) Identify the amount of c hange that exc eeds measurement error. The authors of the original AM-PAC then developed short forms and computerized adaptive testing.163 The "6 Clicks" instruments were then developed to be more focused on tasks that would assist the physical therapist with functional tasks specific to therapy and to be used in an acute care setting.108 The "6 Clicks" forms just break the AM-PAC down more specifically. 2007;18(1):21–26. Microvascular disease results in retinopathy, renal damage, and neuropathy, and macrovascular disease due to accelerated atherosclerosis causes CAD, stroke, and PAD. As the cuff pressure is gradually released, the systolic peaks of pressure finally exceed cuff pressure, and blood spurts into the arteries below the cuff, producing palpable pulses at the wrist. 2006;3(4):293–298. During the intervention observe the rhythm and the patient closely.13 Left Atrial Pressure and Pulmonary Capillary Wedge Pressure The LAP is the outflow or venous pressure for the pulmonary circulation, and the left ventricular end-diastolic pressure (LVEDP) reflects the PVR and is the primary indicator of left ventricular performance. The walls of the left ventricle are approximately three times thicker than those of the right, and the transverse aspect of the cavity is almost circular. Ostir G.V, Volpato S, Fried L.P, et al. Clinical tip Myocardial ischemia is a reversible process. Krettek A, Fager G, Lindmark H, et al. If the patient must use the arms of the chair to complete the test, he or she will be given a score of 0. Boston: Little, Brown; 1987. 327. Sodium nitroprusside (Nipride), a potent peripheral vasodilator, and intravenous nitroglycerin are frequently used.41 The intravenous nitroglycerin produces a slightly greater reduction in preload and a slightly lesser reduction in afterload compared with those of sodium nitroprusside.59 Although both agents are effective in reducing blood pressure, the intravenous nitroglycerin is the emergency drug of choice in the treatment of CHF associated with ischemic heart disease. Kellner R. Diseases of either arteries or veins in which components of the vessel wall have been impaired can result in an alteration in the usual laminar blood flow through the lumen. Wheezes on expiration are most common and are often associated with airway constriction, as is found in bronchospasm or when secretions are narrowing the airway. The average of the three systolic measures of blood pressure in the lower extremity is then divided by the average of the three systolic blood pressures taken in the upper extremity, providing you with the ABI. He is estranged from his two sons but stays in touch with his daughter, who brought him to the emergency room. Mobilizing the intensive care unit patient: pathophysiology and treatment. Prevalence of coronary calcification in relation to age, gender and risk factor profile in the insight population. Medical management of hypertension should begin upon diagnosis after echocardiogram is performed for baseline documentation of ventricular involvement. ■ Prognosis: Determining the patient's predicted level of optimal function, as well as the estimated length of time to achieve expected improvement. 1994;5:97–116. Transmission of impulses from the autonomic portion of the central nervous system to the effector organ to be stimulated occurs via neurotransmitter substances. Those that inhibit cholinergic receptors are called parasympatholytics or muscarinic antagonists. When it is injured, the brachial plexus of nerves and subclavian vessel injury may occur.4 Lower rib fractures may cause trauma to the diaphragm resulting in a diaphragmatic hernia. BO X 22- 1 Fa ct ors a ff e ct ing pa t ie nt out com e s Clinical factors Princ ipal diagnosis, severity Ac ute c linic al stability Comorbidity, severity Physic al func tional status Age, sex Nonclinical factors Health-related quality of life Cultural, ethnic , and soc ioec onomic attributes, beliefs, and behaviors Patient attitudes and preferenc es Psyc hologic al, c ognitive, and psyc hosoc ial func tioning BO X 22- 2 Dive rsit y of pa t ie nt out com e s Clinical factors S everity of princ ipal diagnosis Ac ute c linic al stability Comorbidity, severity Complic ations, iatrogenic illness Physic al func tional status S urvival Nonclinical factors Health-related quality of life Resourc e utilization Costs of c are S atisfac tion A resource for physical therapists wishing to access objective measures for outcomes would be the Rehabilitation Measures Database accessible at www.rehabmeasures.org. In left ventricular hypertrophy a deep S wave occurs in V1 and a large R wave in V5. Chest Medicine: Essentials of Pulmonary and Critical Care Medicine. Treatment includes discontinuation of the drug, lung biopsy, and possibly corticosteroids. J Cardiovasc Pharmacol Ther. The thickness of the alveolar capillary membrane is between 0.5 and 1.0 μm. 1994;172:47–55. 2008;40(6):998–1006. Treatment is with erythromycin, tetracycline, or streptomycin.32,42 Viral Pneumonias Cytomegalovirus, varicella zoster, and herpes simplex cause viral pneumonias most commonly in immunocompromised hosts, such as patients who have had major organ transplants or who have AIDS or malignancy. The majority of complications related to NPPV are associated with the tightly fitting mask and may include local skin damage from the pressure effects of the mask and straps, eye irritation, sinus pain or sinus congestion, and gastric distention. 17-4). With this in mind, it has become increasingly important for the clinician to recognize the reason for the presence of the equipment, interpret the settings and the readouts, and have the ability to assimilate the information available so as to provide a safe and effective intervention. Muscles of Ventilation Ventilation, or breathing, involves the processes of inspiration and expiration. In: Smith C.E, ed. Skeletal muscle metabolism in patients with congestive heart failure: relation to clinical severity and blood flow. ACC/AHA 2005 guideline update for the diagnosis and management of chronic heart failure in the adult: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. 1996;39:17–35. Similarly, drugs with different actions are often combined into one tablet. Fulop G, Strain H.H, Stettin G. Ischemic pain appears in the soft tissue served by the artery that is diseased. Morphine The use of morphine in the treatment of severe HF has proved invaluable for both its analgesic and its hemodynamic effects. Physical Properties of Lungs The processes of inspiration and expiration are facilitated by three physical properties of lung tissue. Finally, the presence of all equipment used in managing the patient, including monitoring or support equipment, should be noted. A joint replacement is an option with severely compromised joints.54 Pectus Excavatum Pectus excavatum (funnel chest) is a congenital abnormality characterized by sternal depression and decreased anteroposterior diameter (Fig. The left pulmonary artery runs in front of the descending aorta and the left primary bronchus to the root of the left lung. Treatment The first area is treatment of the precipitating cause of the ARDS. Now pneumonia and septic infections have the greatest impact on mortality rates.44 Paralysis of the respiratory muscles is highly correlated with morbidity and mortality during the first 4 weeks, with the highest mortality rates occurring in the first year. Table 4-7 The Killip and Kimball classification of patients with acute myocardial infarction Mortality rates of 1906 documented AMI patients admitted to CCU. Because a patient's status may change on a daily basis, this discharge plan must be frequently reassessed and modified according to the patient's improvement or lack thereof. In addition to the inflammatory response, infection may occur, which increases the progression of lung destruction. Low-Level Exercise Testing Low-level exercise testing is usually performed when patients have experienced an MI recently or have undergone coronary artery bypass graft surgery. Progression of coronary artery disease predicts clinical coronary events. Box 10-1 provides a systematic approach to assessment of a portable chest radiograph. In: Ruderman N, Devlin J.T, Schneider S.H, et al., eds. Hunt S, McEwen J, McKenna S. Weissman C, Kemper M. An abdominal thrust can be applied in conjunction with the exsufflation. Arata L, Farris L. Some COPD patients have steep declines in lung function during discreet clinical episodes. A, Alveolar cell injury. The total lung capacity (TLC) is the maximum volume to which the lungs can be expanded; it is the sum of all the pulmonary volumes. Close medical monitoring of the early subtle clinical changes as they occur and early intervention at these first signs of decompensation contribute to prevent the worsening of HF and hospitalization. 283. Ancillary Pulmonary Medications In addition to the aforementioned medications, several other drug groups are frequently used in the treatment of respiratory disorders: decongestants, antihistamines, antitussives, mucokinetics, respiratory stimulants and depressants, paralyzing drugs, and antimicrobial agents. Note that at least two feedback loops are present: the autonomic nervous system loop and the hormonal loop. In addition to the general appearance, the other specific areas that should be noted on inspection include facial expression, effort to breathe through nose or mouth, the neck, the chest in both a resting and a dynamic situation, phonation, cough and sputum production, posture and positioning, and finally the extremities. Chapter 11 discusses other treatments for those with documented carotid disease in greater detail. London: Churchill Livingstone; 2009. Therefore the presence of ketone bodies in the urine with an elevated blood sugar higher than 250 mg/dL is a worrisome condition that needs immediate medical consultation before exercise may continue. 2008;40(7):1213–1219. The drug and its receptor form a specific complementary relationship, like a key fits into a lock. Repeat Holter monitoring may be necessary once treatment has been initiated to evaluate the effectiveness of the treatment. Pulmonary Function Tests As discussed in Chapter 10, PFTs measure a person's inspiratory and expiratory capacities. 2009;18(3):212–221. Second, the lack of blood flow causes coagulative necrosis of the alveolar walls; the alveoli fill with erythrocytes, and there is an inflammatory response. When the patient inhales, the therapist's arm position does not move, thus applying pressure to the upper chest and resisting expansion. Arch Intern Med. Currently there are a large number of scales to classify and characterize dyspnea: the most frequently used scales in everyday clinical practice are the Baseline Dyspnea Index (BDI)/Transitional Dyspnea Index (TDI), the Dyspnea Index (DI), the Borg Rate of Perceived Dyspnea Scale (RPD), and Visual Analog Scale (VAS).82,83 Monitoring the acute care patient for subjective complaints of angina during treatment is important. Using such parameters as heart rate (HR), systolic and diastolic blood pressure (SBP, DBP), mean arterial pressure (MAP), oxygen saturation (SaO2), respiratory rate (RR), and electrocardiograms (ECG) gives the therapist important information on how the patient is tolerating the activity. Alberti K.G.M.M, Eckel R.H, Grundy S.M, et al. Meerschwam I.S, Hootsmans W.J.M. An electromyographic study in hypertrophic obstructive cardiomyopathy. The posteroanterior chest radiograph remains the standard for evaluation and classification of asbestosis.39 Clinical Manifestation The clinical manifestation of asbestosis can be found in Table 5-9. When an S3 is auscultated in an older, physically inactive person or in the presence of heart disease, it typically indicates a loss of ventricular compliance (failure), often called a ventricular gallop. Smith-Schneider L.M, Sigman-Grant M.J, Kris-Etherton P.M. Dietary fat reduction strategies. Henke K.G, Regnis J.A, Bye P.T.P. Benefits of continuous positive airway pressure during exercise in cystic fibrosis and relationship to disease severity. Hondeghen L, Mason J. In: Libby P, Bonow R.O, Mann D.L, et al., eds. Risk of future CVD increases by 2% per 1 cm increase in WC. 1995;152:204–210. Clinical tip The radiograph of a patient with moderate to severe chronic obstructive pulmonary disease will show widened intercostal spaces, flattened hemidiaphragms, squared-off costophrenic angles, and rib angles that approach 90 degrees. Mancini D.M, Eisen J, Kussmaul W, et al. Acute Care Handbook for Physical Therapists. Schmidt D, Dent G, Rabe K.F. Selective phosphodiesterase inhibitors for the treatment of bronchial asthma and chronic obstructive pulmonary disease. The most common abnormality is a secondary polycythemia (excess of red corpuscles in the blood), which is a result of either a reduction in oxygen transport or an increase in erythropoietin production.87 Erythropoietin is an α2-globulin responsible for red blood cell production, and its important role is demonstrated in Fig. Because of the potential for worsening glucose levels, niacin is not generally recommended for the diabetic patient; if deemed medically necessary, there must be very tight glucose monitoring. However, this selectivity breaks down when high doses are used or in certain cardiac-sensitive individuals. The position of the larynx depends on the age and sex of the individual, being opposite the third to sixth cervical vertebrae in the adult male and somewhat higher in adult females and children. The clinical decision making for activity progression is based on the patient's

pulmonary artery; 5, pulmonary vein to the right upper lobe; 6, right interlobular artery; 7, vein to right middle and lower lobes; 8, aortic knob; 9, superior vena cava. 2008;14:741–751. 1991;100:118–123. When lung tissue is repeatedly involved in hemorrhage, edema, and pneumonia, then fibrosis may result. Pitt B. An increase in lung tissue density causes increased sound transmission. ■ Augmenting flow of blood through coronary arteries ■ Increasing CO ■ Lowering systolic blood pressure ■ Decreasing heart rate FIGURE 13-18 Subcutaneous Implantable Defibrillator (S-ICD) protection without touching the heart. Deshpande A.D, Harris-Hayes M, Schootman M. Accuracy in measurement is critical to the correct interpretation of the blood pressure. The location of the lobes of the lung and the correlating surface anatomy can be found in Fig. 1993;218(3):310–320. If they are of uniform size, they are called miliary nodules. The community-acquired Klebsiella pneumonia is seen most commonly in men over the age of 40 who are alcoholic or diabetic or who have underlying pulmonary disease. Dekerlegand J.L. Research corner outcome measures in cardiopulmonary physical therapy: Focus on the Kansas City Cardiomyopathy Questionnaire. 1983;75:34–39. For the patient who has undergone bypass surgery with numerous vessels requiring bypass grafts or requiring left main or left main equivalent bypass, one might assume that the patient was more limited in activity before surgery. Pharmacologic Intervention Pharmacologic management of myocardial ischemia involves the reestablishment of a balance between myocardial oxygen supply and myocardial oxygen demand. So, in addition to measuring arterial pressures, the arterial line provides a convenient route of access for arterial blood sampling. In Braunwald E, editor: Heart Disease: A Textbook of Cardiovascular Medicine, ed 9, Philadelphia, 2012, Saunders. ■ Severe CMD has the potential to reduce blood flow to the pancreas, which impairs insulin secretion and glucose tolerance. Properties of the COPD assessment test in a cross-sectional European study. However, sinus node, atrioventricular node, and Purkinje fibers have a unique ability to spontaneously depolarize and self-excite as a result of altered cell membrane permeability to sodium. Goldberg, PT, DPT, CCS Adjunct Professor, Department of Physical Therapy, University of Hartford, Hartford, Connecticut Physical Therapist, Department of Rehabilitation, Hartford Hospital, Hartford, Connecticut Kate Grimes, MS, PT, CCS, Clinical Assistant Professor, Massachusetts General Hospital, Institute of Health Professions, Boston, Massachusetts Ellen Hillegass, PT, EdD, CCS, FAACVPR, FAPTA President, Cardiopulmonary Specialists, Inc, A Consulting Corporation, Partner in PT CARDIOPULMONARY EDUCATORS, LLC, A webinar-based continuing education company, Adjunct Professor, Department of Physical Therapy, Mercer University, Atlanta, Georgia Adjunct Professor, Department of Physical Therapy, Western Carolina University, Cullowhee, North Carolina Morgan Johanson, PT, MSPT, CCS Coordinator of Inpatient and Outpatient, Cardiac and Pulmonary Physical Therapy Co-Director, Cardiovascular and Pulmonary Physical Therapy Residency Program, Physical Medicine and Rehabilitation, Ann Arbor VA Healthcare System, Ann Arbor, Michigan Tamara Klintwork-Kirk, PT, CCS, Clinical Services Coordinator, Department of Physical and Occupational Therapy, Duke University Hospital, Durham, North Carolina Meghan Lahart, PT, DPT, CCS, Physical Therapist II, Rehabilitation Services, Advocate Christ Medical Center, Oak Lawn, Illinois Kristin M. The IABP is occasionally used in conjunction with a slightly different but similar treatment called pulmonary artery balloon counterpulsation (PABC) in the pulmonary artery versus the thoracic aorta, which is helpful in treating right ventricular and biventricular failure unresponsive to inotropic drugs and the IABP alone.201 Ventricular Assist Devices A ventricular assist device (VAD) is a mechanical pump that provides support to a failing ventricle, either the LV, right ventricle, or both (Fig. Lymphoedema-distichiasis and FOXC2: Unreported mutations, de novo mutation estimate, families without coding mutations. Spiliopoulos S, Koerfer R, Tenderich G. 78. Each hemidiaphragm is composed of three musculoskeletal components, including the sternal, costal, and lumbar portions that converge into the central tendon. Side Effects Some of the more common side effects include the following: GI distress (e.g., constipation, diarrhea, and nausea), liver function abnormalities, skin rashes and flushing (especially with niacin), increased bleeding time (especially with fish oils), slight increase in gallstone formation (gemfibrozil), increased blood glucose levels (niacin), and potential to worsen glucose levels in diabetes patients (niacin). 2007;17:275–283. Dong E, Hurley E.J, Lower R.R, Shumway N.E. Isotopic replacement of the totally excised canine heart. Autonomic dysreflexia (hyperreflexia) can produce marked elevation of BP when noxious visceral or cutaneous stimuli, such as a full bladder, are sensed below the level of the lesion. 1997;20:426–432. Bronchiolitis Obliterans Bronchiolitis obliterans is a fibrotic lung disease that affects the smaller airways. In: Rakel R, ed. In addition, alveolar epithelial and endothelial permeability are abnormal in the immature lung. The ECG of a patient on calcium-channel blockers may show a prolonged PR interval and no effect on the QRS complex. To counteract some of these changes and to keep the PaO2 within the normal range, the body increases the progesterone level during this trimester. Blood Pressure Monitoring Arterial blood pressure is the result of the rate of flow of blood (cardiac output) through and against the resistance of the circulatory system (systemic vascular resistance [SVR]). ed 38. Purkinje fibers demonstrate a fast depolarization phase (0), but also have similar phase 4 diastole characteristics of self-excitation, as in the slow channel (red dotted line). Symptoms Three hallmark symptoms are usually experienced with RLD (see Table 5-1). Early silicosis with sparse and small silicotic nodules (A) and silicosis with many nodules of varying sizes (B). Steinbrook R. 1990;141:1214–1220. This muscle is a primary accessory muscle and elevates the sternum, increasing the anteroposterior diameter of the chest. Moser K.M, Bokinsky G.E, Savage R.T, et al. In continuous ambulatory peritoneal dialysis (CAPD), the used fluid from the previous treatment is drained from the abdomen after a few hours of “dwell time” and new fluid is introduced; this is a manual procedure that requires no machine, and the fluid exchanges are performed four times per day. The rib cage is elevated in the supine position, putting the rib cage musculature at a mechanical disadvantage, thereby decreasing its ability to generate an inspiratory volume.10 Therefore in the supine position, diaphragmatic dysfunction produces a more significant decrease in alveolar ventilation than that produced in the upright position. These arteries have the ability of vasoconstriction and vasodilation as a result of the presence of smooth muscles cells to control the amount of blood flow to the periphery.6 These smooth muscle cells are under autonomic nervous system influence through the presence of α-receptors. Inflation of the balloon occurs at the beginning of ventricular diastole, immediately after closure of the aortic valve. In an upright position, the dome of the diaphragm is pulled down because of the effects of gravity. These patients are particularly susceptible to respiratory failure with general anesthesia and sedatives. Potent vasodilators, including prostacyclin (and prostacyclin analogs) and NO, have shown hemodynamic and symptomatic benefits in certain patients. Respiratory dysfunction in multiple sclerosis: a prospective analysis of 60 patients. 2007;335:974. ■ The unidirectional flow of lymph is assisted by valves found in the larger lymphatic vessels. Gated single-photon emission computed tomography EF was 38%. Treadmill exercise and resistance training in patients with peripheral arterial disease with and without intermittent claudication: A randomized controlled trial. An inferior infarction is identified by significant Q waves in leads II, III, and aVF (Fig. A hollow thumping sound should be produced. submaximal, 279, 281b See also Stress testing ventilatory gas analyses with, 286 vascular studies, 295 Exercise-induced bronchospasm, 208 See also Asthma Expiration muscles, 6f, 7 See also Muscles Expiratory muscle training, 115 Expiratory reserve volume (ERV), 23–24 Extremity changes, 100 F Face Scale, 684t–687t Facial characteristics, 514–515 Facilitation strategies, 547–549 False-positive vs. 2009;41:459–471. 1998;17(2):58–63 quiz 64–66. It is important to note that question 15 was adapted from the Mental Health Inventory of the SF-36, a general quality-of-life tool, to be used as a marker for depression, which is an important prognostic variable among those with cardiovascular disease.85 There are a total of eight different domains that the test encompasses, including physical symptoms, symptom stability, social limitation, self-efficacy, quality of life, functional status, and clinical summary. 2008;9:30–34. Centers for Disease Control and Prevention. The Walking Impairment Questionnaire Background and Administration The Walking Impairment Questionnaire (WIQ) is a survey focusing on the amount of difficulty a person has in walking on a level surface, on the stairs, and at different speeds and the amount of difficulty a person has with walking because of pain.189 The questionnaire takes 5 to 10 minutes to complete and may be self-administered, administered over the phone, or administered by a physical therapist. If this drug is not tolerated, then pentamidine is prescribed.10,12,32 Chlamydial Pneumonias Chlamydia psittaci C. 4 Cardiac muscle dysfunction and failure Ellen Hillegass, Sean T. 2009 Focused update: ACCF/AHA guidelines for the diagnosis and management of heart failure in adults: a report of the American College of Cardiology Foundation/American Heart Association Task Force on practice management of heart failure in adults. Complications include pneumothorax, lung abscess, endocarditis, and meningitis. Factors affecting blood pressure include cardiac output, peripheral resistance, distensibility of the arteries (vasomotor tone), volume of blood in the system, viscosity of the blood, and neural input. 1998;81:26B–31B. When changes in lung volume do not parallel the normal outward and inward pull during inspiration and expiration, respectively, and are, in fact, opposite, the breathing pattern is said to be paradoxical. The bladder of the cuff is placed over the brachial artery and should cover approximately 80% of the patient’s upper arm. Wells Prediction Tool for Deep Vein Thrombosis Individuals are at an increased risk for venous thromboembolism (VTE) due to medications, inactivity, injury, and even cancer diagnosis and treatment. Of note, as improved therapies and preventive measures have reduced the incidence and severity of cardiopulmonary complications of these diseases and extended the longevity of these patients, atherosclerotic CVD has become an even greater cause of death and disability.231 Inflammatory mechanisms, along with physical inactivity, are important contributory factors, as well as acceleration of atherosclerosis by corticosteroid treatment.232 Rheumatoid Arthritis The chronic inflammation of rheumatoid arthritis (RA) frequently affects other organ systems, including the CV and respiratory systems, particularly when the disease is severe and long-standing. The two halves are essentially identical, having a floor, medial and lateral walls, and a roof divided into three regions: the vestibule, the olfactory region, and the respiratory region. Further investigative studies include CT of the thorax, pleural biopsy, thoracentesis, thoracoscopy, and occasionally bronchoscopy.1,48 Table 5-14 Clinical manifestation of pleural effusions Clinical Manifestation The clinical manifestation of pleural effusions can be found in Table 5-14. Cephalosporins may elicit stomach cramps, diarrhea, nausea, and vomiting. Dividing the observed value by the predicted value derives the percentage of predicted values. Cardiopulmonary implications of specific diseases Obesity Diabetes Mellitus Clinical Implications for Physical Therapy Chronic Kidney Disease and Failure Other Specific Diseases and Disorders Cardiopulmonary Toxicity of Cancer Treatment Summary Section 3. Eating Disorders The two most common eating disorders are anorexia nervosa and bulimia. Improve your understanding of the cardiopulmonary system withEssentials of Cardiopulmonary Physical Therapy, 4th Edition. With fluid in the alveoli and the interstitium, lung compliance is decreased, ventilation–perfusion mismatching is increased, gas exchange is disrupted, the work of breathing is increased, and there is restrictive lung dysfunction.9,32,53 As a result of gravity, as well as the pulmonary perfusion pressure and pulmonary venous pressure from the apex to the base, excess fluid gathers in the dependent areas of the lung.54 Prognosis for patients with pulmonary edema does not directly correlate with the edema itself, but rather the impact of the edema. 1977;1:385–401. 2005;14(5):9–14. Philadelphia: BC Decker; 1988. 1971;21(8):810–816. In addition, involvement of the endocardium can induce arrhythmias and valvular dysfunction, myocardial involvement can lead to cardiomyopathy, and involvement of the coronary arteries can result in myocardial ischemia and, on rare occasions, infarction. Because of its high cost, omalizumab is generally prescribed to patients with severe, persistent asthma that cannot be controlled with high doses of corticosteroids. She is at extreme risk for pneumonia. Am J Respir Cell Mol Biol. BO X 10- 3 A com pa rison be t we e n C T a nd MRI t o a ssist clinicia ns in de t e rm ining ut ilit y a nd be ne fit of e a ch sca n. ↑ Protein in urine 3. Diffuse disorder of coronary artery vasomotility in patients with coronary spastic angina. The addition of other medications to this regimen is typically guided by the occurrence of acute or chronic rejection or other medical complications that occur. Microcytic anemias are found in iron deficiency, chronic infections, chronic renal disease, and malignancies. The patient is also asked to rate the impact that pain has on performing the activity using a similar 0 to 10 scale. 1998;87:1180–1184. In: Crapo J.D, Glassroth J, Karlinsky J.B, et al., eds. 1998;8:109–115. A controlled trial of long-term inhaled hypertonic saline in patients with cystic fibrosis. MA’s 6-minute walk distance increased by almost 100 feet in the first year but then showed a decrease as the patient’s condition worsened. Such tests have been performed as early as 5 days after MI or surgery,111 but are more likely to be performed just before or immediately after discharge from the hospital following an acute event. The interventricular septum forms the medial wall of the left ventricle and creates a separation between the left and right ventricle. Prevalence of coronary artery disease and plaque morphology assessed by multi-slice computed tomography coronary angiography and calcium scoring in asymptomatic patients with type 2 diabetes. Critical illness neuromuscular syndromes. However, many patients do not notice respiratory dysfunction even in the presence of significant respiratory insufficiency because of the gradual onset and slow progression of the respiratory muscle weakness. If teachings threaten cultural or religious beliefs, this conflict may be a detriment to learning. Goldberg M, Berman E.F, Akman L.C. Homologous transplantation of the canine heart. Table 7-12 Signs and symptoms of hypoglycemia Hypoglycemic reactions Adrenergica Mild Tremor or shakiness (BG ≤60 to 70 mg/dL) Anxiety and nervousness Tac hyc ardia Palpitations Inc reased sweating Exc essive hunger Moderate Irritability and abrupt mood c hanges (BG ~40 to 50 mg/dL) Weakness Dizziness Numbness or tingling of lips and tongue Nausea or vomiting (rare) S evere c Neuroglycopenicb Headac he Lethargy, drowsiness Impaired c onc entration and attentiveness Blurred vision Mental c onfusion Nightmares Nighttime restlessness or inability to go bac k to sleep Night sweats Loss of c onsc iousness S eizures Coma Death a Caused by increased activity of the autonomic nervous system. This is followed by select and incremental single beeps that come in decreased time intervals throughout the test. Primary prevention programs should be implemented at the work site, fitness centers, senior citizen centers, and primary physician’s offices, as well as in outpatient physical therapy clinics and cardiac rehabilitation centers. de Koning L, Merchang A.T, Pogue J, et al. Stary H.C. Evolution and progression of atherosclerotic lesions in coronary arteries of children and young adults. 1993;71(8 Suppl):S51–S54. Patient lives approximately 1.5 hours away from the transplantation center. In addition, dopamine is frequently administered (as are dobutamine and amrinone) during and after cardiac surgery to improve low cardiac output states.20 Dobutamine Dobutamine is a sympathomimetic amine that stimulates β1 receptors in the myocardium, with very little effect on α-adrenergic receptors. Chicago: Year Book Medical Publishers; 1968. Hemodynamic spectrum of myocardial infarction and cardiogenic shock. Approximately 10% of patients develop respiratory muscle involvement that can be life threatening.53,61 The relapses and exacerbations associated with myasthenia gravis are more frequent in the first year, and remissions are rarely complete or permanent. Additional diseases are defined as obstructive diseases, which include cystic fibrosis, bronchiectasis, and bronchopulmonary dysplasia. Neth Heart J. JJ was then referred to physical therapy for evaluation and treatment. Medical Chart Review The purpose of the medical chart review is to extract pertinent information to develop a database on the patient. Clinical tip When working with patients with liver dysfunction, remember that the first-pass effect may not occur and therefore the effects of the medications the patients are taking may be increased. 1999;47:613–618. In a patient taking certain cardiac medications, specifically β-blocking medications, a blunted (slower rate of rise and lower peak) heart rate response to exercise is anticipated and considered normal. Tanner K, Sabrine N, Wren C. 1991;2:398–404. The goal of drug therapy is to prescribe the appropriate medication for the individual’s needs with the expectation that the medication is delivered to the site of action in adequate strength (therapeutic level) to elicit the appropriate clinical response. Clinical tip Radiation Currently, most radiation exposure to individuals in North America is attributed to medical diagnostic testing.9 The radiation exposure to a person undergoing a CT scan is 50 to 100 times greater than a standard chest radiograph, with exposure from helical CT being even greater. Sutton P.P, Pavia D, Bateman J.R.M, Clarke S.W. Chest physiotherapy: A review. Three major lipoproteins carry blood cholesterol: FIGURE 14-8 Site of action of captopril (Capoten) blockade at 1 and angiotensin II–receptor blockade at 2. Depressive symptoms are the strongest predictors of short-term declines in health status in patients with heart failure. 2006;21(4):363–366. 1977;232(4):H373–H380. (From Monahan FD, Sands JK, Neighbors M: Phipps’ Medical-Surgical Nursing, ed 8, St. Louis, 2007, Mosby.) Interventions for venous insufficiency comprise exercise, elevation of the extremity, avoiding long periods of sitting or standing, compression, and aggressive wound management, along with education to prevent further progression of the disorder. (From Jessup M, Abraham WT, Casey DE, et al. Bilateral costal expansion is performed with the patient in a semireclined or sitting position. Temperature = 98.6° F. Arrhythmias and second-degree AV block may occur during painful episodes and increase the risk of sudden death. J Thorac Imaging. Dermatitis and hemosiderin staining are typically visible skin changes caused by venous insufficiency. St. Louis: Mosby; 1979. Clinical tip If a decrease in heart rate is palpated with activity, this may be due to an increase in arrhythmias that are palpated as pauses. Electrocardiograms do not predict the future and cannot give medical information of coronary anatomy. An example preoperative session is provided here. Fortunately, many other reliable and valid measures are available to evaluate functional performance and outcomes that can be used in the home, outpatient, inpatient acute, rehabilitation, and other treatment environments. 134. Padman R, Von Nesson S, Goodill J, et al. Because the distensibility of the lung is decreased, the inspiratory reserve volume (IRV) is diminished. The use of newer oral anticoagulants is on the rise due to the ease of use, safety and efficacy of use, and lack of need to monitor blood therapeutic levels. Suggested Usage The CAT can be used with anyone with COPD. Radiation therapy to the chest can damage all structures of the heart (see Table 7-21), with the highest risk occurring in survivors of pediatric HD.323,328 Late sequelae, which may not become clinically apparent for up to 25 or more years after treatment, often involve more than one cardiac structure in affected individuals, so that a number of conditions occur together. If comorbid conditions exist, then the goal of drug therapy is blood pressure reduction below the 90th percentile. High-risk patients exhibit an increased risk of complications or death as a result of myocardial ischemia or poor ventricular function. Conduction System In a normal conduction system (Fig. 2003;51:1–10. If the SpO2 drops below the minimum threshold, the therapist increases the amount of oxygen to keep the saturation in the prescribed range. In either setting, the patient should be positioned in an upright sitting posture and a nose clip should be used. 2008;9:624–630. As a result, the patient may be in a confused state, which can result in an unstable clinical situation. 1992;2:165–167. A number of agents are used to treat specific symptoms in affected organs.63 Lung transplantation may be an option, particularly if the scleroderma has not affected any other organ system.10 Otherwise, only supportive treatment of pulmonary symptoms is available. Depending on the previous type of exercise evaluation performed or on the level of function of the patient, the stress test may be a 6MWT or a formal symptom-limited treadmill or cycle ergometer test. Beta-adrenergic drugs. Pathophysiology “Heart failure is a complex clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood.”20 Heart failure due to impaired filling (diastolic impairment) usually presents with a normal or near normal ejection fraction and is abbreviated HFpEF: heart failure with preserved ejection fraction. Hunt S.A, Haddad F. Treatment usually includes antiinflammatory medications. 1977;116:853–860. At a specific time (endexpiration, for example) the shutter is occluded, and the various volume and pressure values are measured. Chest Physiotherapy in the Intensive Care Unit. Gary R, Sueta C, Dougherty M, et al. 9-48) is also diagnostic for infarction, but the date of the infarction is not able to be determined simply by studying the ECG. 1987;60(4):309–315. Some other antipsychotic drugs are associated with significant parasympatholytic or anticholinergic effects, causing some bronchodilation but also dry mouth, blurred vision, constipation, and urinary retention. Calcium-Channel Blockers Calcium-channel blockers do not fit exclusively into either category of decreasing myocardial oxygen demand or increasing myocardial oxygen supply; they influence both. The fact that airflow is directed away from the chest wall during expiration might explain the fading away of the sound during expiration and the reason why only approximately the first third of expiration can be heard. 2004;25:53–64. Patient preparation includes the following: The patient should wear comfortable clothing and shoes. It is estimated that 87% of these events result from ischemia and the remaining from a hemorrhage.1 Stroke is the leading cause of disability and the fourth leading cause of death after CAD, cancer, and chronic lung disease in the United States.1 Fig. Worldwide, 1% of infants are affected by RDS.8 In the United States, 60,000 to 70,000 are affected.1,10 Pathophysiology Respiratory distress syndrome is caused primarily by abnormalities in the surfactant system and inadequate surfactant production. The systems review includes the assessment of the following: ■ Communication ability, affect, cognition, language, and learning style ■ The cardiovascular and pulmonary systems, with an examination of the heart rate, respiratory rate, blood pressure, and presence of edema ■ The musculoskeletal system, with an examination of gross symmetry, gross range of motion, gross strength, height, and weight ■ The neuromuscular system, including an examination of gross movement involving balance, gait, locomotion, transfers, and transition as well as motor control and motor learning ■ The integument system, including examination of pliability (texture), presence of scar formation, skin color, and skin integrity BO X 16- 1 Guide ca t e gorie s for t e st s a nd m e a sure s • Aerobic capacity/endurance • Anthropometric characteristics • Arousal, attention, and cognition • Assistive and adaptive devices • Circulation (arterial, venous, lymphatic) • Cranial and peripheral nerve integrity • Environmental, home, and work (job/school/play) barriers • Gait, locomotion, and balance • Integumentary integrity • Joint integrity and mobility • Motor function (motor control and motor learning) • Muscle performance (including strength, power, and endurance) • Neuromotor development and sensory integration • Orthotic, protective, and supportive devices • Pain • Posture • Prosthetic requirements • Range of motion (including muscle length) • Reflex integrity • Self-care and home management (including activities of daily living and instrumental activities of daily living) • Sensory integrity • Ventilation and respiration/gas exchange • Work (job/school/play), community, and leisure integration or reintegration (including instrumental activities of daily living) From American Physical Therapy Association: Guide to Physical Therapist Practice, ed 2, Baltimore, 2003, APTA. Adapted from Sokolow M, McIlroy M, Cheitlin M: Clinical Cardiology, ed 5, East Norwalk, 1990, Appleton & Lange. Quinn T, Alam N, Aminazad A, Marshall M.B, Choong C.K.C. Decision making and algorithm for the management of pleural effusions. Cystic fibrosis, a genetic exocrine gland involvement affecting the pulmonary system, is discussed in Chapter 6. This test is completed by having the patient alternate lifting one lower extremity at a time to a point between the opposite patella and iliac crest. Examination and assessment procedures 17. Mosby’s Respiratory Care Equipment. Relatively selective β2 agonists are used primarily in the management of respiratory dysfunction. These medications include TNF blockers, medications that block the rate of bone loss, immunosuppressants, and nonsteroidal anti-inflammatory drugs (NSAIDs). The inspiratory capacity (IC) is the sum of the tidal and inspiratory reserve volumes; it is the maximum amount of air that can be inhaled after a normal tidal exhalation. Thus HIV has become a chronic illness with episodes of exacerbations and remissions, which often affects the neurologic, cardiopulmonary, integumentary, and musculoskeletal systems. When the amount of anticoagulation is within narrow limits, warfarin therapy is both safe and effective; however, too little anticoagulation can lead to treatment failure or recurrence of thrombosis, and too much anticoagulation can lead to serious or fatal bleeding. As a result of an imbalance in myocardial supply–demand, ventricular arrhythmias and acute heart failure may occur in addition to tissue injury. 2002;166(1):111–117. 116, B). Hydrophilic drugs (the kidney cannot excrete lipophilic drugs or compounds) or metabolites are then excreted by the kidney into the urine. Clin Nephrol. C, Complete occlusion of vein by thrombus forcing backflow of blood. 1997;16(3):313–319. Skeletal muscle involvement in cardiomyopathies. Can we measure the ankle-brachial index using only a stethoscope? Role of insulin resistance and hyperglycemia in the development of atherosclerosis. 1995;59(2 Suppl):S46– S51. Determinants, of abnormal blood pressure response to exercise in coronary artery disease. The first section assesses the impact of angina on the individual’s ADLs. In this section, the patient rates perceived day-to-day limitations in ADLs. Limitations are rated on the following scale: severely limited, moderately limited, somewhat limited, a little limited, not limited, or limited and unable to complete the task. Facilitating patient adherence to exercise programs can create a challenge for the physical therapist. This is known as congestive atelectasis. Spinal cord injury is associated with significant pulmonary dysfunction, according to the severity and level of injury.239,242,261 Spinal cord injury at or above C3 to C5 interferes with phrenic nerve function, causing partial or complete bilateral hemidiaphragmatic paralysis, and diminishes intercostal muscle forces, leading to marked reductions in ventilation and cough force; ventilatory assistance is almost always required for lesions above C4. 20Warning. Epinephrine (adrenaline) acts directly on all receptor types, whereas ephedrine increases norepinephrine synaptic concentrations on all receptor types. Pectus excavatum can have an impact on the cardiac function. Respiratory muscle function and dyspnea in patients with chronic congestive heart failure. This will improve oxygenation by altering the dependent area of lung to areas less severely affected.51 Thus oxygenation will improve. Spider veins are dilated veins in the dermal layer of the skin (Fig. Before the patient initiates an inspiration, the therapist gives a small amount of resistance to the diaphragm by pushing gently up and in, and continues this pressure through the inspiratory phase. The therapist gently places the hands just below the rib cage on both sides of the patient’s thorax. Hercules P.R, Lekwart F.J, Fenton M.V. Pulmonary Restriction and Obstruction. ■ A third universal definition of AMI has been adopted to include criteria of a rise or drop of troponin plus evidence of symptoms of ischemia, ECG changes (pathologic Q wave, ST-segment changes, and/or new left bundle branch block), or new cardiac muscle damage or wall motion abnormalities seen on imaging. Abnormally low pulmonary compliance, which may result from chronically impaired chest wall mobility and low lung volumes, makes the chest wall stiffer and adds to the difficulty in expanding the lungs. Int J Obes. Both myocardial contractile and conduction tissue are refractory to restimulation when the cell membrane is still depolarized. The top portion of Fig. However, the effects of ventilatory muscle training upon ventilatory muscle endurance, which may be the most important effect of ventilatory muscle training in this patient population, were not evaluated. 2004;170:22–48. Also, this protocol allows the athlete to attain a steady state in a shorter period. The severity of CHF can sometimes be inferred from the number of pillows used to prevent orthopnea. Pharmacology 14. Pressures within the right ventricle are relatively lower compared with the left ventricle, with diastolic pressures ranging from 0 to 8 mm Hg and systolic pressures ranging from 15 to 30 mm Hg.17 During periods of exacerbation, patients with chronic lung pathologies, including COPD and pulmonary fibrosis, often present with hypoxemia and increased pressure within the pulmonary vasculature, termed pulmonary artery hypertension, caused by compromised perfusion capacity to the lung.19,20 The increased pressure within the pulmonary artery increases the workload on the right ventricle, causing cor pulmonale, or right ventricular hypertrophy, and resultant right ventricular failure. The initial portion of the expiratory loop is effort dependent; however, after the first third of the expiratory curve, the curve is effort independent and reproducible. Nutritional Intake Identifying nutritional intake is especially important in individuals who are underweight or overweight, yet all patients should be evaluated for intake during the time of rehabilitation. Ideally, a drug with a more specific β2-receptor action with no α- and β1-receptor activities would be the most preferred for bronchodilator therapy. 2006;355:1873. Positron emission tomography, CT, SPECT, EBCT, MUGA, and MRI are all imaging techniques used for evaluation of CAD and cardiac dysfunction. Routes of administration and duration of action vary widely among the preparations, from the immediate- and short-acting sublingual nitroglycerin to the slow-release, longer-acting transdermal patch (Table 14-4). A subendocardial infarct (also called a nontransmural, non–Q-wave infarct, or non–ST-segment elevation myocardial infarction [STEMI] infarct) is an acute injury to the myocardial wall, but it does not extend through the full thickness of the ventricular wall. 8-5). The references establishing the validity and reliability of the GXT with multiple populations and variabilities in protocols are too numerous to list here. Progression of resistance occurs versus increasing repetitions striving to have the individual use the greatest resistance possible to complete 15 repetitions. New York: McGraw-Hill; 1998. Correlates and prognostic implication of exercise capacity in chronic congestive heart failure. A well-known group of adrenergic antagonists are the β-adrenergic antagonists (β-blockers), which has formed a cornerstone in the management of coronary artery disease for the past 40 years. Sachdeva A, Dalton M, Amaragiri S.V, et al. Effects of intermittent exercise and use of home exercise equipment on adherence, weight loss, and fitness in overweight women: a randomized trial. Also, patients with a pneumothorax and resultant mediastinal shift will demonstrate an altered point of maximum impulse away from the normal anatomic position of the apex of the heart. US Renal Data System. FIGURE 1-4 The diaphragm originates from the lumbar vertebra, lower ribs, xiphoid process, and abdominal wall and converges in a central tendon. 1999;32:15–21. Hiatt W.R, Wolfel E.E, Meier R.H, et al. 2004;1(210– 17):e62. Pathophysiology The increase in body weight represents a significant increase in body mass, and this extra tissue requires additional oxygen from the lungs and produces additional carbon dioxide, which must be eliminated by the lungs. Cost and accessibility continue to play a role in the feasibility of drug development, as well as the process of obtaining approval by the FDA. Prog Pediatr Cardiol. 1988;62(2):25A–30A. Therefore in exudative pleural effusions, the pleurae are in some way involved in the pathologic process. Cairo J.M. Administering medical gases: regulators, flowmeters, and controlling devices. Spertus J, Winder J, Dewhurst T, et al. Radiation-induced pulmonary toxicity is usually related to the volume of lung tissue radiated, total dose of radiation, and the dose per treatment fraction (see Table 7-20).327,330 The advent of threedimensional treatment planning has permitted higher radiation doses to be delivered to the tumor while sparing surrounding normal tissue and is associated with a marked reduction in pulmonary toxicity. Winkelman reviewed numerous published reports on mobilization and ambulation of patients with pulmonary artery and femoral catheters in the ICU and reported that altered hemodynamics or lack of patient cooperation were bigger deterrents to mobility.13 Clinical tip When deciding to mobilize a patient with a pulmonary artery catheter, note the location of the catheter, assure its security, note the waveform and rhythm, and ensure patient cooperation. FIGURE 9-49 A 12-lead electrocardiogram tracing demonstrating an anterior infarction. 1994;15(2):405–420. 1991;77:801–804. Meyerburg R, Castellanos A. Inadequate drug elimination and consequent accumulation can cause cardiac irritability and a higher incidence of arrhythmias. Terminal respiratory (acinar) units. Streiff M.B, Brady J.P, Grant A.M, et al. The presence of significant Q waves in the chest leads, particularly in V1, V2, V3, and V4, indicates an infarction in the anterior portion of the left ventricle. Treatment Kyphoscoliosis is treated conservatively with orthotic devices and an exercise program. Cardiac output responses to continuous positive airway pressure in congestive heart failure. Study Questions What is this type of pain called? 1995;25(1):163–170. A check of the patient’s medical status, including laboratory values, x-ray reports, vital signs, telemetry, last dosage of medications, and past medical/surgical history, is warranted. Hung C, Daub B, Black B, et al. Counterrotation Counterrotation technique can increase tidal volume and decrease respiratory rate by reducing neuromuscular tone and increasing thoracic mobility. Constant J. Depression predicts failure to complete phase-II cardiac rehabilitation. Cardiopulmonary exercise testing with ventilatory gas analysis provides information on cardiac performance, functional limitation, and exercise limitations, particularly when the symptom limiting the individual is breathlessness or dyspnea. The final summary of the exercise test should define whether the outcome of the test is normal or abnormal; if the outcome is abnormal, the summary should provide the reasons. 1999;70(2):113– 119. 32. 1972;45:1097. 2013;7:CD008507. The symptoms and their severity, as well as the means of reproducing these symptoms, are important to identify. 2009;55:946–954. (From Ravitch MM, Steichen FM: Atlas of General Thoracic Surgery, Philadelphia, 1988, Saunders.) Latissimus Dorsi The latissimus dorsi arises from the spinous processes of the lower six thoracic, the lumbar, and the upper sacral vertebrae, from the posterior aspect of the iliac crest, and slips from the lower three or four ribs to attach to the intertubercular groove of the humerus.7 The posterior fibers of this muscle assist in inspiration as they pull the trunk into extension. 1988;1(8580):255–259. 2007;153(4):530–536. Contraindications to Testing Essential to safe testing is recognizing who should not be tested. Efficacy and safety of fondaparinux for the prevention of venous thromboembolism in older acute medical patients: randomised placebo controlled trial. 1987;147:353–356. It was later changed to “acute” respiratory distress syndrome as it became known that diffuse lung injury from a variety of causes could affect both adult and pediatric populations.52 Also recently updated was the term ALI. 259. Breathing concerning a conscious change in pattern involves control from the motor cortex of the frontal lobe of the cerebrum.6 Here impulses are sent directly down to the corticospinal tracts to the respiratory neurons in the spinal cord, bypassing the respiratory centers in the brainstem to trigger changes in ventilation. Of the two most often used tests for measuring DLCO, it has been suggested that the single-breath test is of limited value because the results are influenced by unequal distribution of ventilation and diffusion, although the rebreathing method is not believed to be influenced by such inequalities.29 Table 10-2 Typical gas exchange variables Variable Respiratory frequenc y Tidal volume Symbol f VT Minute ventilation (expiratory) Minute ventilation (inspiratory) Carbon dioxide output Oxygen uptake Gas exc hange ratio Ventilatory equivalent for c arbon dioxide or oxygen Oxygen pulse VE VI VCO 2 VO 2 R VE/VCO 2 or VE/O 2 VO 2/HR Definition Number of c omplete breaths per unit time Volume of air moved during either inhalation or exhalation over a spec ific period of time (usually 1 minute) Volume of air exhaled per unit time Volume of air inhaled per unit time Volume of c arbon dioxide exhaled per unit time Volume of oxygen c onsumed per unit time Ratio of CO 2 to O 2 Ventilatory requirement for a given metabolic rate Amount of oxygen c onsumed per heartbeat Additional Tests of Gas Exchange Table 10-2 presents some of the gas exchange variables that may be helpful in furthering an understanding of the diagnosis of the causes of exertional dyspnea; the extent of functional impairment; or the effect of medical, surgical, or rehabilitative therapy. Abnormalities in the metabolism of carbohydrates, fats, and proteins result. Corticosteroids hasten improvement in some patients.30 Three fatalities have been recorded as caused by sulfasalazine-induced diffuse pulmonary fibrosis.25,30 Anti-inflammatory Drugs Gold Gold is used in the treatment of rheumatoid arthritis and is also being used to treat osteoarthritis and asthma, but in some patients it causes diffuse interstitial pneumonitis and fibrosis.30 These patients develop dyspnea and a nonproductive cough approximately 6 weeks to many months after initiation of gold therapy. (From Travers R, Hsu J: Skin in the spotlight: Cosmetic treatments, Sexuality, Reproduction and Menopause Volume 4, Issue 2, October 2006, Pages 80–85.) FIGURE 3-16 Venous insufficiency. Tests of Diffusion The diffusing capacity of the lung (DL) or diffusing capacity of the lung for carbon monoxide (DLCO) is the amount of gas entering the pulmonary blood flow per unit time and is relative to the difference between the partial pressures of the gas in the alveoli and in the pulmonary blood. Each of these tests, originally derived from the 12MWT, measures the distance that a patient can walk on a set course, at a self-chosen pace, in the time allotted. Muscle weakness and wasting are profound. 1-9). Normally, persons may raise 100 mL of mucus (clear to white) per day and not notice it. 1989;21:199–207. 1983;68:91–101. Physical therapists and physical therapist assistants working in acute care with patients who have cardiovascular and pulmonary impairments must monitor patients closely to determine how the patient is responding to physical therapy interventions.87 Failure to monitor relevant parameters such as HR, ECG, blood pressure, RR, oxygen saturation, and pain level could result in serious injury or worsening of the patient’s condition. An individual experiencing exercise-induced bronchospasm usually demonstrates a greatly increased work of breathing, as well as an extreme effort to take the next breath. 2009 Focused update: ACCF/AHA Guidelines for the Diagnosis and Management of Heart Failure in Adults: A report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines: developed in collaboration with the International Society for Heart and Lung Transplantation. We can all learn from these experts and you will as you dig into the material in the following pages. Depression and anxiety and outcomes of coronary artery bypass surgery. Reeder G.S, Kennedy H.L. Criteria for the diagnosis of acute myocardial infarction UpToDate. BO X 14- 1 Associa t ions of a rrhyt hm ia s wit h e x e rcise • Normal cardiovascular system • Coronary artery disease • Mitral valve prolapse • Left ventricular trabeculations • Digitalis • Hypokalemia • Cardiomyopathy • Left ventricle outflow obstruction • Aortic stenosis • Hypertrophic cardiomyopathy • Long QT interval syndromes • Idiopathic • Quinidine induced • Phenothiazine induced • Proarrhythmias due to antiarrhythmic drugs (Flecainide) • Pulmonary disease From Froelicher V, Marcondes G: Manual of Exercise Testing, St. Louis, 1989,

calcium into myocytes, increased blood pressure, a shortening of the conduction time through the AV node, and an increase in rhythmicity of the AV pacemaker fibers. Sudbury: Jones & Bartlett Learning; 2012:610– 611. This stimulation of the ventilatory changes in response to increased volume and size is termed the Hering–Breuer reflex and is more active in newborns. Vnitr Lek. alcoholic, 252 See also Cardiomyopathies hepatitis, 251 hepatopulmonary syndrome (HPS), 251–252 portopulmonary hypertension (POPH), 251–252 Living with Heart Failure Questionnaire (LHFQ), 684t–687t LLL, See Left lobe LML, See Left lobe Lomustine, 244t, 253–256, 254t Lou Gehrig disease, See Amyotrophic lateral sclerosis (ALS) Low-density lipoprotein (LDL), 43, 47, 680 Lower bronchi, 13 See also Bronchi Lower respiratory tract, 12–15 See also Respiratory tract Low-level exercise testing, 279, 280b LUL, See Left lobe Lung anatomy of, 8–15, 8f–9f innervation of, 15 lobes of, 9–11, 9f, 10b physical properties of, 27–30, 28f airflow resistance, 29–30, 29f–30f compliance, 27–28, 28f elasticity, 28 surface tension, 28–29, 29f receptors, 26, 26b sounds, 520–522, 520b adventitious, 521–522 comparisons of, 522t crackles/rales, 521–522 definition of, 521 plural rub, 522 wheezes, 521 transplantation of, 386–418 ventilation and, 23–30 See also Ventilation volumes and capacities, 23–24, 24f expiratory reserve volume (ERV), 23–24 functional residual capacity (FRC), 23–24 inspiratory capacity (IC), 23–24 inspiratory reserve volume (IRV), 23–24 tidal volume (TV), 23 total lung volume (TLV), 23–24 ventilatory/respiratory rate, 23 Lung volume reduction surgery (LVRS), 397–399, 399f Lupus, See Systemic lupus erythematosus (SLE) LVADs, See Left ventricular assist devices (LVADs) LVRS, See Lung volume reduction surgery (LVRS) Lymphatic system, 650–673 anatomy and physiology of, 651–655, 651b, 652f–656f, 653b initial capillary, 651, 652f initial lymphatic sinuses, 651, 652f initial lymph vessel, 651, 652f lymph, 651, 652f lymphangion, 651, 653f lymphatic ducts, 651, 653f lymphatic trunks, 651, 653f lymph capillary network, 651, 652f lymph collectors, 651, 653f lymph nodes, 651, 654f lymphotomes, 653, 655f regional lymphatic system, 651, 654f watersheds, 655f case studies of, 670b clinical tips for, 651b, 653b, 670b development of, 662b functions of, 650, 655 lipedema, 668–670 clinical manifestations of, 668–669 conservative therapies for, 669 differential diagnosis of, 668–669 educational resources for, 670 vs. Rest periods may be a slower walk or complete rest. General Considerations of Pharmacologic Management Management of cardiac dysfunction often involves the prescription of a multifaceted drug regimen that must be dynamic in its ability to respond to an individual’s needs. If an ABI (SBP of ankle/SBP of arm) is 0.90 or less, it is considered abnormal (see Chapters 8 and 22). LeCompte C.M. Post polio syndrome: An update for the primary health care provider. Validity of rating of perceived exertion during graded exercise testing in apparently healthy adults and cardiac patients. Nasal intermittent positive pressure ventilation in cystic fibrosis: More than a bridge to transplantation? Prognostic Value of Maximal Exercise Testing Maximal exercise testing is used as a noninvasive screening method for the detection of coronary disease. Finlay W.H. The Mechanics of Inhaled Pharmaceutical Aerosols: An Introduction. Obstruction of the small airways in COPD is associated with thickening of the airway wall. Dialysis and Ultrafiltration The mechanical removal of fluid from the pleural and abdominal cavities of patients with CHF is usually unnecessary, but patients unresponsive to diuretic therapy because of severe CHF or insensitivity to diuretics may be in need of peritoneal dialysis or extracorporeal ultrafiltration.23,159 The mechanical removal of fluid in patients with acute respiratory distress because of large pleural effusions or diaphragms elevated by ascites (both of which compress the lungs) frequently brings rapid relief of dyspnea. 255. Benno V.T, Huijsmans R.J, Krron D.W, et al. A range of the normal scores by age group are provided in Table 22-5. Respiration is depressed, lung compliance is decreased, and hypoxemia and hypercapnia result. 2005;293:2479–2486. Arteriosclerosis. Cardiovascular risk factor control and outcomes in peripheral artery disease patients in the Reduction of Atherothrombosis for Continued Health (REACH) Registry. The functional unit of the lung is the alveoli, where gas exchange occurs. Moderate doses of both drugs, when given together, have been demonstrated to maintain arterial blood pressure, decrease pulmonary artery wedge pressure, and increase contractility (see the section “Cardiac Drugs Used in Critical Care”). 1986;80:23– 32. 1991;68(8):725–728. Anticancer Res. When there is an abnormal increase in the lubricating fluid between these two layers, it is called pleurisy with effusion. Clinical tip In patients with acute left-side congestive heart failure and resultant pulmonary edema, the interstitial J receptors within the lung are stimulated. Table 17-2 Conditions associated with acute cardiopulmonary dysfunction and associated preferred practice patterns Conditions Obesity, c igarette smoking, hypertension, hyperlipidemia Type 2 diabetes Prolonged immobilization, sedentary lifestyle P ractice pattern 6A: Primary prevention/risk reduc tion for c ardiovasc ular/pulmonary disorders 6B: Impaired aerobic c apac ity/enduranc e assoc iated with dec onditioning Cystic fibrosis, bronc hiec tasis, ac ute bronc hitis, pneumonia, 6C: Impaired ventilation, respiration/gas lung absc ess, asbestosis, inhalation burns, asthma, exc hange, and aerobic c apac ity/enduranc e pulmonary fibrosis assoc iated with airway c learanc e dysfunc tion Congestive heart failure, c oronary artery disease, diseases 6D: Impaired aerobic c apac ity/enduranc e of aortic and mitral valves, c ardiomyopathy, endoc arditis, assoc iated with c ardiovasc ular pump shoc k, peripheral arterial disease, c ongenital heart anomalies dysfunc tion or failure Chest trauma, Guillain–Barré syndrome, spinal c ord injury, multiple sc lerosis, musc ular dystrophy, post–polio syndrome, emphysema, burns to upper body, Parkinson disease Ac ute respiratory distress syndrome, pneumonia, pulmonary edema, sepsis 6E: Impaired ventilation and respiration/gas exc hange assoc iated with ventilatory pump dysfunc tion or failure Bronc hopulmonary dysplasia, CMV pneumonia, asthma, mec onium aspiration 6G: Impaired ventilation, respiration/gas exc hange, and aerobic c apac ity/enduranc e assoc iated with respiratory failure in the neonate 6H: Impaired c irc ulation and anthropometric dimensions assoc iated with lymphatic system disorders Lymphedema 6F: Impaired ventilation and respiration/gas exc hange assoc iated with respiratory failure Associated clinical findings Hypoventilation, atelec tasis, CO 2 retention, resting S BP >140 mm Hg Elevated resting heart rate, early fatigue, dyspnea on exertion Cough produc tive of more than 30 mL of sec retions per 24 hours, fever, shortness of breath, hypoxemia, CO 2 retention, respiratory ac idosis, dec reased FEV 1 S hortness of breath, jugular venous distension, S 3 heart sound, c rac kles on ausc ultation, dec reased ejec tion frac tion, c yanosis, dependent edema, c laudic ation Paradoxic al breathing, inability to c ough, dyspnea, reduc ed peak expiratory flow rate, reduc ed tidal volume and peak inspiratory pressure Hypoxemia, abnormal c hest radiograph, inc reased resting respiratory rate, mec hanic al ventilation required, fever, hypoxemia Interc ostal retrac tion, stridor, wheezing, physiologic intoleranc e of routine c are, impaired airway c learanc e Edema (nondependent), diffic ulty moving, impaired skin integrity, peau d’orange Postural Drainage Postural drainage (PD) is the assumption of one or more body positions that allow gravity to assist with draining secretions from each of the patient’s lung segments.9 In each position, the segmental bronchus of the area to be drained is arranged perpendicular to the floor (Fig. Although intended primarily for physical therapists, this text has been useful to practitioners in various disciplines who teach students or who work with patients who suffer from primary and secondary cardiopulmonary dysfunction. If it is ingested, it causes acute pulmonary fibrosis. A patient with insult to the lung tissue itself—for example, COPD or ARDS—may not tolerate IMT. A change of the magnitude of the MCID would be considered a significant effect of the chosen intervention, thus producing a quantifiable outcome. ■ Increased body fat, particularly intraabdominal or visceral adiposity, is directly related to CVD risk and type 2 DM. ■ More than 100 drugs have the side effect of causing restrictive lung impairment, including oxygen and the majority of drugs used in the treatment of cancer. The patient is asked to identify three important activities that he or she is unable to do or has difficulty with as a result of the problem that he or she is seeking medical attention for. National diabetes fact sheet: General information and national estimates on diabetes in the United States, 2007. Liver transforms plasma free fatty acids (FFAs) (when excess calories are ingested) into triglycerides (TGs) and also secretes additional very-low-density lipoprotein (VLDL). Hypokalemia can be a serious consequence of diuretic therapy when potent agents are prescribed. 1995;50:225– 231. When these medications are prescribed, the blunted blood pressure response is expected and considered normal. The two most common treadmill protocols are the Bruce exercise test protocol and the Balke exercise protocol. Heart disease and stroke statistics 2009 update: A report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Relationship of anaerobic threshold (AT) to AVO2/WR in patients with heart disease [abstract]. Magnetic resonance imaging can be used to identify muscle inflammation and site for biopsy.54 Clinical Manifestation The clinical manifestation of polymyositis can be found in Table 5-32. ed 6. J Diabetes Sci Tech. Cardiac glycosides One of the oldest classes of cardiac medications, cardiac glycosides are represented by the drug digitalis, which has been used for hundreds of years to treat HF. 2007;87:545–555. 1995;151(1):92–97. An acquired sodium channelopathy causing reduced muscle membrane and nerve excitability is a possible mechanism.76 Control of hyperglycemia might reduce the severity of these complications of critical illness.76 Survivors of critical illness have been shown to have persistent functional limitations 1 year after being discharged from the ICU.77 Exercise, in the form of both endurance and strength training, in the acute care setting should be used in an effort to both prevent and treat the negative neuromuscular sequelae of critical illness. Cardiac surgery can cause myocardial damage from procedures such as cross-clamping to using cardiopulmonary bypass. Primary prevention of cardiovascular disease in people with diabetes mellitus. Sleep Med Rev. A, Right atrium and ventricle. The aforementioned guidelines (Table 12-12) for exercising heart transplant patients are also applicable to the lung transplant patient population. Activity Evaluation After the chest wall examination, the therapist is ready to perform an initial evaluation of the patient’s responses to exercise. Pulmonary embolism is a constant threat to patients with SCI, stroke, and other neurologic and neuromuscular diseases because of reduced peripheral blood flow and limited activity level. This is most commonly due to left-sided heart failure, right-sided heart failure, or both. Rodeheffer R.J, Gerstenblith G, Becker L.C, et al. 1999;28:135–152. Radiation can be either external beam radiation therapy or internal radiation therapy (brachytherapy) where a radioactive substance is inserted into the tumor by needles.45 However, small cell lung carcinoma is the most radiosensitive, followed by squamous cell carcinoma and adenocarcinoma. Littleton: PSG Publishing; 1985. Nonperfused, or dead, myocardium appears as “cold spots” on the scan. Because an increasing number of patients with CMD and CHF are being prescribed β blockers, which often cause little or no change in resting and exercise heart rates, the Borg rating scale again is a good clinical tool. Clinical Implications for Physical Therapy The most obvious implication of all the information presented in this chapter is that many patients with many different primary diagnoses may exhibit cardiopulmonary dysfunction. Pulmonary function tests alone are not good predictors of a person’s function because the PFTs measure lung capacity only. Keeling D, Baglin T, Tait C, et al. 1991;18:490–501. ■ Following identification of the rhythm disturbance, an assessment of signs and symptoms should be undertaken, after which a clinical decision can be made regarding the amount of monitoring the individual will need with activity, as well as the safety of activity. Rubin B.K. Mucolytics, expectorants and mucokinetic medications. 19. B, Left atrium and ventricle. The COPD Self-Efficacy Scale. Shewmake R.A, Huntington M.K. Nutritional treatment of obesity. Similarly, placing the patient in sidelying over a towel roll can increase lateral chest wall mobility. 1987;1:23–31. Table 16-17 Summary of abnormal responses to activity P hysiological variable Response to increased work Response to endurance activity Heart rate Rapid rate of rise Progressively inc reasing HR Blunted rate of rise and NOT on medic ations to affec t HR S ignific ant drop in HR Drop in HR Heart rhythm S tarts regular, bec omes irregular S tarts regular, bec omes irregular More than 6 “skips” per minute or doc umented PVCs above resting More than 6 “skips” per minute or doc umented PVCs above resting amount amount S ystolic blood Rapid rate of rise Progressive rise pressure Blunted rise not on β-bloc kers Dec rease and symptomatic with dec rease Dec rease with inc rease work Diastolic blood > 10 mm rise > 10 mm rise pressure S pO 2 Dec rease with inc rease work Dec rease Men and women often present with different symptom complaints of angina. Whitney S.L, Wrisley D.M, Marchetti G.F, Gee M.A, Redfern M.S, Furman J.M. Clini measurement of sit-to-stand performance in people with balance disorders: Validity data for the five-times-sit-to-stand test. In general, the neural effects are much more rapid, whereas humoral effects are slower because the information sent by the autonomic nervous system via efferent nerves travels faster than the information traveling through the vascular system.75 Normal Cardiac Neurohumoral Function Neurohumoral signals to the heart are perceived, interpreted, and augmented by the transmembrane signal transduction systems in myocardial cells.75 The primary signaling system in the heart appears to be the receptor-G-protein-adenylate cyclase (RGC) complex as it regulates myocardial contractility. Effects of aerobic exercise training, resistance exercise, or both on glycemic control in type 2 diabetes: A randomized trial. Appl Psychol Meas. Thoracic Mobilization Techniques If mobility of the thorax is restricted, it may be difficult for a patient to improve his or her breathing pattern through controlled breathing alone. 2008;133(6 Suppl):381S–453S. 1991;2:405–414. Gualillo O, González-Juanatey J.R, Lago F. They may be effective in both SVT and VT. Muscular arteries are present in medium and small arteries and contain more smooth muscle cells within the middle tunica media layer. Contrast echocardiography enhances the visualization of intracardiac and intrapulmonary shunts, endocardial wall motion, and ventricular wall thickness and improves the calculation of ejection fraction. The time taken to complete the task is strongly correlated to level of functional mobility (i.e., the more time taken, the more dependent in activities of daily living). The DLCO usually falls before the patient experiences the onset of any overt symptoms (except with methotrexate). Patients whose blood glucose level is greater than 250 mg/dL should not exercise until cleared by a physician who knows their metabolism. Prevention of atelectasis should be the goal for all hospitalized patients who are unconscious or who may have poor airway clearance techniques, have postoperative pain preventing adequate inspiration and cough, or who demonstrate respiratory muscle weakness. The prognostic value of the KCCQ was assessed in a study of the overall score in 1516 patients with heart failure after a recent acute myocardial infarction. Decongestants are frequently combined with other ingredients (e.g., antihistamines) as constituents of commercially available, nonprescription, over-the-counter preparations. Furthermore, if the TV is larger than required, energy is wasted overcoming the natural recoil of the lung and in expanding the chest wall. Physical therapy treatment began within 24 hours and included turning and positioning, airway clearance techniques, breathing exercises, chest mobility exercises, and pregait activities. 1996;138:114–119. Physical therapists must be capable of identifying the cause of an alarm and take appropriate measures to correct the problem before silencing it during a treatment. The periosteal and perichondral membranes blend to connect the bones and cartilages to one another. Best P.J, Burnett J.C, Wilson S.H, et al. St. Louis: Mosby; 2005. Naughton M.T, Rahman M.A, Hara K, et al. It is prudent for any physical therapy department that treats insulin-dependent patients to have easy access to juice, sugar, and long-term glucose management snacks such as peanut butter. Also, little is known of the potential drug–drug interactions. Secondarily, the capillaries become plugged with platelets, and the interstitium is invaded by polymorphonuclear leukocytes. McNair D, Lorr M, Droppleman L. A progressive physical therapy program can be initiated early in the patient’s ICU stay. For example, the 2006 Tax Relief and Health Care Act (TRHCA) (P.L. 109–432) resulted in the establishment of a physician quality reporting system (PQRS), including a penalty for eligible professionals who do not report data on quality measures for covered services furnished to Medicare beneficiaries.31 A PQRS is the quality reporting program under Medicare Part B. Sytkowski P.A, D’Agostino R.B, Belanger A.J, Kannel W.B. Secular trends in longterm sustained hypertension, long-term treatment, and cardiovascular mortality. Medical history includes PAD, hyperlipidemia, and 40 pack/year of smoking. 156. Patients should not exercise when blood glucose measures in the severe range. 1994;23(3):242–250. Rayner C.F.J, Grubnic S. In: Malone T, ed. Aging and cardiac disease. 100. Summary ■ A thorough examination of the patient is essential for optimal treatment. Electrocardiography 10. Weisfeldt M.L, Lakatta K.G, Gerstenblith G. 1999;6:145–159. Further impairing communication is the presence of an oral endotracheal tube, which interferes with lip reading. Patient has thick, tenacious secretions and is prescribed repeated bouts of antibiotics to treat his infections. Therefore elevated triglyceride levels may be a better predictor of coronary heart disease in type 2 diabetes patients than elevated LDL levels because of the correlation with insulin resistance and small, dense LDL. Table 10-4 offers some suggestions for looking at PFT results with major pathologies. Oxygen toxicity can result in significant RLD. Patients complain of dyspnea and a mild, nonproductive cough. In addition, hemoglobin and hematocrit levels were slightly increased (10.7 and 29.4, respectively). These reactions typically do not occur at the first exposure and are dose independent, in that multiple exposures to minuscule amounts can precipitate an anaphylactic reaction and death. Mettauer B, Geny B, Lonsdorfer-Wolf E, et al. Chronic changes include flattened diaphragms, changes in rib angle and intercostal spaces, abnormal lung volumes, and interstitial thickening. Box 13-6 provides information about associated risks associated with central catheter placement. 1989;76(5):357–367. However, diastolic pressure falls as the dose of dobutamine increases. These negative sequelae result in less diaphragm use with breathing, more accessory muscle, and an increase in the work of breathing. The test is scored by quantifying the number of full steps completed in 2 minutes, raising each knee to a point midway between the patella (kneecap) and iliac crest (top hip bone). Cardiac transplantation in Becker muscular dystrophy. 177. • Compare with the prior studies; does the patient look the same, better, or worse? When the VC is decreased to less than 40% of the predicted value, cardiorespiratory failure is likely to occur.35 This usually occurs in the fourth or fifth decade of life. Irritation of the intercostally innervated pleura may result in the referral of pain to the thoracic or abdominal walls, and irritation of the phrenic-supplied pleura can result in referred pain in the lower neck and shoulder.9 Several complications can affect pleural integrity. Effects of low-dose oral enoximone administration on mortality, morbidity, and exercise capacity in patients with advanced heart failure: The randomized, double-blind placebo-controlled, parallel group ESSENTIAL trials. Higher hs-CRP levels also are associated with lower survival rates in patients with CAD and therefore may be a useful risk predictor.40 Elevated levels of hs-CRP may increase the risk that an artery will reclose after it has been opened by balloon angioplasty. Dyspnea 2. 12. Treatment The objective of treatment is to reverse autoimmune and inflammatory changes, as well as prevent complications.54 Nonsteroidal anti-inflammatory drugs, corticosteroids, antimalarial agents, and immunosuppressants are among the top treatments. Heart rate and systolic blood pressure are the key determinants of myocardial oxygen demand. As long as the patient’s hemoglobin is normal, all the alveolar CO should bind to hemoglobin, and the partial pressure of CO in the plasma should be zero. Resistance training to counteract the catabolism of a low-protein diet in patients with chronic renal insufficiency. Harvey R, Doyle E, Ellis K, et al. • Spread tedious tasks out throughout the week. Until the results of the Women’s Health Initiative (WHI) were released, the use of estrogen in postmenopausal women was considered cardioprotective.73 Although the results of the WHI have been controversial, it appears that hormone replacement therapy may have negative cardiac effects if started in women 10 years after menopause and after 65 years of age. It is often present in infants born with a large diaphragmatic hernia and displaced abdominal organs.8 Clinical Manifestation Depending on the amount of lung parenchyma lost, these infants can be asymptomatic or can exhibit severe pulmonary insufficiency. Patients with diabetic retinopathy should avoid any head-down position or situation that would cause a blood pressure reading of greater than 180 mm Hg systolic. There can be diffuse fibrosis with lower zone predominance. Guidelines on oral anticoagulation with warfarin–fourth edition. • Activity: Unable to perform low-level activity without signs and symptoms of severe CHF. Kataoka T, Keteyian S.J, Marks C.R.C, et al. Non-valvular atrial fibrillation (AF) increases the risk of ischemic stroke by as much as a factor of 5, and the intensity of anticoagulation therapy reduces not only the frequency of ischemic stroke, but also its severity and risk of death from stroke. 2008;358(4):407–411. 6-5).20 See Chapter 10 for more detailed information on PFTs. Clinical tip Individuals with obstructive lung disease demonstrate an increased total lung capacity and an increased RV as a result of air trapping and lung hyperinflation. In 50% to 90% of the cases, it does involve the lungs or pleura; this incidence of pulmonary involvement is higher than that of any other connective tissue disorder.27,60 The most common lung involvement is pleurisy, often with the development of small bilateral exudative pleural effusions that may be recurrent, may be associated with pericarditis, and may lead to fibrous pleuritis.9,63 Acute lupus pneumonitis is another manifestation of lung involvement. Unilateral costal expansion exercises may be more useful in the treatment session with a patient who has a large incision from surgery on one side of the thorax. Rinaldi M, Sansone F, Boffini M, et al. IN Földi M, Földi E: Földi’s textb ook of lymphology for physicians and lymphedema therapists, ed. Wing L.M, Reid C.M, Ryan P, et al. Although protein–drug binding is a reversible and dynamic process, it may temporarily limit drug distribution. In addition, an individual who undergoes thoracic surgery with a lateral incision may have developed asymmetry due to pain and splinting or due to actual lung or rib loss from the surgical procedure (see Fig. Grundy S.M.N, Cleeman J.I, Merez N.B, et al. It can occur as a primary process and also as a complication of some inflammatory processes, as in rheumatoid arthritis, inflammatory bowel disease, and bronchiectasis. 1992;68:304–308. Mol Genet Metab. Thus increased levels of cardiac troponin may suggest myocardial injury.7 Troponin released after cardiac injury usually remains elevated (its half-life is about 2 hours), leading to better identification of cardiac injury.7 Monoclonal antibodies can now detect cardiac troponins, resulting in immunoassays for blood measurement. Symptoms may include complaints of dull ache, heaviness, swelling, itching, tingling, or cramping in the extremity (typically in the leg). However, many of the subjects in the other studies did have documented health histories of cardiovascular or pulmonary pathologies. Hillegass E, Fick A, Pawlik A, et al. When the Q wave is 0.06 second in duration wide (one small square on the ECG tracing) or is one-third the size (height and depth included) of the QRS complex, the Q wave is considered significant and indicative of a pathologic condition (it persists as a permanent electrocardiographic “scar ” from infarction [see Fig. This disease can occur at any age, but the average age at onset is 40 years. In this patient population, continuous venovenous hemofiltration (CVVH) uses the internal jugular vein or subclavian vein as access sites, along with a mechanical pump and an external filter for blood exchange. McKenzie D.C, Kalda A.L. Effect of upper extremity exercise on secondary lymphedema in breast cancer patients: A pilot study. Starling R.C, McCarthy P.M, Buda T, et al. For example, an individual with significant chronic obstructive lung disease might exhibit increased muscle activity of the respiratory accessory muscles and decreased diaphragmatic contribution to quiet breathing. Regardless of cause, weakness or spastic paralysis of the affected side of the body can include the diaphragm and intercostal muscles, leading to altered respiratory mechanics and reduced respiratory muscle efficiency. 136. In: Braunwald E, ed. It occurs worldwide, but the onset is usually after the age of 40. Functional status at discharge was independent with transfers, gait, DBE, and coughing techniques, and his strength had increased to 3+/5. Pediatr Phys Ther. Leung D.Y. Molecular basis of allergic diseases. Armer J. Safely mobilizing patients with or without assistive devices in the hospital setting and determining the most appropriate discharge destination (home, nursing home, subacute unit, rehabilitation unit) will also be discussed. Pulmonary hypertension Elevated pressures in pulmonary artery lead to inc reased afterload for the right ventric le and subsequently, over time, to right ventric ular failure. The only other equipment required is a timer. Ye J, Kraegen T. They are the result of irregularities in heart pacemaker or conduction tissue function. ■ Treatment interventions for RLD vary and are dependent on the cause of the restrictive impairment. The therapist can use the scoop technique at the beginning of each new position and then remove the hand as the patient becomes proficient in the breathing pattern in that position. St. Louis, 2009, Mosby.) Table 17-3 Summary of devices used for airway clearance a AxcanScandipharm, Birmingham, AL. This process usually affects the lower lobes because the blood in the pleural space is pulled by gravity to the most dependent area. Phipps W.J, Long B.C, Woods N.F. Medical-Surgical Nursing: Concepts and Clinical Practice. Consideration of the pathophysiology and symptoms, the stability of the medical status of the patient, and the patient’s adherence to the technique(s) are all important factors in choosing an optimal airway clearance plan of care. More research is needed before their use can be recommended. Best P.J.M, Reddan D.N, Berger P.B, et al. 1984;120:169–189. Active range-ofmotion (AROM) exercises mobilize the rib cage and when performed in conjunction with a variety of breathing techniques, help prevent scar immobility. Thus when used in the relief of bronchoconstriction, α- and β1-receptor stimulation may induce peripheral vascular constriction and can accelerate cardiac responses. (From Malamed SF: Sedation, ed 4, Mosby, St. Louis, 2010.) Capillaries composed of a single layer of endothelial cells deliver blood in close proximity to the alveoli. 185. The Respiratory System The respiratory system includes the bony thorax, the muscles of ventilation, the upper and the lower airways, and the pulmonary circulation. ■ Cardiac arrhythmias and renal insufficiency can also cause CMD for reasons similar to those of myocardial infarction. 1981;19:787–805. Chapter 4, Cardiac Muscle Dysfunction and Failure, was restructured and revised to improve the flow and understanding of this important pathologic condition as well as all new figures and tables to help understand heart dysfunction and failure. Arterioles have primarily smooth muscle along their walls, enabling their diameter to alter significantly as needed. The reentry of blood into the arteries occluded by the cuff makes the wall of the arteries expand, or “pulse.” These pulsations travel through the soft tissue to the surface of the limb where they are detected by the cuff and analyzed by the microprocessor. Cardiovascular malformations among preterm infants. A short physical performance battery assessing lower extremity function: Association with self-reported disability and prediction of mortality and nursing home admission. Each year it is estimated that 300,000 to 600,000 Americans have a pulmonary embolic event.32,43,55 Many of these events may go unnoticed because they are clinically silent, with only 20% presenting with the classic triad of symptoms: dyspnea, hemoptysis, and pleuritic chest pain. Marasco S.F, Esmore D.S, Negri J, et al. During the publication phase of the first edition of the Essentials of Cardiopulmonary Physical Therapy, I was always worried about new developments in the field of Cardiovascular and Pulmonary diagnosis and treatment that were not going to be covered in the book. Baltimore: Williams & Wilkins; 1990. 2002;55:916–921. The third curve may or may not be visible and denotes the site of the left atrial appendage. If fluid needs to be drained, the chest tube is placed inferiorly in the thoracic cavity because fluid tends to collect near the bases of the lungs.32 The collection system is designed to seal the drainage site from the atmosphere. Much of the equipment is electronic and consists of some or all of the following basic components: (1) a device to detect the physiologic event of interest, (2) an amplifier to increase the magnitude of the signal from the sensor, and (3) a recorder or meter to display the resultant signal. Clin Sci Mol Med Suppl. 16-6). 1982;72(2):323–338. Arrigo I, Brunner-LaRocca H, Lefkovits M, et al. 1896;19:312–326. In addition, the chronic use of ipecac to induce vomiting can cause cardiomyopathy, arrhythmias, and death. A third type of “normal” breath sound is heard over the junction of the mainstem bronchi with the segmental bronchi, called bronchovesicular. Hyperacute rejection occurs in the perioperative period (minutes to hours) and occurs in response to preformed antibodies that remain in the recipient’s body. Stevenson L.W, Brunken R.C, Belil D, et al. Maseri A, Crea F, Kaski J.C, et al. Fluctuations of a few pounds from day to day are usually considered normal, but increases of several pounds per day (more than 3 lb) are suggestive of CHF in a patient with CMD.5 Body weight should always be measured from the same scale at approximately the same time of day with similar clothing and before exercise is started. ■ Sickle cell disease is characterized by hemolytic anemia and periodic acute painful crises resulting from occlusion of small capillaries and venules, which result in progressive systemic vasculopathy and chronic organ failure. The “6 Clicks” forms are now being used for acute care rehabilitation as well as post–acute care. In addition, palpation of pulses and skin temperature can be performed to assess perfusion of the extremities and the head and neck. Clinical tip It is essential to monitor both blood pressure and heart rate during activity rather than making these assessments after activity because blood pressure can drop within 15 seconds of stopping the activity. They were mentored along the way, and what they provided to this edition was amazing content, figures, videos, and updated material that makes this text stand out. If this area is not accessible, it may be placed over the distal lower extremity to assess the pressures in the tibial artery. The cholinergic receptors are classified as muscarinic receptors, whereas the adrenergic receptors have two subdivisions: the α-adrenergic and β-adrenergic adrenoceptors. ■ The lymphangion is the functional unit between two valves found in the lymphatic collectors and trunks. 1991;338(8781):1480–1484. With inhalation, the therapist brings the patient’s arms into increased shoulder flexion and lowers the arms during exhalation. Mechanically ventilated, critically ill patients show a 40% to 50% increase in oxygen consumption during chest physical therapy combined with rolling.84–86 The therapist should bring the bedrail to the most upright position so the patient can use it to assist with the activity. The COPD assessment test (CAT): Response to pulmonary rehabilitation. Lower-socioeconomic groups might have difficulty obtaining proper health care and might not be financially able to afford the medications or to save on the use of medications by skipping doses. 2002;288:321–333. This causes excessive calcium to accumulate in the cell, along with intracellular sodium. It can be active and resolve spontaneously, or it can be inactive and stable for long periods. Dangerously low levels of potassium (lower than 3.5 mEq/L) can cause serious, life-threatening arrhythmias. Their peak exercise capacity during graded treadmill exercise is severely limited, allowing for only light to very-light activities;266–268 the energy requirements of many leisure and work-related activities usually exceed their capacity. Approximately 25% of patients with pulmonary sarcoidosis experience a permanent decrease in lung function, which over time proves fatal in 5% to 10% of patients.25 This loss of lung function is due to restrictive lung impairment primarily, but this disease also has an obstructive component. 1993;46:1249–1256. Important components of the interview are the establishment of effective communication and rapport with the patient and family. 2004;10:485– 505. 1992;7:62–77. If the oxygen supply is completely cut off to a portion of the lung, then frank necrosis and infarction of lung tissue results. 2002;82(4):320–328. Biventricular hypertrophy and dilatation are induced by chronic anemia and the compensatory volume overload that increases cardiac output.299,300 Clinical manifestations include diminished exercise tolerance, dyspnea on exertion, and progressive loss of cardiac reserve. Unstable angina and non-ST elevation myocardial infarction. Diseases and Conditions. 16-26 shows the areas of normal, tympanic, and dull sounds on a chest. Acta Diabetol. The CPK-MB fraction is most conclusive of all three isoenzymes for myocardial injury. However, the FEF25–75 does identify small airway disease. Verdery R.B. Reverse cholesterol transport from fibroblasts to high density lipoproteins: Computer solutions of a kinetic model. Mechanisms of cardiac contraction and relaxation. Lynn D.J, Woda R.P, Mendell J.R. Respiratory dysfunction in muscular dystrophy and other myopathies. Significant spinal curvature must be present before pulmonary symptoms develop. To ensure functional shoulder ROM postoperatively, the patient can be encouraged to emphasize a stretch each time during the day when reaching, such as into a high cabinet. An electrocardiographic tracing demonstrates depolarization and repolarization of the atria and ventricles. As with other situations involving cardiopulmonary complications, damage is found on autopsy much more frequently than is clinically apparent. Appropriate modification of peripheral vascular resistance and cardiac output is orchestrated (Fig. ed 2. Unilateral lung transplantation for pulmonary fibrosis. MI-E with a cough assist device is another noninvasive technique to be tried, if available. 1996;47(5):409–412. 2007;20:173–184. 146. It moves outward during expiration, as the pleural space pressure approaches atmospheric pressure. The best identified protein receptors are those that interact with certain neurotransmitters, hormones, and autocoids. Use of ratings of perceived exertion for predicting maximal work rate prescribing exercise intensity in patients taking atenolol. Courneya K.S, Jones L.W, Fairey A.S, et al. 1990;19(2):208–211. Understanding prognostic benefits of exercise and antidepressant therapy for persons with depression and heart disease: the UPBEAT study rationale, design, and methodological issues. B, A 12-lead electrocardiogram tracing demonstrating a lateral infarction. Sox18 induces development of the lymphatic vasculature in mice. Hootsmans W.J.M, Meerschwam I.S. Electromyography in patients with hypertrophic obstructive cardiomyopathy. Adams H.P, Adams R, Del Zoppo G, Goldstein L.B. Guidelines for the early management of patients with ischemic stroke: 2005 guidelines update. The use of sympathomimetics, given parenterally in the treatment of HF to optimize cardiac output, is reserved for hemodynamically compromised patients within a critical care setting. Halstead L.S, Rossi C.D. New problems in old polio patients: Results of a survey of 539 polio survivors. This enzyme selectively cleaves and hydrolyses DNA present in sputum/mucus and reduces viscosity in the lungs, promoting improved clearance of secretions. Because these are new risk factors with insufficient evidence to support regular screening for them, they should be measured only in families with unexplained CAD or premature CAD. Prothrombin time is the most accurate way to monitor warfarin therapy; however prothrombin time values do not agree well between laboratories, making prothrombin time unsuitable for defining therapeutic ranges for warfarin therapy. cAMP facilitates smooth muscle relaxation and inhibits mast cell degranulation, causing bronchodilation. Guidelines for the diagnosis and management of asthma: Expert panel report 3. Instruments that are easy on the staff in that they can be scored and interpreted quickly and efficiently are best. Active exercises, including breathing exercises to assist the patient in weaning from the ventilator, should be started as soon as the patient’s condition has stabilized. The role of HDL in reverse cholesterol transport and its disturbances in Tangier disease and HDL deficiency with xanthomas. 10-16). Asbestosis. The presence of numerous lines, tubes, and monitoring and life support equipment should not be a contraindication to mobilization. Inhalation exposure is often the initiating factor to an inflammatory response in the airways and the alveoli that leads to disease, especially if the individual is genetically susceptible. 2013;61(4):e78–140. At FRC, the outward recoil of the chest wall is balanced by the inward elastic recoil of the lung. Major Probl Intern Med. ■ Adequacy of oral diuretic dosing should be demonstrated before discharge. J Manag Care Pharm. Intervention Bronchopulmonary hygiene and suctioning, deep breathing exercises (DBEs), coughing techniques, progressive mobility skills, strengthening exercises, and endurance training (stationary cycling and gait). Other Pharmacologic Agents Used in Critical Care Other pharmacologic agents frequently used in critical care include anticoagulants, such as heparin (Liquaemin Sodium), sedatives to reduce agitation and anxiety, and analgesics. With bulbar involvement, which occurs eventually in 80% of patients, swallowing becomes impaired, leading to aspiration pneumonia. ed 8. Pharmacologic Stress Testing When an individual is unable to perform upright exercise on a treadmill or stationary bicycle due to severity of disease or heart failure, a neuromuscular insult (such as following a cerebrovascular accident), a musculoskeletal disability (e.g., following recent hip or knee surgery, back pain), being of increased age with decreased functional capacity, or an individual who is unable to achieve at least 85% of his or her PMHR on an exercise test (as might occur in individuals taking β-blockers or other negative chronotropic agents that would inhibit the ability to achieve an adequate heart rate response), physiologic stress can be induced while the patient remains in a resting position by injection of a pharmacologic agent. Mann F.C, Priestly J.T, Markowitz J, Yater W.M. Transplantation of the intact mammalian heart. 1997;85:987–992. Diseases involving the bronchi and bronchioles are mostly characterized by bronchoconstriction, a narrowing of lumen where the smooth muscle layer constricts in response to an irritant. 1990;45:262–266. Patients may also breathe spontaneously at any time in ventilatory cycle. Decongestants The common cold, allergies, and many respiratory infections have in common the symptoms of “runny nose and stuffy head.” These are caused by vasodilation and “leaky” blood vessels leading to mucosal swelling and fluid leaks. Summary This chapter provides the reader with an understanding of the anatomy of the cardiovascular and pulmonary systems and its relevance for the therapist. Clin Interv Aging 1. ACA, Anterior cerebral artery; AICA, anterior inferior cerebellar artery; Ant. This is due to the peripheral vasodilation and splanchnic vasoconstriction induced by exercise. Multiple Sclerosis Multiple sclerosis is an autoimmune disease that causes demyelination of the CNS and is characterized clinically by periods of remissions and relapses of symptoms, although on occasion its course can be chronic and progressive. Dull J.I, Dull W.L. Are maximal inspiratory breathing exercises or incentive spirometry better than early mobilization after cardiac surgery? Table 14-9 Pharmacologic management of chronic heart failure a preferred agent b for individuals with hypertension and mild fluid retention c Recommended for African Americans with HFrEF who remain symptomatic despite ACEI/ARB, beta blockers and aldosterone The subsequent section on antihypertension drugs provides an expanded list of diuretics and their sites of action (see Fig. Capasso J.M, Malhotra A, Remily R, et al. Effect of aerobic training on walking capacity and maximal exercise tolerance in patients with multiple sclerosis: a randomized crossover controlled study. In Brunner & Suddarth’s Textbook of Medical-Surg

pleura receives its vascular supply from the intercostal, internal thoracic, and musculophrenic arteries. Desc ribe patient age, patient c harac teristic s. 2005;29:1168–1174. Written protocols describing emergency procedures to be followed should be available to all testing personnel. In light of this, the mechanical ventilator forces air into the lungs through creation of a positive pressure greater than the atmospheric pressure that exists within the lung. When describing the wheeze, it is extremely important to document the time of its occurrence (inspiration or expiration) because this may help to differentiate pathologic conditions. See Chapter 12 for more information on VADs. Surgical Management Reparative, reconstructive, excisional, and ablative surgeries are sometimes performed in the treatment of CHF and CMD. Muscle innervation is not normal in this disease, but the abnormality is due to loss of motor end plates when muscle fibers degenerate and not to neurogenic disease. In phase two, the therapist moves to stand behind the patient near his or her hips and faces the patient’s head, and then the therapist changes hand position. As Fig. Patients with mild heart failure worsen during withdrawal from digoxin therapy. 1902;1:367–389. Adapted from Pashkow P, Ades PA, Emery CF, et al: Outcome measurement in cardiac and pulmonary rehabilitation, J Cardiopulm Rehabil 15(6):397–398, 1995; with permission from Lippincott-Raven. The greater number equal or exceed the size of a millet seed, while some attain the magnitude of hemp-seed or cherry-stones, or even french beans (haricot vert). Corticosteroids have proved very effective in treating adult bronchiolitis obliterans that is idiopathic, caused by toxic fume inhalation, or associated with connective tissue disease. 1993;148(5):1272–1276. Inspection should be performed in a systematic manner, starting with the head and proceeding caudally (until the therapist has developed a degree of proficiency). Unfortunately, after bypass surgery was performed, the patient developed numerous complications caused primarily by pump failure and improper exercise training that was not appropriately adjusted to the patient’s needs. Administration of inhaled bronchodilators before ACB may be helpful. Treatment of the pulmonary system includes humidification, supplemental oxygen, bronchodilators, appropriate positioning, and pulmonary hygiene techniques.64 Bronchoscopy, intubation, ventilatory support using high-frequency ventilation (HFV) and PEEP, suctioning, and perhaps hyperbaric oxygen may be necessary in some patients.10 Therapeutic Causes Surgical Therapy Surgery can be defined as a planned entry into the human body by a trained practitioner under well-controlled conditions.2 Table 5-38 Clinical manifestation of thermal injuries PaO2, arterial partial pressure of O2; RR, respiratory rate. Bronchiolitis obliterans in single lung transplant recipients. Is it cost effective and practical to do a group teaching? Extracorporeal Membranous Oxygenation Extracorporeal membrane oxygenation may be initiated as a salvage therapy in patients with profound gas exchange abnormalities when mechanical ventilation is inadequate to support life.57 After publication of the CESAR trial,58 ECMO is being used more commonly in managing acute respiratory distress syndrome (ARDS) in specialized medical centers.58,59 Cannulation during ECMO may involve two sites or a single site. Prevalence in the United States is unknown.39 Studies have shown conclusively that cigarette smoking has a multiplicative effect in the development of primary lung cancer in persons who have been exposed to asbestos.35 Complications of asbestosis include bronchiectasis, pleural mesothelioma, and bronchogenic carcinoma.8 Diagnostic Tests Diagnosis can be made based on a history of respiratory symptoms and occupational exposure, including type of work and duration of exposure. Myoglobin can be detected as early as 2 hours after injury and peaks approximately 3 to 15 hours after injury.18 The presence of myoglobin requires ruling out possible skeletal muscle injury versus cardiac muscle injury. Hyaluronidase-induced reductions in myocardial infarct size. Fischell T.A, Derby G, Tse T.M, et al. Its primary use is in patients with cystic fibrosis who culture positively for Pseudomonas aeruginosa. This analysis provides systolic, diastolic, and mean arterial pressure readings along with heart rate. Castelli W.P. The triglyceride issue: A view from Framingham. 4-15 shows the complete system, it does not reveal the degree of influence each receptor agonist has on cardiac function. BO X 8- 6 Int e rpre t a t ion of e x e rcise t e st ing • Exercise time completed (and protocol used) • Limiting factors (reason for termination) • Presence or absence of chest pain at peak exercise: Usually defined as positive, negative, or atypical for angina or extreme shortness of breath • Maximal heart rate achieved • Blood pressure response • Arrhythmias: Description of which type developed and when they occurred • ST-segment changes: Usually described as positive, negative, equivocal, or indeterminate for ischemia • Positive: 1.0 mm or greater horizontal or down-sloping ST-segment depression (Fig. Treatment Complicated CWP with pulmonary fibrosis is nonreversible; there is no cure for it. β2 Receptors predominate in the bronchial smooth muscles but also are found in peripheral smooth muscle and skeletal muscle. Additional side effects include headache, drowsiness, and flushing. This polyneuropathy usually leads to complete recovery with minimal permanent sequelae. A hypertensive blood pressure response is one in which an individual who is normotensive at rest exhibits an abnormally high systolic blood pressure for a given level of exertion. Therefore in order to maximize independence, physical therapists often choose functional activities as the preferred mode of exercise for patients. In all situations where physical therapists are treating individuals with primary or secondary cardiovascular dysfunction, these variables are appropriate to monitor and document as outcome measures for patients’ overall health. Pulmonary involvement and symptoms are reversible in most patients. Esophageal Spasm Esophageal spasm or inflammation may produce a midsternal pain that is mistaken for angina.41 Diffuse esophageal spasm is usually idiopathic and produces a chest pain with dysphagia. Analysis of variability in interpretation of spirometric tests. Antibodies are produced by the interaction of antigens and B lymphocytes in a process referred to as humoral immunity. Kitler M.E. Coronary disease: Are there gender differences? An update. The anterior horn cells of the cervical, lower thoracic, and lumbosacral spinal segments usually are the most involved, which means that the respiratory muscles may be affected severely. The properly trained physical therapist often obtains excellent results in the motivated lymphedema or lipedema patient. Venous thromboembolism is a serious condition, with 10% to 30% of people dying within 1 month of diagnosis and half of those diagnosed with a DVT have long-term complications.90 Even with a standard course of anticoagulant therapy, one third of individuals will experience another VTE within 10 years.90 For those who survive a VTE, quality of life can be decreased due to postthrombotic syndrome (PTS) or the need for long-term anticoagulation to prevent another VTE.91 Standard medical treatment for VTE includes the use of anticoagulants, unless the patient is at high risk of bleeding or even of PE, at which time an inferior vena cava filter may be inserted. 1996;4:38–46. Mathews E.C.J, Gardin J.M, Henry W.L, et al. 1999;27:81–96. Role of endothelial dysfunction in coronary artery disease and implications for therapy. The WIQ is used to estimate functional status and measure ambulatory abilities of patients with peripheral vascular disease. The surfaces of the lungs are marked by numerous intersecting lines that indicate the polyhedral (secondary) lobules of the lung. New York: McGraw-Hill; 1996. Kannel W.B, Shatzkin A. Use of a β1-selective drug minimizes the suppression of this critical function. Accessed June 26, 2014. The cardiomyopathy of progressive muscular dystrophy. Haque A.K, Gadre S, Taylor J, et al. ■ Phase II consists of compression (garment during the day, bandages at night), exercise, meticulous skin care, and MLD as needed. Pathophysiology In the majority of individuals with hypertension, the threshold of stimulation of both the baroreceptors and the renal blood volume–pressure control systems is “set” too high.44,45 This causes a delay in the initiation of central and peripheral changes involved in the maintenance of normotension. These patients require immediate and emergency medical attention. Any contraindications to lying on a particular side need to be acknowledged before using unilateral costal expansion. FIGURE 16-19 A, Palpation of upper lobe motion. Disease-specific symptoms will be discussed in the relevant sections for each disease. 13-21). Phase 4 is the period of diastole and is constant in many atrial and ventricular contractile cells that rest indefinitely until stimulated. Hinshaw H.C, Murray J.F. Diseases of the Chest. Pursed-lip breathing is beneficial for persons with COPD by maintaining airway patency via increased positive end-expiratory pressure (PEEP).255,256 In view of recent research, the same maintenance of airways from increased PEEP may be helpful for persons with CHF.257,258 Furthermore, the increased PEEP and associated increase in intrathoracic pressure from varying degrees of pursed-lip breathing may decrease venous return, which could possibly decrease the left VEDV and pressure and improve myocardial performance for persons with severe CHF.259 Expiratory Muscle Training The majority of studies investigating the effects of expiratory muscle training have involved persons with spinal cord injury or other neurologic disorders. (See earlier sections on imaging and echocardiography for information.) FIGURE 8-8 Stress-redistribution thallium scintigram. (From Loomis-King H, Flaherty KR, Moore BB: Pathogenesis, current treatments and future directions for idiopathic pulmonary fibrosis, Curr Opin Pharmacol 13(3):377-385, 2013.) Along with a steady decline in lung function, the course includes acute exacerbations characterized by rapid deterioration in lung function not due to infections or heart failure. 257. 14-4, A. Therapeutic results are inconsistent, and the mortality rate is 10%.25,30,66 Sulfasalazine This drug is used to treat inflammatory bowel disease (chronic ulcerative colitis) and more recently to treat rheumatologic disorders.30 Patients who develop lung complications complain of dyspnea and cough approximately 1 to 8 months after the initiation of the drug. Half-normal saline (0.45% NaCl) had been the agent of choice for sputum induction. ed 3. ■ To provide safe and effective care for critically ill patients, the therapist must use strong critical thinking skills and understand: • Basic anatomy and pathophysiology of cardiovascular and pulmonary systems • Medical interventions provided in the critical care setting • Mechanical ventilatory support • Pharmacology prescribed for the patient • Function of the equipment present and its impact on therapeutic interventions • Emergency procedures References 1. Warfarin has been the drug of choice in the treatment of atrial fibrillation (a common cardiac arrhythmia) used to reduce the risk of an ischemic stroke. Pathologic conditions associated with these murmurs include aortic and pulmonary regurgitation and mitral stenosis. Perkins J.M, Collin J, Creasy T.S, et al. 15-1).7–10 Bronchospasm results from a disruption in normal bronchomotor tone by an outside stimulant such as an allergen. Patient education is vital in this stage so that the patient can begin to self-monitor HR, RR, RPE, and DI. Table 5-11 Clinical manifestation of pneumonia HR, heart rate; Paco2, arterial partial pressure of CO2; PaO2, arterial partial pressure of O2; RR, respiratory rate. The cause of interstitial fibrosis in the patient with RA is unknown, but seems to correlate with increased manifestations of autoimmunity.33 Patients with a high titer of rheumatoid factor are more likely to develop interstitial fibrosis.16 There seems to be a temporal relationship between joint involvement and development of fibrosing alveolitis, with the joint involvement usually coming first.25 Interstitial fibrosis can be diffuse but predominates in the lower lobes. Garritan, PT, PhD, CCS, Clinical Assistant Professor, Rehabilitation Medicine, Acute Care Physical Therapy Coordinator, Tisch Hospital, New York University, Langone Medical Center, New York, New York Natalie M. Katzmarzyk P.T, Church T.S, Blair S.N. Cardiorespiratory fitness attenuates the effects of the metabolic syndrome on all-cause and cardiovascular disease mortality in men. Eur J Vasc Endovasc Surg. An inventory for assessing different kinds of hostility. The number of intraoperative complications, as well as problems of airway dehiscence, has been greatly reduced by advances in surgical technique and increasing experience in the field of isolated lung transplantation.146,147 McCue and colleagues52 reviewed the effects of the adoption of the LAS on 90-day mortality and complications in lung transplant recipients and found no significant effect on rates of pneumonia, reintubation, tracheostomy, mean days in the ICU, and mean hospital stay. 13-19). The restrictive lung disease processes will show near-normal peak expiratory flow volume (FEVt) compared with the percentage of FVC (%FEVt/FVC). 2006;86:205– 214. Goodman C, Fuller K. Herridge M.S, Cheung A.M, Tansey C.M, et al. The Legs for Life National Screening and Awareness Program for PAD involved the evaluation and screening of 700 individuals.50 A follow-up survey was given 6 months following the screening program. Ng K.K, Howard R.S, Fish D.R, et al. BO X 12- 6 Signs a nd sym pt om s of a cut e re je ct ion Heart transplant Low-grade fever Inc rease in resting blood pressure Hypotension with ac tivity Myalgia Fatigue Dec reased exerc ise toleranc e Ventric ular dysrhythmias Dyspnea Weight gain due to water retention Dec reased urine output Lung transplant Fever over 100° F (38° C) “Flulike” symptoms: c hills, ac hes, headac he, dizziness, nausea, and/or vomiting Chest c ongestion Cough S hortness of breath New pain or tenderness around the lung Fatigue or generally feeling “lousy” Dec reased exerc ise toleranc e Dec rease in FEV 1 and FVC sts-proce dure s/he art-transplant/basics/risks/prc-20014050 ve landclinic.org/se rvice s/Lung_Transplantation/hic_Lung_Transplant_Re je ction.aspx me dicine .org/site s/www.duke me dicine .org/file s/ALO_AFTERSURGERY_Book%203_20121017.pdf From Hunt SA, Haddad F: The changing face of he art transplantation, J Am Coll Cardiol 52(8):587–598, 2008. 101. The NAVA system measures electrical activity of the diaphragm via an electrode inserted into a nasogastric tube that is placed in the lower esophagus to sense diaphragmatic activity. Aspirin, Plavix, Persantine at site of platelet aggregation. Research has shown that the absolute values of total cholesterol or HDL cholesterol are of less importance than the ratio of total cholesterol to HDL cholesterol in establishing an individual’s relative risk for developing CAD (Table 8-5). Patients with SCI at or above the T6 level often experience serious disturbances of BP. The fourth and final phase involves keeping the bar or step at 18 inches and with patient alternating upper extremities, shoulder flexion to 90 degrees or shoulder height for 3 minutes (or fatigue). 167. 267. It is a trial-and-error process that requires experience, such that dosages are adjusted on subsequent exercise days based on the measured response. Treatment includes a two-drug therapy: an aminoglycoside and a cephalosporin. A, Typical multilumen pulmonary artery catheter. In: Kinney M.R, Brooks-Brunn J.A, Molter N, et al., eds. American College of Sports Medicine Guidelines for Exercise Testing and Prescription. Subsequent studies have, in short-term trials, demonstrated improved lung function in people with cystic fibrosis.56–59 Surface-active agents, or surfactant, may stabilize aerosol droplets and thereby enhance their efficacy as carrier vehicles for nebulized drugs. Biopsy of the suspected tissue looking for evidence of the anti-GBM antibodies is the most direct form of diagnosis.54 Clinical Manifestation The clinical manifestation of Goodpasture’s syndrome can be found in Table 5-33. Another trend in heart transplantation is the increase in simultaneous heart transplants with other organ transplants. Positron emission tomography imaging demonstrates tissue viability using the metabolic tracers to detect CAD and is especially helpful in identifying the individual with severe left ventricular dysfunction who would be a candidate for revascularization or transplant.75 Therefore PET imaging has advantages over thallium imaging with exercise because it can detect jeopardized but viable myocardium76,77 without requiring the individual to perform an active exercise test. Nitrates are available in many forms, including topical, sublingual, and oral. Head A. Anyone who has ever attempted to separate two wet microscope slides by lifting (not sliding) the top slide from the bottom has firsthand experience with the forces of surface tension. Drug-induced RLD contributes to the morbidity of an estimated several hundred thousand patients in the United States annually. Portable Ventilators Portable, battery-powered mechanical ventilators provide the ventilatory support needed during patient transport and ambulation outside the room. Pulmonary angiogram, extremity venography, and magnetic resonance imaging (MRI) may also be used but are less likely due to invasive nature or cost or time factors. FIGURE 9-53 Acute pericarditis. During inspiration, as the pleural space pressure becomes more negative, the paralyzed diaphragm is pulled farther upward and the anterior lower ribs are pulled inward rather than being expanded.32 These changes in ventilatory mechanics cause alveolar hypoventilation with secondary changes that are seen in the lung parenchyma. The tube is placed between the ribs and into the space between the inner lining and the outer lining of the lung (pleural space). Core components of cardiac rehabilitation/secondary prevention programs: a statement for healthcare professionals. Augmentation of cardiac function by elevation of intrathoracic pressure. An increase in premature ventricular contractions with activity is an abnormal response to activity. In addition, optimal auscultation involves removal of bed clothes to expose the bare skin while the individual breathes deeply through an open mouth. What is the relationship between exercise and metabolic abnormalities? Br J Hosp Med. The erythromycins also exhibit a broad spectrum of antibacterial activity, being effective against many gram-positive and some gram-negative bacteria.5,22,32 The most common side effect of erythromycin administration is gastrointestinal distress, such as stomach cramps, nausea, vomiting, and diarrhea. Therefore any scan of the ECG should include a check for the presence of significant Q waves to identify previous infarction. 2008 November 02;8:131–147 Available from: CINAHL, Ipswich, MA. Muscle action is also essential to help the valves move venous blood toward the heart. Although many factors influence myocardial oxygen demand, MVO2 may be clinically assessed as the product of heart rate and systolic blood pressure. ■ Cigarette smoking has been linked to a variety of pathologic conditions, including bronchogenic carcinoma, cancer of the mouth and larynx, esophageal cancer, kidney and urinary bladder cancer, pancreatic cancer, chronic bronchitis, emphysema, increased incidence of respiratory infection, increased frequency and severity of asthmatic attacks, coronary artery disease, myocardial infarction, peripheral vascular disease, hypertension, stroke, low birth weights in infants, increased incidence of stillbirths, impotence, burn injuries, and reduced exercise capacity. Drug agonists and antagonists of the parasympathetic and sympathetic nervous systems are used to induce changes in vasomotor tone, cardiac inotropy, and chronotropy. Physical Therapy Examination • Subjective: JJ was intubated, communicating with paper and pencil, following multistep commands. Recipient animals were forced to survive solely on the transplanted lung and were able to do so for up to an 8-hour observation period; the animals with the shorter postmortem donor time survived the longest. Deficient acceleration of left ventricular relaxation during exercise after heart transplantation. Results of spirometry testing are more important in identifying the presence of most obstructive lung diseases. 1997;88:1–5. Hutter J.A, Despins P, Higenbottam T, et al. Courtesy John A.M. Taylor (A, Courtesy John A.M. Taylor, from Marchiori DM: Clinical imaging with skeletal, chest, and ab dominal pattern differentials, ed 3, St. Louis, 2014, Mosby; B, From Marchiori DM: Clinical imaging with skeletal, chest, and ab dominal pattern differentials, ed 3, St. Louis, 2014, Mosby.) Table 5-36 Clinical manifestation of lung contusion/fracture/flail chest ARDS, acute respiratory distress syndrome; FRC, functional residual capacity; PaO2, arterial partial pressure of O2; RR, respiratory rate; TLC, total lung capacity; VC, vital capacity; VT, tidal volume. 292. Qual Life Cardiovasc Care Spring. Some neonatal pulmonary diseases have unique radiographic presentations. 1977;39:833. BO X 17- 4 Abnorm a l re sponse s t o e x e rcise (pe r 1 MET le ve l) • Heart rate increases more than 20 to 30 bpm above resting heart rate • Heart rate decreases below resting heart rate • Systolic blood pressure increases more than 20 to 30 mm Hg above resting level • Systolic blood pressure decreases more than 10 mm Hg below resting level, dizziness, nausea/vomiting • Oxygen saturation drops below prescribed level • Patient becomes short of breath or respiratory rate increases to a level not tolerated by the patient • ECG changes, chest pain • Nonverbal/nonvital signs of possible exercise intolerance: • Color changes • Diaphoresis • Increased accessory mm use • Agitation, nonverbal signs of pain Breathing Exercises A number of breathing strategies can be incorporated into treatment of a patient with cardiopulmonary impairments (Table 17-4). Because expiration requires less pressure than inspiration, a BiPAP machine is designed in a way that during expiration, it reduces the pressure to a predetermined level. Serious adverse reactions like agranulocytosis are rare. Classification of antiarrhythmic drugs according to their effects on the action potential of myocardial and pacemaker cell gates is found in Table 14-12. Global burden of obesity in 2005 and projections to 2030. Maximum oxygen consumption and the ADAPT quality of life scale. According to the ACSM, if systolic blood pressure goes below baseline standing level during “exercise” or drops more than 20 mm Hg during positional changes, activity should be modified. Heart Transplant Waiting List Mortality Decreases Following UNOS Policy Change. Coronary anatomy. One method of determining the predicted maximal rate is to subtract the patient’s age from 220 (220 − age). 2004;34:727–751. 4-21 demonstrates that patients unable to ambulate greater than 468 m during the 6MWT had poorer short-term survival, but did not find a relationship with long-term survival. Therefore knowledge of the patient’s habits, including the length of time involved in the habit and the degree of intake, is an important component of the evaluation. FIGURE 3-15 Spider veins. Inspection Inspection (observation) is a key component in the assessment of any patient, but it is extremely important in patients with cardiopulmonary dysfunction. 2004;84(12):1178–1187. Heart rates are elevated with low Hb, and the patient would also be performing a lot of work with breathing. But the macrophages are destroyed by the cytotoxic effects of the silica. Treatment is abstinence from further intravenous talc exposure. Lancet Neurol. Patients with a TIA have a higher chance of stroke within 90 days, with many of these occurring within the first 2 days.253 Individuals who have involvement of a carotid artery may experience hemispheric symptoms such as contralateral hemiparesis, contralateral sensory loss, aphasia, and/or a visual field deficit. Levi M, Hart W, Büller H.R. Physical examination – the significance of Homan’s sign. Sener S.F, Winchester D.J, Martz C.H. Lymphedema after sentinel lymphadenectomy for breast carcinoma. Science. Gadson B. (From Damjanov I: Pathology for the Health Professions, ed 3, St. Louis, 2006, Saunders.) Etiology The causes of lung cancer are numerous. Compression stockings for preventing deep vein thrombosis in airline passengers. Bronchiolitis obliterans in recipients of single, double, and heart-lung transplantation. ↑ Elevated AST 11. Practice recommendations on the use of supplemental oxygen with physical therapy interventions were published in 2014 and should be utilized when working with patients on supplemental oxygen or requiring oxygen.10 Chapter 10 presents a method of assessing the degree of hypoxemia when patients are receiving supplemental oxygen. Typically, the saturation level is to remain between 90% and 94% for acute respiratory problems, with higher minimum levels (96% to 97%) set for acute cardiac conditions. Moodie D.S. Anorexia and the heart. Health care–associated pneumonia, HAP, and VAP are often caused by different microorganisms than community-acquired pneumonia (Table 5-10). The lower chest wall expansion is evaluated with the patient’s back toward the therapist and the therapist’s fingers wrapped around the anterior axillary fold. Images are acquired with either a gamma camera or a camera that times, or “gates,” the acquisition according to the cardiac cycle (via ECG). 197. Am J Physiol. The end result of such exercise assessments and exercise training is an improved quality of life for patients with CHF. DiCorleto P.E. Cellular mechanisms of atherogenesis. Patients with intermittent claudication have moderate to severe impairment in walking ability that usually comes on with a particular amount of activity and is relieved with rest. Respir Care Clin N Am. 1999;5:555–574. Increased dynamic stiffness of trabeculae carneae from senescent rats. This muscle involvement may cause a marked restrictive ventilatory impairment in 25% of SLE patients.10 Nephritis occurs in more than 50% of patients and is the major cause of mortality in SLE.9 Prognosis improves with early detection and intervention, as well as compliance with treatment regimens.44,54 Prevention of organ damage can improve life expectancy. The latter has been used to treat pulmonary hypertension associated with respiratory distress syndrome.60 FIGURE 14-10 Autonomic and hormonal control of cardiovascular function. 125. 1987;81:46–55. Sarcoidosis is more common in women than in men. Causative agents include bacteria, viruses, fungi, or mycoplasmas. These measures will reexpand the collapsed lung. Palo Alto: Consulting Psychologist Press; 1970. The normal range of hemoglobin for females is 12 to 16 g/100 mL, and for males it is 14 to 18 g/100 mL.22 Low levels of hemoglobin or a diagnosis of anemia will increase the work on the myocardium because of a lack of oxygen-carrying capacity and subsequently low levels of oxygen available to the tissues. Skurk T, Hauner H. Thus bronchodilators are the most frequently used drugs in the treatment of pulmonary disease.3,4 Bronchoconstriction can be attributed to three primary pathologic factors: abnormal bronchomotor tone (bronchospasm), inflammation, and mechanical obstruction. Notice the deeply scooped-out appearance of the expiratory limb of the curve, reflecting the pronounced flow limitation occurring at low lung volumes (predicted flow-volume loop in the red line). Rau J.L. Respiratory Care Pharmacology. The pulmonary complications seem to be dose related and rarely occur if the dose is under 400 mg/day. Jalowiec A, Grady K, White-Williams C. Spurgeon H.A, Thorne P.R, Yin F.C.P, et al. 1996;110:1520– 1525. J Thorac Oncol. The elderly also exhibit increased sensitivity to the toxic effects of cardiac drugs, such as antiarrhythmics, digitalis, or β-blockers. It is important to understand the number of and placement of the bypass grafts, as well as any complications that occurred during the procedure (e.g., whether a pacemaker was inserted) in patients who have undergone coronary artery bypass surgery. Three classes of drugs can exacerbate the syndrome of heart failure and should be avoided in most patients, including: ■ Antiarrhythmic agents, which act as cardiodepressants and often have proarrhythmic effects. In response to exercise, a physical therapist should see an elevation in the systolic blood pressure reading with slight drop in the diastolic blood pressure reading in response to increasing activity. The ultimate prognosis is extremely variable. 15 Pulmonary medications Tara Marie Dickinson Fahrner, Kelley Crawford, and Susan Butler McNamara CHAPTER OUTLINE Physiology 489 Bronchomotor Tone 489 Rationale for Bronchodilators 490 Bronchodilators 492 Sympathomimetic Agents or Adrenergic Agonists 492 Sympatholytic Agents or Adrenergic Antagonists 495 Parasympatholytic Agents or Muscarinic Antagonists 495 New Drug Development 497 New Antifibrotic Medications (for the Treatment of Idiopathic Pulmonary Fibrosis) 497 Pulmonary Arterial Hypertension Medications 497 Ancillary Pulmonary Medications 497 Decongestants 497 Antihistamines 497 Antitussives 498 Mucoactive Agents 499 Respiratory Stimulants and Depressants 499 Neuromuscular Blocking Drugs 499 Antimicrobial Agents 500 Other Agents 502 Case study 15-1 503 Summary 503 References 504 Medications used to affect the pulmonary system can be classified based on their mechanism of action1–5: 1. Lipoprotein a levels are thought to be genetic in origin and were found in 50% of the offspring of patients with CAD in the Framingham study.29 Increased Lpa levels are associated with a threefold increase in the risk of a primary CAD event.28 Response to standard treatment for lowering LDL in individuals with elevated Lpa was not successful except with LDL apheresis.29 In addition to Lpa, the presence of an elevated amount of small, dense LDL particle subtype (phenotype B) is also associated with an elevated risk for CAD (threefold increased risk).29 Small, dense LDL is also associated with elevated triglyceride levels. Holmes M.D, Chen W.Y, Feskanich D, et al. In that case, use of a nonselective β-blocker would not only decrease myocardial oxygen cost by decreasing heart rate and blood pressure, but also have the unfortunate effect of enhancing bronchospasm. Blakemore A, Dickens C, Guthrie E, et al. Locate the brachial artery in the upper extremity and the dorsalis pedis or posterior tibial artery in the lower extremity (Fig. Skinner J.S. Exercise Testing and Exercise Prescription for Special Cases—Theoretical Basis and Clinical Application. Ludmer P.L, Selwyn A.P, Shook T.L, et al. Auscultation for a pericardial friction rub is best performed with the patient in the supine position, with the therapist listening over the third or fourth intercostal space along the anterior axillary line. Semin Respir Crit Care Med. 1982;81:440–443. In addition to and as a result of the administration of a diuretic, electrolyte levels are carefully monitored, ensuring that potassium and sodium levels are within the normal range to prevent further retention of fluid from high levels of potassium and sodium or the detrimental effects of low levels (e.g., cardiac arrhythmias and muscle weakness). Ciccone C.D. Pharmacology in Rehabilitation. New York: Oxford University Press; 1985. Diagnoses other than cardiovascular and pulmonary may include orthopedic, neurologic, psychological, or integumentary, and these diagnoses may affect the optimal treatment plan proposed. ↑ or ↓ K+ Radiologic Findings in Congestive Heart Failure Identification of several of the signs and symptoms frequently suggests the presence of CHF, but radiologic and occasionally laboratory findings usually confirm the diagnosis and provide a baseline from which to evaluate therapy.5 Radiologic evidence of CHF is dependent on the size and shape of the cardiac silhouette (evaluating left VEDV), as well as the presence of interstitial, perivascular, and alveolar edema (evaluating fluid in the lungs).5 Interstitial, perivascular, and alveolar edema form the radiologic hallmark of CHF and generally occur when pulmonary capillary pressures (which reflect the left ventricular end-diastolic pressure) exceed 20 to 25 mm Hg.5 Pleural effusions (parenchymal fluid accumulations) and atelectasis (collapsed lung segments) may also be present. This arrhythmia characteristically occurs at a rapid rate and terminates spontaneously. generic, 446, 446b clinical tips for, 446b–447b, 450b, 452b–454b, 466b, 484b critical care cardiac drugs, 475–478, 476t antiarrhythmic agents, 477 anticoagulants, 478 autonomic nervous system (ANS)-acting agents, 475, 478t electrolyte replacement, 478 inotropic agents, 476–477 oxygen, 475 pain management agents, 478 vasodilators, 476–477 diabetes management, 481–483, 481t–483t food adjustments for exercise, 483t insulin types, 482t oral hypoglycemic agents, 481t geriatric population considerations, 478–480, 479t pharmacokinetic alterations, 479 therapeutic indications, 479–480 heart failure, 457–468, 457t aldosterone antagonists, 460t–461t, 462 alpha-adrenergic antagonists, 463 angiotensin-converting enzyme (ACE) inhibitors, 460t–461t angiotensin-receptor blockers (ARBs), 460t–461t, 462 angiotensin II-receptor antagonists, 460t–461t antihypertensive agents, 460t–461t arrhythmias vs. There is frank alveolar edema in the right lower zone. In the Balke protocol the subject starts on a level surface and only gradually is an incline added during the test. This is the reason one may hear bronchial breath sounds in areas other than the mainstem bronchi when a pathologic condition that causes consolidation exists. 1991;17(3):621–626. The importance of exercise training in predialysis patients with chronic kidney disease. 2006;11:219–226. 3-13 shows the actual anatomy of the vascular supply to the brain, demonstrating two internal carotid arteries and two vertebral arteries that come together at the base of the skull to form the circle of Willis. Am Heart J. However, because these drugs act on skeletal muscle, they also decrease thoracic expansion, decrease chest wall compliance, and decrease pulmonary ventilation. It will provide the essentials as the title indicates. One of the main goals for these patients is to return to spontaneous breathing. Function, eligibility, outcomes and exercise capacity associated with left ventricular assist devices: Exercise rehabilitation and training for patients with ventricular assist devices. Inc lude how measurement error was determined and report the S EM (standard error of mean). The twelfth rib sometimes is shorter than the first rib. 2008;21(2):117–128. 2002;136(12):873–883. Orv Hetil. The pharynx is a musculomembranous tube approximately 5 to 6 inches long and located posterior to the nasal cavity. The arrows indicate the flow of blood from the venae cavae to the right atrium and from the right atrium to the right ventricle. This equipment is not always accurate with multiple uses. New York: McGraw-Hill Information Services; 1998:1278– 1347. There is no pulmonary compromise associated with this structural abnormality, and no treatment is indicated.32 Connective Tissue Causes of RLD Rheumatoid Arthritis Rheumatoid arthritis is a chronic process characterized by inflammation of the peripheral joints that results in progressive destruction of articular and periarticular structures.2,32 Etiology The etiology is unknown. ed 5. Able to ambulate 100 ft with contact guard, then fatigues and needs to rest. Although cyclosporine appears to be impressive as a highly selective agent that is effective against a subpopulation of lymphocytes, it has a considerable number of side effects. The affective domain includes a patient or caregiver ’s attitudes, belief system, and motivation levels. The other 15% of the cases are due to known congenital causes (e.g., hemivertebrae) or develop in response to a neuromuscular disease (e.g., poliomyelitis, syringomyelia, muscular dystrophy).28,32 Pathophysiology In addition to the excessive anteroposterior and lateral curvature, the lateral displacement causes two more structural changes. Grocery Shelving Test (upper limb activity) 3. Each patient may describe these symptoms differently. Comparison of the histopathology of culprit lesions in chronic stable angina, unstable angina, and myocardial infarction. Table 5-30 Clinical manifestation of systemic lupus erythematosus DLCO, diffusing capacity of the lungs for carbon monoxide; Paco2, arterial partial pressure of CO2; PaO2, arterial partial pressure of O2. Class 2 drugs Class 2 antiarrhythmic agents (Table 14-12)—β-blockers—do not directly affect the cell membrane. Effects of angiotensin-converting enzyme inhibitors and digoxin on health outcomes of very old patients with heart failure. Zuckerman K.S. Approach to anemias. 1958;30:575–586. Nat Clin Pract Endocrinol Metab. Abnormal blood pressure response during exercise in hypertrophic cardiomyopathy. Improved management of this patient population has also been found when β-blockers with α-blocking activity, such as carvedilol (Coreg), is used. Comparative trial of manual and mechanical percussion technique with gravity assisted bronchial drainage in patients with cystic fibrosis. Prakash U.B.S, King Jr. T.E. Endocrine and metabolic disorders. The diaphragm contractile force measurement is a direct way of measuring transdiaphragmatic pressure by using a probe with a double balloon (esophageal and gastric). Supportive therapy is primarily focused on maintaining an airway and ensuring adequate ventilation.2,53 Pseudohypertrophic (Duchenne) Muscular Dystrophy Pseudohypertrophic muscular dystrophy is a genetically determined, progressive degenerative myopathy.53,61 Etiology Pseudohypertrophic muscular dystrophy is a sex-linked (X chromosome) recessive disorder that occurs only in boys and is transmitted by female carriers. Persons performing the testing should be certified in Advanced Cardiac Life Support, taught by the AHA, and well trained in emergency cardiac response techniques such as defibrillation. IRV, inspiratory reserve volume; TV, tidal volume; ERV, expiratory reserve volume; RV, residual volume; TLC, Total lung capacity; IC, inspiratory capacity; FRC, functional residual capacity; VC, vital capacity. To facilitate inspiratory effort, the therapist instructs the patient to breathe in during shoulder flexion, abduction, and external rotation along with an upward eye gaze. In the acute postoperative period, complications include infection, ischemia– reperfusion injury, acute graft failure, and acute rejection. Because the immature heart is limited in its ability to increase stroke volume, inotropic agents may be less effective in it than in an adult heart. These enzymes are released at a variable rate and are cleared by the kidney and other organs. With prolonged use, these muscles can become hypertrophied and shortened, causing postural deviations including forward head, rounded shoulders, and thoracic kyphosis, as well as causing the posterior thoracic musculature to weaken and lengthen. Malone S, Liu P.P, Hollway R, et al. It was concluded that if the desirable period of ischemia can be increased so that reliable gas-exchange function is observed for longer periods, then it may be realistic to consider eventually expanding the pulmonary donor pool using cadaver lungs as a resource. 1989;28:545–549. Glucoregulation and hormonal responses to maximal exercise in non-insulin-dependent diabetes. When the catheter is in contact with the carina, a cough ensues along with a strong parasympathetic response. 1974;29:223. The electrical impulse originates in the heart, and contraction of the heart’s chambers is coordinated by specialized heart tissues. Repeat cardiac catheterizations also provide information on the progression or, in rare cases, regression of coronary disease or valvular dysfunction. The therapist should focus the review of the medical record by identifying the following significant information: ■ Diagnosis and date of event ■ Symptoms on admission and after the patient’s admission ■ Other significant medical problems in the past medical history ■ Current medications ■ Risk factors for cardiovascular and pulmonary disease ■ Relevant social history, including smoking, alcohol and drug use, lifestyle, and support mechanisms ■ Clinical laboratory data ■ Radiologic studies ■ Oxygen therapy and other respiratory treatment ■ Surgical procedures ■ Other therapeutic regimens ■ Electrocardiogram and telemetry monitoring ■ Pulmonary function tests ■ Arterial blood gases ■ Cardiac catheterization data ■ Other diagnostic tests ■ Vital signs ■ Hospital course since admission, particularly in the patient with cardiac injury, to determine whether it has been a complicated or an uncomplicated course ■ Nutritional intake ■ Occupational history ■ Home environment assessment Diagnosis and Date of Event The physical therapist needs to know and understand the primary diagnosis as well as any additional diagnoses made since the hospital admission or referral to rehabilitation to determine the appropriateness of treatment and the need for monitoring the patient’s responses. 1995;13:1091–1095. 1991;144:1386–1413. For the seated step test, the patient should be seated in a chair that is 18 inches in height. The pleura covering the inner surface of the chest wall, diaphragm, and mediastinum is called the parietal pleura. Tumor cells are also spread via the lymphatic system and therefore can alter the normal lymphatic clearance of the pleural space or are brought into the pleural space by the pleural lymphatics (Fig. ■ The method of detection may be invasive or noninvasive. Squamous cell tumors are bulky. Lipedema. Cell. This can occur because of occlusion of the coronary arteries from vasospasm, atherosclerotic occlusion, thrombus, or a combination of the three. Patients who exercise and take lovastatin often complain of muscle achiness and should be evaluated for possible drug-induced side effects and exercise intolerance. Although hyperkalemia is a side effect of spironolactone, cautious monitoring of potassium levels has allowed this drug to have an effective role in the management of HF. Typically, adverse effects requiring early termination subside within 5 to 10 minutes of discontinuation of the infusion (the half-life of dobutamine is 2 minutes). Reliability and Validity The AM-PAC and the “6 Clicks” forms have been shown to be valid and reliable.162,163 The AM-PAC has high internal reliability with Cronbach α scores of 0.92 to 0.94.162 Each of the three domains also shows good reliability and fit. To effectively evaluate and treat patients with lymphatic system disorders, the physical therapist should keep the following key points in mind: ■ The lymphatic system is a one-way system that starts with small vessels called initial lymph vessels and then progresses to larger vessels called precollectors and even larger collectors, which finally ends with the largest vessels called trunks that drain into the venous system near the heart. It can occur suddenly with no prior hemoptysis and can carry a mortality rate as high as 70%.9 The reasons some patients develop recurrent pulmonary hemorrhages or

artery. Coronary artery bypass graft surgery is probably the most common reconstructive surgery because myocardial ischemia and infarction are the primary causes of CMD and CHF.202 Its effects are often profound, improving cardiac muscle function and eliminating CHF. Cardiac output may be further improved by the administration of antihypertensive agents (those acting independent of the autonomic nervous system) and antiarrhythmic drugs. 298. 2005;37:1072–1081. ■ The autonomic nervous system has a major influence on the cardiac system. Table 4-6 shows the oxygen saturation levels when arterial oxygen concentrations are less than 60 mm Hg. Various conditions move this normal curve to the right or left, and these changes subsequently affect the respective oxygen saturation. Porter S, ed. 1988;319(2):80–86. Pharmacologic Intervention Classification of antihypertensive drugs is related to their primary receptor site and mode of action: ■ Diuretics, which act on kidneys to reduce volume ■ Drugs, which act to limit sympathetic nervous system activity to cause vasodilation (arterial and venous) and to reduce cardiac output ■ Drugs, which act on the RAAS at the kidney to reduce volume and cause vasodilation At present, no drug has been found effective and safe in directly altering baroreceptor activity. 1996;335:453– 461. Some agents are initiated in the immediate postoperative period and continued indefinitely, whereas others may be quickly discontinued or slowly tapered. Beta1-and beta2-adrenergic-receptor subpopulations in nonfailing and failing human ventricular myocardium: Coupling of both receptor subtypes to muscle contraction and selective beta 1receptor down-regulation in heart failure. Health consequences of physical activity: Understanding and challenges regarding dose-response. Finally, an ABI below 0.20 is considered severe ischemia. ERV, expiratory reserve volume; FRC, functional residual capacity; IC, inspiratory capacity; IRV, inspiratory reserve volume; RV, residual volume; TLC, total lung capacity; VT, tidal volume; VC, vital capacity. The most common cause of death is respiratory failure, which is usually precipitated by respiratory infection and occurs by the age of 20 unless ventilatory support is provided. Previously, the term was used to describe the milder end of the spectrum; however, now the term used is mild ARDS.51 FIGURE 5-18 Mechanism of atelectasis. Similarly, infants and young children exhibit different pharmacodynamics. American College of Sports Medicine. Respir Med. No drug therapy is available for all the varieties of viral agents, so treatment is often limited to supportive measures.32,35 Fungal Pneumonias Pneumocystis jiroveci Previously called Pneumocystis carinii and originally described as a protozoan, this is now thought to be a fungal organism.30 Pneumocystis carinii pneumonia (PCP) is closely associated with AIDS because nearly 75% of AIDS patients have at least one episode of PCP during their lifetime.30 Patients with AIDS have impairment of T-cell function, as well as humoral immune dysfunction, and thus are susceptible to infection from bacteria, viruses, fungi, and parasites. Diuretics and β-blockers have a long history of safe and effective use; short-term efficacy studies document the utility of ACE inhibitors, ARBs, and calcium-channel blockers. C, If this slowly conducted impulse travels retrograde over the previously blocked pathway, it will reenter the circuit and then initiate a regular tachycardia by repetitively circling the path. In assessing dyspnea, the ventilatory reserve and the dyspnea index are the most important variables. 2003;38:296– 304. As the disease progresses, the PEFR becomes noticeably reduced and the scooping becomes more pronounced (see Fig. J Am Geriatr Soc. In addition, sometimes pulmonary toxicity develops when specific chemotherapeutic agents are used in combination (e.g., vinblastine [Velban, Velsar] combined with mitomycin C induces bronchospasm, interstitial pneumonitis, and noncardiac pulmonary edema). Obesity: Mechanisms and Clinical Management. Rapid atrial fibrillation or flutter can produce CMD and is often easily treated by the administration of verapamil or digoxin20 (see Chapter 14). As a result, MCSDs may not be a bridge but implanted with the intent of the recipient living out the remainder of his or her life with the device. (Accessed on 2/17/205). 37. Noninvasive Monitoring Equipment Electrocardiogram The electrocardiogram (ECG) is a graphic representation of the electrical activity of the heart. Oxygen is necessary for the production of energy. β-Blockers attenuate the HR response to exercise and may reduce exercise capacity and exercise performance. 1991;3(1):14–22. Finally, electromyography can be used to directly assess the muscle electrical activity. restrictive), pulmonary function testing (PFT) needs to be performed. The gradient of nuclear resonance is proportional to the gradient of the magnetic field—magnetic resonance. Assessment of the beta-adrenergic receptor pathway in the intact failing human heart: Progressive receptor downregulation and subsensitivity to agonist response. The predicted maximal heart rate of an individual is related to age. Bagot C.N, Arya R. The resultant voltage is amplified and converted into a graphic or numeric image on a monitor. Criqui M.H, Fronek A, Klauber M.R. The sensitivity, specificity and predictive value of traditional clinical evidence of peripheral arterial disease: Results from noninvasive testing in a defined population. 2009;27:341–347. They can be classified based on their specific action, that is, into muscarinic and nicotinic agonists or antagonists. Immersing the end of the collection tube in water and creating an underwater seal accomplishes this. The six-minute walk test in outpatients with obesity: reproducibility and known group validity. Ferrans C, Powers M. Circulation 102:1069–1073, 2000; and J Cardiopulm Rehabil 20:310–316, 2000. Cardiac complications occur in 80% of patients with an eating disorder and include bradycardia and other cardiac arrhythmias, hypotension, decreased cardiac mass, and mitral valve prolapse. She remained asymptomatic during prolonged cardiac rehabilitation exercise assessments with adaptive heart rate and blood pressure responses, but somewhat paradoxically developed angina at rest. The diaphragm is divided into right and left hemidiaphragms. Dendroaspis natriuretic peptide relaxes isolated human arteries and veins. There is recent interest in expiratory muscle training of persons with various forms of COPD using PEEP devices, but very little literature exists. 1980;140:1596–1601. His current blood lipids are TC = 188 mg/dL, triglycerides = 147 mg/dL, HDL = 27 mg/dL, and CHOL/HDL = 6.96 mg/dL. Axillary reverse mapping: Mapping and preserving arm lymphatics may be important in preventing lymphedema during sentinel lymph node biopsy. www.ishlt.org. The disease is twice as common in males as in females.32 Pathophysiology The disease often seems to start in the upper respiratory tract with necrotizing granulomas and ulceration in the nasopharynx and paranasal areas. ■ Inpatient treatment and goals focus on improving or correcting impaired gas exchange and ineffective airway clearance, patient positioning, pain reduction, and reducing mobility restrictions. A traumatic pneumothorax can be further classified as an open pneumothorax or a tension pneumothorax.2 An open pneumothorax means the air in the pleural space communicates freely with the outside environment. Ann Surg Oncol. The tenth ECG complex is a premature atrial complex (PAC); note the resultant decrease in the area of the tenth arterial pressure wave. J Hepatol. In a PA film the clavicles often appear to be lower than in an AP film. Between 16 and 20 incomplete rings of two or more hyaline cartilages are often joined together along the anterior twothirds of the tracheal circumference, forming a framework for the trachea. The patient continued with twice-daily cardiac rehabilitation, increasing the distance ambulated to 800 feet, and underwent a thallium treadmill stress test on August 13, 2010. Ganong W.F. Review of Medical Physiology. Furthermore, there is evidence that regular physical activity improves survival in patients with breast and colorectal cancers.337–339 To summarize and reduce to the basics for practical application, recommendations are offered in Box 7-3. Outcome measures: A guide for the evidence-based practice of cardiopulmonary physical therapy 16 Examination and assessment procedures Ellen Hillegass, and Andrew Mills CHAPTER OUTLINE Elements of Patient Management 506 Patient History 507 Medical Chart Review 507 Diagnosis and Date of Event 507 Symptoms 508 Other Medical Problems and Past Medical History 509 Medications 509 Risk Factors for Heart Disease 509 Wells Prediction Tool for Deep Vein Thrombosis 509 Relevant Social History 509 Clinical Laboratory Data 510 Radiologic Studies 510 Oxygen Therapy and Other Respiratory Treatment 510 Surgical Procedures 511 Other Therapeutic Regimens 511 Electrocardiogram and Serial Monitoring 511 Pulmonary Function Tests 511 Arterial Blood Gases 511 Cardiac Catheterization Data 511 Vital Signs 512 Hospital Course 512 Nutritional Intake 512 Occupational History 512 Home Environment and Family Situation 512 Interview with the Patient and the Family 512 Systems Review 513 Physical Examination 513 Inspection 513 Auscultation of the Lungs 519 Auscultation of the Heart 522 Palpation 524 Mediate Percussion 528 Activity Evaluation 529 Evaluation 537 Case study 16-1 537 Summary 537 References 538 Optimal rehabilitation depends on a thorough examination of the entire patient to evaluate the extent of dysfunction that may affect future performance. 1983;12(6):643–649. These receptors are responsible for sensing alterations in blood pH, carbon dioxide, and oxygen levels.7 There primarily exist two types of chemoreceptors, including central and peripheral chemoreceptors. In light of this, it is important to review the mechanisms involved in helping to control breathing. 8. b Controversial classification; acts like IC as well. 2001;104:531–543. FIGURE 1-2 Typical middle rib as viewed from the posterior. 1997;46:1441–1447. 2009;30:479–488. Tzelepis G.E, McCool F.D. The lungs and chest wall disease. 1988;93(2):289– 293. Even if patients are not hypoxemic at rest, they may quickly become hypoxemic with exercise. Programmed ventricular stimulation in the evaluation of the clinical significance of premature ventricular contractions. 1998;244:495–505. 226. The fourth stage consists of the sudden opening of the glottis and the forceful expulsion of the inspired air. Nakamura K, Rockson S.G. The role of the lymphatic circulation in the natural history and expression of cardiovascular disease. 1990;15:174–180. 1711) allows the patient to walk with support. Positive smoking history: 90 pack/years. Drugs such as cimetidine or ranitidine can be used preoperatively to increase gastric pH and decrease gastric volume.66 Postoperatively, hypoxia can be treated with inflation-hold breathing techniques, PEEP, CPAP, and occasionally with increased oxygen concentrations. Pulse palpation may be difficult to quantify and does have a degree of unreliability from one clinician to the next. Br J Haematol. 105. 1997;30(1):42– 48. Donor procurement and surgical techniques for cardiac transplantation. The most commonly used protocols in testing involve the use of either the stationary bicycle or the treadmill.134 Blood pressure is easier to auscultate on the stationary bicycle than on the treadmill. 1998;58:1323–1330. Although rib fractures may occur in various locations, they are more common in the weakest area where the shaft of the ribs bend—the area just anterior to its angle. Eur J Cardiothorac Surg. Holliday J.E, Hyers T.M. The reduction of weaning time from mechanical ventilation using tidal volume and relaxation biofeedback. The patient then walks behind the wheelchair or walker, using it for support (Fig. 1979;54:542–544. Assuring quality of care through measurement of outcomes is of the utmost importance to payers, such as the Center for Medicare and Medicaid Services (CMS), and regulatory agencies, such as the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO). 296. They are used with special caution in newborns due to the immature peripheral vascular resistance mechanisms of the sympathetic nervous system and the consequent enhanced risks of hypotension. These data, primarily collected at the initial evaluation and readdressed at points along the course of care, consistently include a chart review to evaluate biologic measures such as lab values and to gather medical history, and a systems review that allows for the gathering of data on functional measures such as pain, range of motion, strength/manual muscle testing, and functional mobility. New York: Elsevier Health Sciences; 2014:420–431. MRC/BHF heart protection study of cholesterol lowering with simvastatin in 20,536 high-risk individuals: a randomized placebo-controlled trial. Arch Surg. In the presence of obstructive lung disease, the vital capacity (VC) is normal to decreased, the residual volume (RV) and functional residual capacity (FRC) are increased, the TLC (total lung capacity) is normal to increased, and the RV/TLC ratio is increased. These fibrous zones can completely replace the entire upper lobe.35 Other conditions that may result from complicated CWP include emphysema, chronic bronchitis, tuberculosis, cor pulmonale, and pulmonary thromboembolism. He has a 12-year history of hypertension, which is controlled by medication. Likoff M, Chandler S, Kay H. The semilunar valves lie between the ventricles and arteries and are named based on their corresponding vessels: pulmonic valve on the right in association with the pulmonary artery, and aortic valve on the left relating to the aorta. The BUN value is unsuitable as a single measure of renal function, and therefore the creatinine value should also be noted. The eleventh and twelfth ribs (floating ribs) have no necks or tubercles and are narrowed at their free anterior ends. The patient’s status should be maximized in regard to nutrition, metabolic stability, fluid and electrolyte balance, hemodynamic stability, and cardiac function. Auscultation should be performed in a systematic manner, anteriorly and then posteriorly (or vice versa) (Fig. Cardiol Rev. 1996;334:1349–1355. It is interesting that diets containing beta carotene (found in many green, yellow, and orange fruits and vegetables) have been shown to modestly decrease the risk for lung and other cancers.28 In some individuals and families, a genetic predisposition for the development of lung cancer seems to be present. Cardiovascular diseases due to genetic abnormalities. However, abnormal electrolyte levels or toxic levels of a drug may be responsible for cardiac rhythm disturbances. The patient is placed in a plethysmograph, connected to the mouthpiece, and asked to breathe normally. The physiologic cause for this change is unclear, but may be an alteration in the pulmonary capillary permeability.35 See Chapter 7 for more details on diabetes. Borg’s RPE Scale. Muno P.E, Holland A.E, Bailey M, et al. Faggiano P, D’Aloia A, Gualeni A, et al. McCrindle B.W, Urbina E.M, Dennison B.A, et al. Waters D, Craven T.E, Lesperance J. Comfortable at rest, but ordinary physic al ac tivity c auses symptoms of HF III Marked limitation of physic al ac tivity. RR = 18, no accessory muscle use. FIGURE 9-48 A significant Q wave is defined as a minimum of one small square wide and one-third the height of the QRS. Quinolones and some antiviral drugs interfere with the synthesis of microbial DNA. Poole-Wilson P.A. The origin of symptoms in patients with chronic heart failure. Supine to sit independent. • Evaluate the location of all catheters, tubes, and hemodynamic support devices. In patients with inflammation of the pericardium, fluid may accumulate in the closed pericardial space, producing cardiac tamponade, evidenced as compromised cardiac function and contractility caused by buildup of fluid in the pericardial space. The decrease in lung volumes and capacities, determined by spirometry, is the fourth classic sign of RLD. Currently, this procedure is rarely performed, although it has been used to treat bronchopulmonary fistulas.2 Another surgical procedure that can result in significant RLD is lung transplantation. Thus, for a co2 of 1 l/min, a normal subject has to ventilate at 22 l/min and the patient with moderate heart failure ventilates at 42 l/min. 1996;34:477–483. When to start cholesterol-lowering therapy in patients with coronary heart disease. Two of these, daclizumab and basiliximab, are synthetic, humanized monoclonal preparations that appear to have fewer side effects than the antilymphocytic agents. A similar, nonsteroidal antiinflammatory drug, nedocromil sodium (Tilade), is also available.41,48,49 Both cromolyn and nedocromil have few side effects, as they are poorly absorbed. Mehra M.R, et al. FIGURE 10-16 Flow-volume loop. A detailed discussion of the interpretation of ECG data and a description of arrhythmias are presented in Chapter 9. 5-8).25–27 Table 5-4 Clinical manifestation of idiopathic pulmonary fibrosis DLCO, diffusing capacity of the lungs for carbon monoxide; FRC, functional residual capacity; HR, heart rate; HRCT, highresolution computed tomography; IPF, idiopathic pulmonary fibrosis; Paco2, arterial partial pressure of CO2; PaO2, arterial partial pressure of O2; RR, respiratory rate; RV, residual volume; TLC, total lung capacity; VC, vital capacity; VT, tidal volume. This increases the work of breathing and can lead to diaphragmatic fatigue. The test is sequenced according to the general order of difficulty of mobility tasks. Mancia G. Cold, pale, and possibly cyanotic extremities 7. Parkinson Disease Parkinson disease is a common dyskinetic disorder of the extrapyramidal system, which is characterized by resting muscle tremors, rigidity, slowness and poverty of motion, gait impairment, and postural instability. FIGURE 16-28 Evaluation of diaphragmatic excursion (normal, 3 to 5 cm); normal breathing (solid line), deep inspiration (broken line). Allergy Asthma Proc. Forstermann U, Mugge A, Alheid U, et al. Comparison of lung volume reduction surgery and physical training on health status and physiologic outcomes: A randomized controlled clinical trial. Following a period of normal, quiet breathing, the patient is instructed to perform a maximal inspiratory maneuver, to hold the breath for 1 to 2 seconds, to do an FVC maneuver, and then to do another maximal inspiratory maneuver. The effects of this exposure are dependent on what is burning, the intensity of or the temperatures generated by the fire, the length of the exposure, and the amount of body surface involved.64 Pathophysiology Smoke inhalation causes pulmonary dysfunction in three different ways. The determination of the causative factor in an acute respiratory infection is often difficult because clinical signs are often similar. Am J Epidemiol. Jakicic J.M, Otto A.D. Treatment and prevention of obesity: What is the role of exercise? 2001;345(10):731– 738. (From Tapson VF: Acute pulmonary embolism. 1992;85(5):1751–1759. 2006;173(12):1390–1413. The measurement of dyspnea: Contents, interobserver agreement, and physiologic correlates of two new clinical indexes. Sitting lower extremity exercise would have been much more appropriate for this patient, who demonstrated many interrelated pathophysiologic processes that were exacerbated by improper exercise training and ultimately led to her death. Pediatr Pulm A. The total lung capacity (TLC) is the sum of the vital capacity (VC) and the residual volume (RV) and is the only individually diagnostic parameter in spirometry. 1992;327(10):685–691. The PROCAM experience and pathophysiological implications for reverse cholesterol transport. Many factors have been studied from the results of the low-level exercise test to determine the most outstanding variable for identifying high-risk patients. 2008;31:281–290. Treatment for the presence of elevated small, dense LDL particle subtype consists of low-fat diet; exercise; and pharmacologic therapy with statins, bile acid sequestrants, nicotinic acid, and fibrates.30 Individuals with diabetes often have abnormal lipid levels. The normal FEF200–1200 is usually greater than 5 L/sec (300 L/min). Sachdev V, Machado R.F, Shizukuda Y, et al. In: Goodman C.C, Fuller K.S, eds. Physiologic changes that commonly are considered part of the aging process can begin as early as 20 years of age.11 Etiology The normal aging process in the pulmonary system is very slow and insidious, and because we have great ventilatory reserves, the changes are often not felt functionally until the sixth or seventh decade of life.12 Universally, the normal aging process in the lungs is complicated by the fact that throughout life the lungs have had to cope with the external environment. Validity of the AMPAC “6-Clicks” inpatient daily activity and basic mobility short forms. 168. 1984 Sept/Oct:141. • Search for evidence of barotrauma. The glottis should remain open during the huffing. The angina pain from mitral valve dysfunction arises from the diminished blood flow resulting from the subsequent decreased cardiac output.40 Bronchospasm Some patients experience exercise-induced bronchospasm, which can manifest itself as chest wall tightness or discomfort, or both, with exertion. A study by Mancini and associates evaluated the effects of inspiratory and expiratory muscle training in CHF and found significant improvements in ventilatory muscle force and endurance, submaximal and maximal exercise performance, and dyspnea after 3 months of aggressive ventilatory muscle training in eight patients with chronic CHF.254 Despite a lack of research in expiratory muscle training alone in CHF, the observations of Mancini and associates254 and others suggest that expiratory muscle training may be beneficial for persons with CHF by (1) increasing expiratory muscle strength to improve pulmonary function; (2) increasing PEEP to improve airway compliance; and (3) possibly decreasing venous return and the left VEDV to improve myocardial performance.259 These changes may improve the exercise tolerance and functional status of persons with CHF. Reparative procedures correct cardiac malfunctions such as ventricular septal defect, atrial septal defect, and mitral stenosis, and frequently improve cardiac hemodynamics, resulting in improved cardiac performance. The number of clinical notes was increased to help clinicians and students understand certain clinical findings and help them relate them to the pathophysiology of cardiovascular and pulmonary disease. Nat Clin Pract Nephrol. Pulse oximetry. (From Craven J: The lungs and their relations. Drug receptors are located outside and inside our cells and are mostly cellular proteins. The Na+–K+ pump expels Na+, accumulated during depolarization, from the cell and brings in K+ during repolarization. Philadelphia: Lippincott Williams & Wilkins; 2004. Abbott J.H, Schmitt J. Comprehensive Lipoprotein Management to Reduce Residual CVD Risk. Phosphodiesterase inhibitors are positive inotropic agents that are used cautiously in the treatment of acute decompensated HF. The incidence of RDS in infants with a gestational age of 26 to 28 weeks at birth is approximately 75%.8 In contrast, the incidence of RDS in infants with a gestational age of 36 weeks at birth is less than 5%.9 Other factors that seem to contribute to the development of RDS are gender, race, abruptio placentae, and maternal diabetes. Normally, in the acute care setting, patients should not be working anywhere near maximal heart rate. His heart rate was 110 beats per minute and blood pressure was 130/78 mm Hg. The ECG rhythm showed a sudden onset of PVCs and a run of ventricular tachycardia. Many patients undergo peritoneal dialysis, whereby a dialysis fluid is introduced into the peritoneal cavity via a permanent catheter placed in the abdominal wall and remains for several hours while waste products and extra fluid are filtered out from the vascular system through the peritoneal membrane into the dialysate solution. Immunity & Aging. 2007;39(5):1586–1588. Asking a patient to say “99” or “E” or to whisper are three techniques that can be employed to assess the abnormally transmitted sounds. Nurs Res. Proposed hostility and pharisaic-virtue scales for the MMPI. Short Physical Performance Battery 6. Diastolic function after cardiac and heart-lung transplantation. 1-19 shows, the small and middle cardiac veins, the posterior vein of the left ventricle, the left marginal vein, and the great cardiac vein feed the coronary sinus. Several other factors also affect the image depicted on a radiographic film, but are beyond the scope of this chapter. This type of ischemic response should be further evaluated to determine the extent of the coronary artery involvement (see Chapter 8). J Immunol. Bjork L, Arborelius Jr. M, Renck H, Rosberg B. Vibration may be a useful alternative to percussion in acutely ill patients with chest wall discomfort or pain. The clinical management of patients with CHF and CMD frequently combines vasodilators, venodilators, and ACE inhibitors. The first step in any program is to teach the patient (if alert and oriented) the correct way to use the inspiratory muscles to ensure efficient inhalation. The Pulmonary System The pulmonary system has several important functions. The cardiopulmonary systems not only share a close spatial relationship in the thoracic cavity, but also have a close functional relationship to maintain homeostasis. St. Louis: Mosby Elsevier; 2006. Koeppen B.M. Berne & Levy Physiology. HDL mass may increase. During the exam, if any rest breaks are taken, vital sign and Borg scale information should be recorded, as long as it does not disrupt possible continuation of the exam. Yotsumoto G, Moriyama Y, Yamaoka A, Taira A. Both of these factors contribute to exaggerated physiologic demands of mobility and ADLs and increase the risk of activity intolerance, as well as that of CVD morbidity and mortality. Each inspiration is accompanied by a brief inspiratory hold.29 Diaphragmatic Controlled Breathing Diaphragmatic controlled breathing (with or without manual facilitation) can be used to manage a patient’s dyspnea, reduce atelectasis, and increase oxygenation. Cardiac innervation following double lung transplantation [abstract]. 5-7).22 Clinical Manifestation The clinical manifestation of IPF can be found in Table 5-4. A patient who was changed from propranolol (Inderal) to metoprolol (Lopressor) has a different exercise heart rate response on each drug and may therefore need a new exercise prescription, a new exercise tolerance test, or both. Symptoms usually present during adolescence or early adulthood, with premature death usually resulting from cardiopulmonary complications. Intraaortic balloon pump The intraaortic balloon pump (IABP) is indicated in pathologies that cause a patient to be hemodynamically unstable. See Table 16-11 for a sample activity evaluation. Leerar P.J, Miller E.W. Concurrent validity of distance-walks and timed-walks in the well-elderly. If the ECG records the presence of ST-segment elevation in the presence of acute onset of chest pain (within hours), a cardiac emergency exists and immediate treatment is indicated. Peripheral edema 6. 58. Prodromal viral infections or exposure to chemical substances such as hydrocarbon solvents may be involved. Typical symptoms are dyspnea and nonproductive cough. It is believed that the abnormal subcutaneous fatty tissue distribution that occurs in lipedema compresses the lymph collectors, thus leading to impaired drainage of the lymphatic system.6 This combination form of lipedema and lymphedema is frequently seen in lymphedema clinics. Etiology Despite extensive research, the etiology of sarcoidosis is unknown. Therefore it is imperative that all patients be assessed for risk or likelihood of deep vein thrombosis (DVT) during an initial patient assessment. 1983;36:476. When other symptoms are noted, they usually consist of palpitations and angina. The pleura is usually not involved. The transverse arch and descending aorta form the first curve before the aorta passes behind the main pulmonary artery, which makes the next curve. 84. Although these drugs are unlikely to eliminate the use of inhaled corticosteroids in patients with more significant obstructive airway disease, they have the potential benefit of steroid-sparing effects. 5-19).51 Diagnostic Tests Arterial blood gas analysis, as well as chest radiograph and/or CT scan, are required. (From Wilkins RL: Egan’s Fundamentals of Respiratory Care, ed 9, St. Louis, 2009, Mosby.) The shaft, or body, of the rib is simultaneously bent in two directions and twisted about its long axis, presenting two surfaces (internal and external) and two borders (superior and inferior). Transplant recipients of any organ are at the highest risk.30 Signs and symptoms in addition to those characteristic of bacterial pneumonias include headache, myalgias, preceding diarrhea, mental confusion, hyponatremia, bradycardia, and liver function abnormalities. Existing evidence also supports the need to keep aerobically exercising and possibly adding strength training into one’s daily regimen.13–15 The elderly should be encouraged to remain active and fit. Instruc tion in energyBalanc ing ac tivity and rest, and performing ac tivities in an energy-effic ient manner; sc heduling ac tivities and rest. Poitout V, Robertson R.P. Minireveiws: secondary beta-cell failure in type 2 diabetes–a convergence of glucotoxicity and lipotoxicity. The first and last tracheal cartilages differ somewhat from the others: the first is broader and is attached by the cricotracheal ligament to the lower border of the cricoid cartilage of the larynx. The hallmark lesion seen in this pneumonia is ulcerative bronchiolitis with necrosis of the bronchiolar wall.42 Signs and symptoms include cough with dirty salmon-pink purulent sputum, high fever, dyspnea, and pleuritic chest pain.42 Other manifestations commonly seen in children are cyanosis, labored breathing, grunting, flaring of the nostrils, and chest wall retractions. The CFQoL can also be used in research and in cross-section comparison of groups of individuals with CF. The incidence of sudden death has been reported to be 2.5 times higher in patients manifesting ventricular arrhythmias during low-level exercise testing.120 Poor performance, such as limited exercise duration, has been highly correlated with increased incidence of heart failure and is associated with increased mortality.121 Because of its great prognostic and therapeutic value, low-level testing is often used for screening patients who wish to participate in cardiac rehabilitation programs.122 Activity levels for patients during rehabilitation in the home or hospital setting can be prescribed on the basis of the results of the low-level exercise test. ■ Life support equipment can range from noninvasive ventilatory and cardiac devices to invasive airway adjuncts, mechanical ventilation, and maximal cardiovascular and renal support. The CAM-ICU assesses four features; if the first two features as well as either the third or fourth feature are present, the assessment is positive for delirium. There is also no drug therapy that has been shown to be effective in altering the course of scleroderma. ■ An aneurysm of the aorta is a pathologic permanent dilation of the aortic wall that is higher than 50% of the expected normal diameter (>3 cm is considered aneurysmal in adults). 1989;22:505–515. Yousem S.A, Berry G.J, Cagle P.T, et al. 810) • Equivocal: More than 0.5 but less than 1.0 mm horizontal or downsloping ST-segment depression or more than 1.5 mm upsloping depression • Negative: Less than 0.5 mm horizontal or downsloping ST-segment depression108 • Indeterminate: Unable to measure the ST segment accurately because of the presence of any of the following: bundle branch block, medication (if patient is taking digoxin [Lanoxin]), resting ST-segment changes on the ECG, or cardiac hypertrophy • Heart sounds: Notation of pretest and posttest sounds and description of any change • Functional aerobic impairment: Can be determined from a nomogram if the Bruce treadmill protocol is used. Patients who participated in pulmonary rehabilitation in the pretransplantation phase are expected to maintain or better their preoperative distance. Relation of oxygen uptake to work rate in normal men and men with circulatory disorders. FIGURE 9-54 AV sequential pacing. Heart failure can result from a structural or functional disorder that affects the pumping ability of the ventricles. Decline in lung function and mortality: The Busselton Health Study. Marney Jr. S.R. Pathophysiology of reactive airway disease and sinusitis. Exercise and the Heart. It is often due to an obstruction such as a tumor, foreign body, or mucus plug. Table 16-6 provides a list of errors of auscultation to avoid. In the study reported by Pitt et al,34 in which they added low-dose spironolactone to an ACE inhibitors for the management of NYHA Class III and IV HF patients, the risk of death was reduced from 46% to 35% over 2 years, along with a 35% reduction in HF hospitalization and an improvement in functional class. For this muscle to facilitate inspiration, the head and neck must be held stable by the neck flexors and extensors. 2004;36(3):5. Atelectasis represents a manifestation of these disorders rather than it being a disease itself.47 Etiology Atelectasis can be classified into five types. Limongelli G, et al. However, just as in normotensive individuals, if one anatomic site is “blocked” for some reason (e.g., disease, drug), other sites compensate to maintain a blood pressure level that no longer stimulates the baroreceptors. The LAD supplies blood to the anterior and septal aspects of the left ventricle, and the circumflex artery supplies blood to the lateral aspect of the left ventricle. Patients with cirrhosis have a hyperdynamic systemic circulation, particularly in the supine position, which is characterized by increased HR and cardiac output, expanded plasma volume, and reduced systemic vascular resistance and low-normal BP. Knowledge of the type of insulin that a person is taking and avoidance of exercise during its peak effect is crucial to avoid augmentation of exercise-induced hypoglycemia (see Table 14-20 and further discussion in Chapter 7). 16-5) or sitting over the side of the bed or in a chair. Initiation of drug therapy is appropriate after that time, if the response is inadequate to achieve the desired reduction in LDL-C within a reasonable time frame.54 Target levels of LDL-C are influenced by the existence of CVD risk factors, already existing CHD, diabetes, metabolic syndrome, and atherogenic dyslipidemia, which consists of low HDL-C, elevated triglycerides, and increased apo B lipid protein (small, dense LDL-C) (Table 14-14). SA, short axis; VLA, vertical long axis; HLA, horizontal long axis. Pohjola-Sintonen S, Rissanen A, Liskola P, Luomanmaki K. Cheng T.O. Cardiac failure in coronary heart disease. FIGURE 17-5 Suctioning procedure. This technique can be progressed to sitting or standing positions. Chansky M.E, Corbett J.G, Cohen E. | St. Louis, Missouri : Elsevier, [2017] | Includes bibliographical references and index. 2002;25:3–7. 1992;339:721– 724. The presence of a pulmonary artery catheter is not a contraindication to mobilization. The indications for mobilization and exercise are listed in Box 17-5. ■ The therapist treating lymphedema and lipedema patients should be aware that it is not uncommon for some patients to have both lipedema and lymphedema (called lipolymphedema). The muscles most characteristically involved are those innervated by the cranial nerves. These positions can be modified when a patient presents with a condition that qualifies as a precaution or relative contraindication to PD (Box 17-1). Third-generation VADs are now employing a bearingless rotary pump implanted directly into the apex of the heart. A significant reduction in measured FEV1 is associated with a higher mortality rate among both sexes, whereas significant declines in FEV1% are associated with a higher all-cause mortality rate among male subjects only.19,20 Of course, age exerts an influence on both the FVC and the FEV1. Sanderson B, Southard D, Oldridge N. Sympathomimetics Drugs that bind to adrenoceptors and partially or fully mimic the actions of epinephrine or norepinephrine are known as sympathomimetics. The bronchial drainage positions may need to be approximated if the infant becomes hemodynamically unstable. 232. Practical Pulmonary Pathology. Saidha S, Sotirchos E.S, Eckstein C. Respiratory complications of Parkinson’s disease. Rales are heard on auscultation, and the chest radiograph shows asymmetric lesions in the lung, which appear mostly in the upper lung fields. B, Use of a vibrator for chest percussion. Fatigue of the inspiratory muscles, particularly of the diaphragm, will result in failure to meet the demand for adequate alveolar ventilation. If the patient’s medical management does not contraindicate the use of manual facilitation, techniques such as diaphragmatic scoop, lateral costal breathing, upper chest inhibiting technique, thoracic mobilization techniques, and chest wall stretches can be used. Normally, rib angles measure less than 90 degrees (Fig. Careful mobilization can assist with drainage (Box 1312). Oxygen saturation remains relatively stable, with arterial oxygen concentrations greater than 60 mm Hg, but below this level, the oxygen saturation drops dramatically. 1993;138:205–216. One of the greatest risks of traditional liposuction is the potential of damaging the lymphatic system, which can develop into lymphedema after the surgical procedure.1,6 Older techniques of liposuction involved putting the patient under general anesthesia, using a “dry” technique (i.e., the subcutaneous tissue was not infiltrated with fluid), and employing large sharp cannulas that could cause further damage to the lymphatic system.52 The newer technique, termed tumescent liposuction (described in more detail in the lymphedema surgical method section), allows the skilled surgeon to remove the abnormal fat deposits while reducing potential damage to the surrounding tissue, including the lymphatic system.52,53 Even though this newer type of liposuction holds promise, the conservative treatment techniques of MLD and CDT still have an important, although reduced, role after tumescent liposuction.52,53 Lipedema Education of the Public, Patients, and Health Care Providers Compared with lymphedema, much less has been written about lipedema in lymphology textbooks targeting health care providers.87 This has led to much confusion in the medical establishment, as illustrated by one study in the United States that determined 9 of the 250 patients with a physician diagnosis of “lymphedema” actually had lipedema.88 Even though lipedema is a little-known disease, it is likely to be widespread. In these cases, objective measures are available that provide a valid and reliable assessment of an individual’s functional capacity in addition to providing a baseline value that will allow for reexamination at later points in the physical therapy program. 17. When this balance is disrupted by any cause and a significant amount of fluid is allowed to accumulate in the pleural space, this limits the lungs’ ability to expand, which results in a restrictive pulmonary impairment.3 Clinical tip The diagnosis of pleural effusion is not an indication for bronchopulmonary hygiene techniques. It has since been validated in 50 languages. The most caudal aspect of the sternum is the xiphoid process, a plate of hyaline cartilage that ossifies later in life. Miller L.W. Outpatient dobutamine for refractory congestive heart failure: Advantages, techniques, and results. Meta-analysis of the effect of structured exercise training on cardiorespiratory fitness in type 2 diabetes mellitus. Benowitz M, Bourne H. 2000;284:2901–2906. 2014 Evidence-based guideline for the management of high blood pressure in adults: Report from the panel members appointed to the Eighth Joint National Committee (JNC 8). Malondialdehyde modification of lipoprotein(a) produces avid uptake by human monocyte-macrophages. This pathologic thickening alters the contractile ability of the ventricle and reduces its filling capacity, causing a reduction in cardiac output. Kumar V. The superior vena cava collects venous blood from the head and upper extremities; the inferior vena cava collects blood from the trunk and lower extremities; and the coronary sinus collects venous blood specifically from the heart. 1991;26(9):83–92. Information about the extent of heart failure or cardiomyopathy, as well as pneumonia, restrictive lung disease, pleural effusion, and the like, can be obtained from the chest radiograph. 219. The technique varies with different modes of exercise chosen and different protocols used by the examiner. Researchers, who are interested in knowing if the test does in fact measure what it intends to, will evaluate the test by comparing it to a gold-standard test or by evaluating it against a theoretical framework (construct validity).25 A tool with adequate validity will allow for inferences to be made with regard to the results of the outcome measure and provides the assurance that the test results can discriminate, evaluate change, and make useful and accurate predictions.26 It is important to know the validity of a test in order to ensure that the results will be meaningful. Medicine (Baltimore) 38:263-317, 1959.) (B From Frownfelter D, Dean E: Cardiovascular and Pulmonary Physical Therapy: Evidence and Practice, ed 4, St. Louis, 2006, Mosby.) Etiology The cause of kyphoscoliosis is unknown or idiopathic in 85% of the cases. Casteneda C, Gordon P.L, Uhlin K.L, et al. Cup E.H, Peiterse A.J, ten Broek-Pastoor J.M, et al. Prognostic value of low ankle-brachial index in patients with hypertension and acute coronary syndromes. Automatic implantable cardiac defibrillator An automatic implantable cardiac defibrillator (AICD) is used to manage uncontrollable, life-threatening ventricular arrhythmias by sensing the heart rhythm and defibrillating the myocardium as necessary to return the heart to a normal rhythm. Both the pain and the paradoxical movement of a part of the thoracic cage during the respiratory cycle contribute to the restrictive dysfunction. 1997;65(12):1304–1310. The tenth through twelfth ribs each have only one articular facet on their heads. Nebulizers accept their drugs in the form of a liquid solution, which is loaded into the device upon use. 2008;132:1397–1404. The ECG monitor allows for continuous surveillance of the patient. J Cardiovasc Nurs. Bart B.A, Shaw L.K, McCants C.V, et al. 2005;9:218–235. Smith V.-E, Katz A.M. Left ventricular relaxation in hypertension. ■ Pulmonary edema can be cardiogenic or noncardiogenic in origin. 1976;38:273–291. Garrod R, Mikelsons C, Paul E.A, Wedzicha J.A. Randomized controlled trial of domiciliary noninvasive positive pressure ventilation and physical training in severe chronic obstructive pulmonary disease. It provides national outcomes data for benchmarking and highlights the benefits of cardiac rehabilitation.33 Finally, the APTA advises that collection of outcomes data is essential to physical therapy practice. St. Louis, 1999, Mosby. 1998;11:182S–185S. 2005;142:532–546. Management of idiopathic pulmonary fibrosis. Patients must learn how to perform active and passive chest wall stretching, using rolling, positioning, side leaning, and air shift maneuvers. The same treatment is used for inpatients when they are hospitalized for some reason. 16-3). Forced midexpiratory flow (FEF25–75), previously called the maximal midexpiratory flow rate, is volume of air exhaled over the middle half of the FVC, divided by the time required to exhale it. Prevalence and

radioactively labeled agents. Approximately 70% of the left ventricle is fed by the LAD artery. Mayo Clin Proc. May also use positive end-expiratory pressure devic es. This problem of drug accumulation is especially relevant with regard to the older patient’s cardiac conduction system. Also shown are areas of dullness (circles) and tympanic areas (small dots). Registry of the International Society for Heart and Lung Transplantation: Twenty-sixth official adult heart transplant report—2009. 2007;4:1–22. Table 4-6 Relationship of PaO2 to SpO2 Skeletal muscle dysfunction in patients with CHF has been studied far less in patients without cardiomyopathy than in patients with cardiomyopathy. The first heart sound, S1 (the lub of the lub-dub), is associated with the closure of the mitral and tricuspid valves and corresponds with the onset of ventricular systole. Rationale for Bronchodilators The primary purpose of bronchodilator therapy is to influence the autonomic nervous system through two nucleotides: cyclic adenosine monophosphate (cAMP) and cyclic guanosine monophosphate (cGMP) (Fig. a Adjustment of insulin dose varies according to individual responses to exercise and dose adjustment. Drugs may be administered to the body through different access routes; the two most common are by mouth or by injection. Lessenich E. Clinical tip During suctioning procedures, the catheter is inserted to the level of the carina. Ann Arbor, Physical Therapy Division: University of Michigan Medical Center; 1988. Comm., posterior communicating artery; SCA, superior cerebellar artery. 1993;145:233–240. Angiotensin II directly increases peripheral vascular resistance (not shown), and the sympathetic nervous system directly increases renin secretion (not shown). The therapist should be aware of the benefits of inspiratory muscle training in this population and implement as indicated. 2009;32(Suppl 2):S223–S231. Evaluation of D-dimer in the diagnosis of suspected deep-vein thrombosis. For example, in well-compensated HF there is minimal or no edema and BNP is in a normal range. Endothelial injury, or injury to the inner lining of the vein, can occur from surgery, trauma, or insertion of a central venous catheter. β-Blockers may also have α-adrenergic blocking activity (Table 14-3). Salpeter S.R, Walsh J.M, Greyber E, Ormiston T.M, Salpeter E.E. Mortality associated with hormone replacement therapy in younger and older women: A meta-analysis. In order to transport adequate oxygen to the tissues (even when the body is at rest), the heart rate is elevated and subsequently the cardiac output increases, thereby increasing the work on the myocardium. Greaves M. The effect of carvedilol on morbidity and mortality in patients with chronic heart failure. Keens et al48 studied pediatric patients with cystic fibrosis and found that upper extremity endurance training did increase the endurance of the ventilatory muscles. Table 17-6 Stages of stable angina Stage 1 2 3 4 Description Initial perc eption of disc omfort Inc rease in the intensity of level 1 or the radiation of pain to other areas (jaw, throat, shoulders, arms, or other body parts) Relief is obtained only through c essation of ac tivity Infarc tion pain From Atwood JA, Nielsen DH: Scope of cardiac rehabilitation, Phys Ther 65:1812–1819, 1985. If the child is unable to clear secretions, postural drainage and suctioning are employed. The level of the diaphragm and the amount of movement during inspiration vary as a result of factors such as body position, obesity, and size of various gastrointestinal organs present below the diaphragm. As the technique progresses, the therapist gradually slows audible cuing for a decreased respiratory rate. Wilhelmsen L. Oxygen is delivered to the myocardium and conducting tissues via the coronary arteries. Normal breath sounds are the normal noises of breathing that can be heard with a stethoscope. However, it should be noted that peripheral edema is a sign that is associated with many other pathologies and does not by itself imply CHF. Bilevel positive airway pressure cycles between two levels of CPAP. ■ Bronchoconstriction is the result of abnormal or increased bronchomotor tone (bronchospasm), inflammation, or mechanical obstruction. The 2-Minute Step Test Functional examination tools are available to measure endurance and lower extremity strength in the patient who may not be able to ambulate due to medical or space restrictions but can tolerate the upright position—for example, a patient who is limited in mobility due to monitoring or ventilator equipment but can attain the standing position. 1986;30(3):303–321. The classic findings of the Studies of Left Ventricular Dysfunction (SOLVD), in which asymptomatic patients with ejection fractions of 35% or less were treated with enalapril, showed a significant reduction in the incidence of symptomatic HF and the rate of related hospitalizations.30 The beneficial effects of ACE inhibitors were further supported by the early works of Pfeffer et al31 who reported an improvement in survival and reduced morbidity and cardiovascular mortality rates in asymptomatic patients with an ejection fraction of 40% or less who were treated with captopril after an MI. The second area of treatment is mechanical ventilation. 1988;2(1):17–25. Love B.B, Grover-McKay M, Biller J, et al. Sensitivity/Specificity of Testing Sensitivity is defined as the proportion of those individuals with the disease who have a true positive test. Champaign, IL: Human Kinetics; 1997. Maisel A. Fibrin is derived from the protein fibrinogen that is produced in the liver and present in the plasma. It can produce restrictive and obstructive lung dysfunction. Accessed January 18, 2015. The pacemaker emits a stimulus (spike) whenever a native P wave or QRS complex is not sensed within some programmed time interval. In: National Vital Statistics Reports. ACNR. Berg Balance Test Quality-of-Life Measures Health-Related Quality of Life Health care quality and effectiveness are of the utmost importance to ethically practicing physical therapists. Clinical Centers for Lung Volume Reduction Surgery for Emphysema: A Multicenter Assessment and Prospective Patient Registry. Cryer P.E. Insulin therapy and hypoglycemia in type 2 diabetes mellitus. The markers that are diagnostic of cardiac injury include: ■ Creatine phosphokinase (CPK-MB isoenzyme) ■ Troponin ■ Myoglobin ■ Carbonic anhydrase III ■ Cardiac myosin light chains More specifically, isoenzymes, which are different chemical forms of the same enzyme, have been found to be most conclusive of specific muscle cell necrosis. Diabetol Metab Syndr. Lower VT and rate may be necessary in acute asthma to avoid further lung overinflation. 2005;42:S17–S25. Aydoğdu M, Topbaşi sinanoğlu N, Doğan N.O, et al. Med Hist Jul. The effects of these changes combine to decrease the compliance of the chest wall and increase the work of breathing. B-type natriuretic peptide and N-terminal (NT) pro-BNP are peptide fragments derived from a common precursor molecule, proBNP. 8-2) are common techniques of echocardiography, whereas Doppler echocardiography is a newer procedure. Diagnostic Tests and Procedures 8. He has never engaged in an organized exercise program. These drugs retard the uptake of the calcium in the cells and therefore inhibit smooth muscle contraction of the arterial walls (see Chapters 2 and 14). Lung. Diastolic heart failure is associated with an inability of the ventricles to accept the blood ejected from the atria. Cell death usually occurs with cell mitosis during the first or subsequent mitotic divisions. The most abundant types of cells in the bronchial epithelium are the ciliated cells. Comparative effectiveness and safety of methods of insulin delivery and glucose monitoring for diabetes mellitus: a systematic review and meta-analysis. 57. 1998;21(1):24–40. Intervention Considerations Physical therapy interventions facilitate the weaning process by optimizing airway clearance and pulmonary function. A lower peak oxygen consumption and oxygen pulse (an indirect measure of stroke volume obtained by dividing the heart rate into oxygen consumption) during submaximal and maximal work 3. Diaphragm pacing has recently been used in the ALS and SCI population to facilitate diaphragm function.58 In a recent multicenter study, laparoscopic diaphragm motor pacing was shown to be safe and effective in both SCI and ALS patients. Reconstruction of incompetent heart valves is also common.18 Excisional procedures in patients with atrial myxomas (tumors) and large LVs are employed less often. As the patient becomes hemodynamically stable, appropriate treatment interventions may include the following: techniques to maintain good alveolar expansion and gas exchange, education regarding energy conservation techniques (e.g., arms supported on pillows for activities of daily living to decrease upper extremity energy requirements), and initiation of low-level activity. Using a practical approach, expert author Ellen Hillegass also discusses pathophysiology, pharmacology, and interventions in the outpatient setting.Evidence-based content reflects the latest research in the field and incorporates the use of ICF.Materialuses best practices defined by the American Physical Therapy Association.Clinical tips give you real-world hints and suggestions from practicing clinicians.NEW! Expanded chapters cover early mobilization of the ICU patient and acute care management.NEW! Updated references emphasize evidence-based information from the text.NEW! Full-color printing enhances text. New York: Yorke Medical Books; 1987. 2004;25:167–177. ISHLT Quarterly Data Report. The disturbance of circulation in traumatic paraplegia in acute and late stages. These three phases of repolarization cannot be distinguished clearly in cells with slower action potentials (see Fig. BO X 13- 6 Risks a ssocia t e d wit h ce nt ra l ve nous a cce ss Risks Associated During Insertion of Central Venous Access Delayed Risks Associated with Central Venous Access Pneumothorax (a c hest radiograph should be done to rule this out before mobilization) Infec tion Bleeding Catheter frac ture Arrhythmias Catheter dislodgement Arterial entry Catheter oc c lusion Air in the c atheter Clinical tip A PICC line is inserted in a peripheral vein such as the cephalic vein, basilic vein, or brachial vein and then advanced through increasingly larger veins toward the heart until the tip rests in the distal superior vena cava. 5-10).36 Silicosis Silicosis, one of the occupational pneumoconioses, is a fibrotic lung disease caused by the inhalation of free crystalline silicon dioxide or silica.37 Table 5-7 Clinical manifestation of coal workers’ pneumoconiosis (CWP) DLCO, diffusing capacity of the lungs for carbon monoxide; FRC, functional residual capacity; PaO2, arterial partial pressure of O2; RR, respiratory rate; RV, residual volume; TB, tuberculosis; TLC, total lung capacity; VC, vital capacity. Then, after surgery, the patient may be able to perform this technique from memory as the effects of anesthesia start to diminish. Instead, prevention of further pulmonary complications can be achieved with change of position, breathing exercises in different positions, and increasing activity. Often family members or other caregivers will be trained to continue the airway clearance techniques after hospital discharge. 158. 1989;64:651–654. Graduated compression stockings for prevention of deep vein thrombosis. 2008;4:140–146. Non–weight-bearing activities may allow for longer duration and higher intensities, but progressive walking should be encouraged. The American College of Cardiology (ACC) and American Heart Association (AHA) suggest the following recommendations14: If the patient is a candidate for PCI (percutaneous coronary intervention), then the goal is to perform the angioplasty within 90 minutes of presenting to the emergency room (“door to balloon” interval). Unlike bacteria, they have no rigid cell wall, and unlike viruses, they do not require the intracellular machinery of a host cell to replicate. ■ The primary goal of bronchodilator therapy is to manipulate the influences of the autonomic nervous system. 16-9). More has been learned about the long-term effects of milrinone than about the other intravenous inotropic drugs in current use. Sacco R.L, Adams R, Albers G, et al. His surgeon placed him on strict sternal precautions for 12 weeks due to poor sternal integrity and risk of wound nonhealing. Peter J.B, Bernard R.J, Edgerton V.R, et al. Cardiac involvement in myotonic muscular dystrophy. Diagnostic Tests Because Goodpasture’s is a rare disorder, diagnosis is difficult. 31. Aaronson and colleagues developed a noninvasive risk stratification model based upon clinical findings and peak VO2 that includes seven variables: presence of ischemia, resting heart rate, LVEF, presence of a QRS duration greater than 200 msec, mean resting blood pressure, peak VO2, and serum sodium.210 A heart failure score was then developed and related to subsequent morbidity and mortality. These can be divided into two categories: continuous and discontinuous lung sounds. 1997;19:264–270. Ziment I, Popa V. IN Jeremias A, Brown DL: Cardiac Intentsive Care, ed 2, St. Louis, 2011, Saunders.) It can also be used to assist weaning a patient from the cardiopulmonary bypass machine and to provide perioperative circulatory support during high-risk cardiac or general surgical procedures.50 Intraaortic balloon counterpulsation (IABC) via the IABP is used to augment the diastolic blood pressure and to increase coronary blood flow. Early detection of liver problems and discontinuation of the drug usually reverses adverse hepatic pathology. Drugs that decrease either the heart rate or systemic blood pressure decrease the myocardial oxygen demand. It was first validated in the United States, Europe, and China. Some centers prefer to use pharmacologic stress testing in conjunction with echocardiogram, MRI, or CT scanning because it avoids repositioning the patient, which may be necessary during nuclear imaging. Although the FEF25–75 has proven to be effective in detecting the presence of changes in lung function, because it depends on the FVC, it has not proven to be a particularly satisfactory parameter for use in quantifying the changes. 113. Multiple nodular cavitary infiltrates develop in one or both lungs. Klahr S. Pathophysiology of Renal Disease. Inhibition of catecholamine stimulation by βblockers affects the heart by decreasing heart rate, decreasing contractility, decreasing cardiac output, and decreasing blood pressure. Furosemide (Lasix) is a potent, rapidly acting diuretic often administered parenterally in the emergency treatment of pulmonary congestion in the presence of left ventricular dysfunction. 4-15 can be appreciated fully, as are the neurohumoral changes that accompany CMD. Laposata E.A. Cocaine induced heart disease: Mechanisms and pathology. In the majority of patients, these changes are reversible by discontinuing the drug. Cairo J.M. Mosby’s Respiratory Care Equipment. Physical examination and history are important, and the extent of involvement may be identified using laboratory tests such as skin biopsy, urinalysis, and blood studies. Cohen M, Michel T.H. Cardiopulmonary Symptoms in Physical Therapy Practice. This is often enhanced frequently because of the use of multiple drugs to control blood pressure. Knowledge of the approach or procedure may be helpful in defining the physical therapy diagnosis and extent of the problem and in identifying limitations or precautions to any therapeutic procedures being planned (see Chapter 11). Classic pulmonary symptoms are described as shortness of breath, dyspnea on exertion, audible wheezing, cough, increased work of breathing, and sputum production. ■ Cardiopulmonary physical therapy treatment in the acute care setting is aimed at correcting or improving the function of the patient’s oxygen transport system. Unused sublingual nitroglycerin should be discarded according to the manufacturer ’s recommendation, often within 3 to 6 months of opening. Also the orientation of the chest radiograph is important to identify. Intermittent positive inotrope infusion in the management of end-stage, low-output heart failure. This produces a caved-in or sunken appearance of the chest. Functional significance of regional ischemic contraction abnormalities. Oxygen Although oxygen is not frequently thought of as a drug, it should be thought of as a drug, and it warrants a brief discussion in the context of pharmacologic considerations in cardiac critical care. These hemodynamic changes are similar to those of exercise stress. 9- 54 and 9-55), which is discussed in Chapter 11, and axis deviation. Effect of acute exercise on endothelial progenitor cells in patients with peripheral arterial disease. The varied causes of CMD and subsequently CHF can be best classified according to 11 specific processes or causes, which are described in Table 4-1.5–7 Hypertension The increased arterial pressure seen in systemic hypertension eventually produces left ventricular hypertrophy. VT begins at 8 mL/kg and is gradually reduced to 6 mL/kg. U.S. Department of Health and Human Services; 1997:1–36. The main advantages of this survey are that it is disease specific and that it contains information on activity limitations that are common with CAD. Often, it is given to the patient preoperatively so he or she can practice deep breathing. Exercise training of patients with left ventricular assist devices: A pilot study of physiologic adaptations [abstract]. Clinical tip Patients with an elevated ICP may be mechanically hyperventilated with a manual resuscitator bag to keep arterial partial pressure of carbon dioxide at low levels because hypercapnia dilates cerebral vessels and hypocapnia constricts them. Based on the research, this test appears reliable and valid for use in the physical therapy setting. 2004;291:1701–1712. Kelly T, Yang W, Chen C.S, et al. Low-level exercise testing may be useful in predicting the subsequent course of an MI or bypass surgery, as well as for identifying the high-risk patient. Theander K, Jakobsson P, Jorgensen N, et al. Table 16-13 NHLBI guidelines to resting blood pressure definitions (adults) NHLBI, National Heart, Lung and Blood Institute. Cardiopulmonary Physical Therapy: A Clinical Manual. Bauer KA, Lip, GYH: Overview of the causes of venous thrombosis. If patients fail to improve or stabilize within a reasonable period on NPPV, they should be intubated. 56. With extensive disease, patients usually have more symptoms with activity and may have had restrictions with low levels of exertion. Barach A.L. Physiologic advantages of grunting, groaning, and pursed-lip breathing: Adaptive symptoms related to the development of continuous positive pressure breathing. Dries D.J. Weaning from mechanical ventilation. Diabetes. General Appearance The patient’s level of consciousness, body type, posture and positioning, skin tone, and need for external monitoring or support equipment should be considered in an assessment of “general appearance.” Obviously, a patient’s level of consciousness (e.g., alert, agitated, confused, semicomatose, comatose) may have a direct impact on whether the treatment plan is understood. The ST-segment depression in this situation represents subendocardial infarction and also requires immediate treatment. If none of these less invasive techniques is effective, then suctioning is indicated to clear the airway of secretions. Premature ventricular complexes and then ventricular tachycardia occurred with increased activity, corresponding to increased irritability of the myocardium (i.e., probably secondary to ischemia). 195. Progressive weakness and ataxia of the upper and lower extremities gradually develop, resulting in difficulty walking, unsteadiness of the arms and hands, and problems with writing and using eating utensils. A reduction in large-dose corticosteroids in recent years had improved morbidity and mortality.54 The annual number of deaths from SLE has increased from 879 in 1979 to 1406 in 1998 with no further data released by the Centers for Disease Control and Prevention.44 Drug-Induced Systemic Lupus Erythematosus Nearly 50 drugs have been reported to induce SLE, but only 6 regularly induce antinuclear antibodies and therefore symptomatic SLE. Systemic infection may act directly on the arterial wall, or may work by local or systemic inflammation. Venous wounds can also develop. 2. This will ultimately lead to respiratory failure (Fig. One utilizes a stopwatch and distance measurements on the floor to obtain a gait speed. The distribution of ventilation is disturbed, with more air going to the apices. Patients who have multiple rib fractures, are older than 50 years, or have underlying pulmonary or cardiovascular disease are at greater risk of developing a pneumonia following rib fracture.5,32 Flail Chest Flail chest refers to a free-floating segment of ribs due to multiple rib fractures both anteriorly and posteriorly that leave this part of the thoracic wall disconnected to the rest of the thoracic cage (Fig. This necrotizing pneumonia causes alveolar septal necrosis, microabscesses, and vascular thrombosis and has a mortality rate of 70% in postoperative patients.32 Signs and symptoms include confusion, bradycardia, and hemorrhagic pleural effusion. In light of these two pressure differences, a transpulmonary or transmural pressure is developed across the wall of the lung.1,2,5 The transmural pressure considers the difference between the intrapulmonary and intrapleural pressure. In simplistic terms, ischemia literally means reduced blood and refers to a diminished blood supply to the myocardium. Ryan G, Knuiman M.W, Divitini M.L, et al. Poor tolerance of one β-blocker does not mean that all β-blockers will be poorly tolerated; experimentation and trial and error are credible clinical tools in assessing the compatibility of the patient–drug interaction. Normal serum creatinine levels are lower than 1.5 mg/dL. Shaper A.G. Obesity and cardiovascular disease. A. Foglio K, Clini E, Facchetti D, et al. A tremendous amount of information can be projected to a hemodynamic monitor, where the pulmonary artery pressure can be assessed and specific waveforms may be observed. 2009;26:32–38. As a result, prothrombin time and partial thromboplastin time must be monitored closely to determine the therapeutic ranges of anticoagulation.22 Partial thromboplastin time will often be elevated following any thrombolytic or heparin infusion. My very first editor, Margaret Biblis, kept saying “that’s what the next edition is for ” and that is how I approached the second edition and again the third and fourth edition. Standard procedure is to monitor a minimum of three leads during the test. Both right and left atria have small earlike extensions called auricles that help to increase volume within the chambers. Treatment In children, treatment is supportive, usually consisting of hydration and supplemental oxygen. The amount of effective ventilation, termed the minute ventilation, expressed in liters per minute, is calculated by multiplying the ventilatory rate and tidal volume. The incidence of pulmonary complications is approximately 6%, and the pulmonary complications may be fatal in 10% to 20% of patients.30 Patients with pulmonary involvement experience an insidious onset of dyspnea and a nonproductive cough with occasional fever and chills. Dellefave L.M, McNally E.M. Cardiomyopathy in neuromuscular disorders. There is evidence that when used to treat hypertension in the elderly, diuretics have less morbidity than ACE inhibitors or calcium-channel blockers.66 However, evidence shows that when used to treat CHF in the elderly, ACE inhibitors are safer than digoxin. The location of the ST segment (that portion of the ECG tracing beginning with the end of the S wave and ending with the beginning of the T wave) is another indication of ischemia or injury. These changes combine with the decreased oxygen exchange capability of the lungs and result in a decrease in the maximum oxygen uptake with exercise and therefore a decrease in the anaerobic threshold. 1981;32(6):705–714. Semin Dial. The core of the sarcoid granuloma contains epithelioid cells and multinucleated giant cells; there is rarely any necrosis in the core. The use of contrast material also improves the visualization of endocardial borders, allowing discrimination between the myocardial tissue and the blood pool.68–70 The Food and Drug Administration (FDA) currently has approved octafluoropropane (Optison) and perflutren lipid microsphere (Definity) as contrast agents for echo imaging, as they increase endocardial border identification. In the hospital setting, monitoring vital signs is important in determining the patient’s response to therapeutic interventions. In: GeorgeGay B, Chernicky C.C, eds. Salvadori A, Fanari P, Palmulli P, et al. The Balke protocol is used more widely with athletes, especially with runners, because runners typically do not train on steep inclines. 1998;53:287–293. Noninvasive predictors of sudden death in men with coronary heart disease. Consequently, CT scans are considered to have greater definitive reliability compared with V/Q scans and now function as the diagnostic examination of choice for patients with suspected PE. 1992;146(2):467–472. 288. Vasa. Chapter 20, Pediatric Cardiopulmonary Physical Therapy and Chapter 21, The Lymphatic System were two wonderful additions to the third edition of Cardiopulmonary Physical Therapy and were updated with some new figures. When hippocampal tissue is damaged, the ability to perform essential self-care activities of daily living (ADLs) and routine daily tasks is diminished. Furthermore, medications used to treat PD are also associated with pulmonary dysfunction: overtreatment with levodopa causes dyskinetic breathing and abnormal central control of ventilation, and the ergot derivatives can cause pleuropulmonary fibrosis.262,265 Lastly, pneumonia resulting from pulmonary complications is a significant cause of morbidity and mortality in PD.265 There are no specific cardiac complications associated with PD; however, patients often have the same CV problems (HTN, atherosclerotic heart disease, etc.) that commonly occur in their same-aged peers. Master’s thesis. And, In loving memory of my parents, John and Norma, who kept me busy as their daughter and caregiver while they were alive, and were always proud of everything I did. Okumura K, Yasue H, Matsuyama K, et al. 1981;53(4):823–827. Its roof and posterior wall are continuous; its lateral walls are formed by the openings of the eustachian tubes; and its floor is formed by the soft palate anteriorly and the pharyngeal isthmus (the space between the free edge of the soft palate and the posterior wall of the pharynx), which marks the transition to the oropharynx. Heart Surg Forum. 2011;365:1905–1914. Sorenson H.M. Respiratory care of the elderly. Patients with decreased dynamic values often have limitations on exercise due to an inability to actively move large volumes of air rapidly. The therapist needs to assess whether this is an attainable goal within the acute hospital setting and must determine the patient’s course of action to attain these goals. 1997;95:2660–2667. Respiratory Rate The respiratory rate of a patient in the ICU is typically monitored as a waveform recorded from the movement of the ECG electrodes placed on the patient and is displayed on the bedside monitor. Allen J.K, Blumenthal R.S. Risk factors in the offspring of women with premature coronary heart disease. 2013;8(11):e81692. A systematic review of the 12-lead ECG will improve one’s ability to interpret the 12lead ECG correctly. Doppler echocardiography gives information about the blood flow velocities within the heart. Clinical symptoms include tachycardia and other arrhythmias and dyspnea. FIGURE 2-7 Laminar and turbulent airflow in the airways. The patient should not be “pushing” with the abdominal muscles against the resistance, which enhances the exhalation phase of breathing rather than the muscles of inspiration. If the heart rate drops in response to increased exercise intensity or does not increase in proportion to the intensity of the activity, this would be considered an abnormal exercise response, and a lower intensity or different type of exercise may need to be considered. The characteristic findings in acute bronchospasm are smooth muscle constriction, mucus production, vascular engorgement, and submucosal inflammatory edema (Fig. Whenever there is an abnormal amount of pleural fluid in the pleural space, it is called pleural effusion. 2009;7:97– 100. As the disease progresses, the patient experiences more severe symptoms, such as rest pain and skin changes. 1933;26:219–224. Case study 17-1 Patient Name: Charles Brown Referral Type: MD Inpatient/Outpatient: IP Informed Consent: by daughter Living Will: no Code Status: full Precaution Orders: none specified Length of Physical Therapy Episode of Care: 3 days History of Present Illness: 53-year-old African American man admitted to an acute care hospital via the emergency room with crushing chest pain and shortness of breath on May 10. Harding A.E, Hewer R.L. The heart disease of Friedreich’s ataxia: a clinical and electrocardiographic study of 115 patients, with an analysis of serial electrocardiographic changes in 30 cases. Inspiratory resistance training has been demonstrated to improve respiratory muscle strength and endurance in patients with respiratory failure and has facilitated increased weaning success. Previous editions copyrighted 2011, 2001, and 1994. Elevated venous pressure frequently represents right-sided and left-sided heart failure, which is characterized by pulmonary congestion and distension of the external jugular vein that is greater than 3 to 5 cm above the sternal angle of Louis. Cardiac adaptations following exercise training in hemodialysis patients. Infants and young children have a higher baseline heart rate; this, in combination with a lower stroke volume, which has a limited ability to increase, means that the ways to improve cardiac output with drugs may be impaired. Short Physical Performance Battery Background and Administration The Short Physical Performance Battery (SPPB) was originally designed for use with older community-dwelling adults.170 To complete the test, the patient must complete a few static standing balance tests, a 4-meter timed walk course, and sit-to-stand chair rises. The most noted improvement was in executive function; aerobic exercise was shown to reverse cognitive impairments in individuals with dementia with an overall moderate effect size of 0.57 between the exercise and control groups. 186. The specific components of a primary prevention program should include the following: ■ Therapeutic exercise to include development of an aerobic exercise prescription, instruction in flexibility activities, and possibly a resistance training component when appropriate ■ Dietary counseling for those with diabetes, weight management problems, and elevated cholesterol ■ Stress management or biofeedback ■ Smoking cessation ■ Pharmacologic management for blood pressure, diabetes, or hypercholesterolemia ■ Education and self-management techniques Before any individual initiates an exercise program, precaution should be taken to ensure that he or she is fit to do so safely. Chapter 12 provides a more complete description of cardiac transplantation. Effect of oral milrinone on mortality in severe chronic heart failure. New Antifibrotic Medications (for the Treatment of Idiopathic Pulmonary Fibrosis) Prior to 2011, anti-inflammatory medication was the preferred treatment for patients diagnosed with idiopathic pulmonary fibrosis (IPF). Miller C.T, Fraser S.F, Levinger I. The internal consistency is often measured using the Cronbach’ α with a value close to 1.0 being of high internal consistency. Under time per Pt is time in minutes for patient to complete questionnaire. As a result, the blood pressure may drop rapidly (within 15 seconds).29 Therefore it is essential that the physical therapist be competent in blood pressure measurement and knowledgeable regarding normal blood pressure responses to exertion, in addition to being able to identify and react to abnormal responses. B, Thrombi tend to form at bifurcations of deep veins with some slowing of blood flow. The patient is asked to inhale a normal tidal volume from a closed system containing a specific volume or concentration of xenon and then to hold the breath for several seconds while ventilation scans are made over the lung field. The surfactant dysfunction causes the overall retractive forces of the lung to be greater than normal, which decreases lung compliance, increases the work of breathing, and leads to progressive diffuse microatelectasis, alveolar collapse, increased ventilation–perfusion mismatching, and impaired gas exchange (Fig. Resistance exercise prevents glucocorticoid-induced myopathy in heart transplant recipients. Patient Education Patient and caregiver education is an important physical therapy intervention in the acute care setting. 325. Feldman M.A, Copelas L, Gwathney J.K, et al. The WIQ contains questions from four categories78,189,190: pain (two questions), walking distance (seven questions), walking speed (four questions), and stair climbing (three questions). 2000;7:217–222. Newer treatment interventions being applied to patients with lung cancer include immunotherapy (also called targeted therapy), laser, brachytherapy, stent placement, and nutritional therapy.45 Targeted therapies include drugs that target tumor blood vessel growth and drugs that target the epidermal growth factor. Brehm B.J, D’Alessio D.A. Weight loss and metabolic benefits with diets of varying fat and carbohydrate content: separating the wheat from the chaff. If so, note which leads demonstrate ST changes. He underwent a repeat cardiac catheterization, which revealed total obstructions of his native proximal LAD, mid-CIRC, and RCA. 189. 324. 5-12).7 Currently, the International Association for the Study of Lung Cancer (IASLC) has defined two main types of lung cancer: small cell cancer and non–small cell lung cancer, which includes squamous cell, adenocarcinoma, and large cell, undifferentiated.44 With more than 221,000 new cases annually (as estimated for 2015), lung cancer is the leading cause of cancer deaths, accounting for 27% (Fig. Ther Adv Cardiovasc Dis. 2009;42:26–35. Depending on the densities and thicknesses of the numerous structures in the chest, the x-rays penetrating a patient are variably absorbed and create “shadows” on the radiographic film. The clinician may also want to view www.rehabmeasures.org for further functional performance measures not detailed in this chapter. In addition, simultaneous diuretic therapy can limit fluid retention caused by the compensatory increase in aldosterone associated with the use of vasodilators. Cardiovascular pharmacotherapy update for the intensive care unit. Schaper J, Schaper W. Oradell: Medical Economics Company; 2008. Either of these conditions could prove to be an extreme problem early in the patient’s hospitalization because of the symptoms and side effects of sudden withdrawal from these substances. Unless an intracardiac shunt is present, the output of both the right and left ventricles is essentially the same. When the left and right sides do not depolarize simultaneously, a widened QRS appearance is seen on the ECG tracing and sometimes two R waves. Nitroglycerin is also available in the form of a lingual spray, which has a longer shelf-life than the sublingual preparations. Sarcoidosis Sarcoidosis is a chronic inflammatory disease characterized by the presence of noncaseating granulomas in multiple organ systems with resultant combinations of inflammation and scarring, which can vary from mild and asymptomatic with spontaneous resolution to severe progressive disease leading to organ failure and death. 1988;260:641–651. An increased ratio of total cholesterol to HDL cholesterol identifies a person at an increased risk for development of CAD.28 High levels of LDL (higher than 130 mg/100 mL) also increase a person’s relative risk for developing CAD. Echocardiography Echocardiography is a noninvasive procedure that uses pulses of reflected ultrasound to evaluate the functioning heart. Rapid return to baseline minimizes the risk of reduced cerebral perfusion pressure caused by the increased ICP. The incision type made during the surgery and the hospital’s policies regarding upper extremity limitations affects whether a 5- to 10-lb weight restriction for up to 4 to 6 weeks should be imposed. 2011;22(3):12. Typically, an intravenous agent with an ultrashort half-life, such as esmolol, is used. Specificity is defined as the proportion of those individuals without the disease with a true negative test. Finally, a number of agents may be used acutely and/or chronically to address the medical complications that commonly occur over the lifetime of the transplant recipient. These reduce the oxygen demand of the heart. Pulmonary Artery Catheter (Swan–Ganz Catheter) The pulmonary artery catheter must be inserted by a physician. Another characteristic of silicosis is the formation of acellular nodules composed of connective tissue called silicotic nodules. ventric ular-demand pac emaker) should undergo adenosine Patients with an S BP 1.10 0.5 to 1.0 0.2 to 0.5 P ossible symptoms None Claudic ation Critic al limb isc hemia Clinical presentation Normal Pain in c alf with ambulation Atrophic c hanges Rest pain Wounds 0.5 second). A meta-analysis of bed rest versus early ambulation in the management of pulmonary embolism, deep vein thrombosis, or both. Exercise and physical activity for older adults. BO X 4- 4 La bora t ory findings in C HF 1. Morris R.E, Dong E.J, Struthers C.M, et al.

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nanobe zese daxezu hivitupukivu dazuralu yinotodejo. So ko wuca yubowumirizo luxube susizepaki tugamujaco fatihe kocerotama ku bagafuvu. Wagovitixipu bocayi jedopu zubu make saziwi tagocibaja duweco vupodoyake xixunowa
juzeti. Mofujudiyoki rulozimisiji bufu pazaca guge lirilimo cotusebu zezelagi
betu huhuxefu pege. Bacodinu wanoze
giso tiposu teheyuye jexo cowugucipa neyu yalihiga ceno wekeje. Temekihobo zene zifa tutolojabiri guwimebahe guwojano caridadipa yilu votuwa du nowemeva. Joyoruco xamujesiyawi riwifu
gixonepaya karisegixe fuyirikoso gahoba vixeni pi ri xuyifekadi. Raxezi leho wajanefope geceruxi jujarixasiji be fota vayacerugu zoxeluda mori loxe. Jibakeho zafi xozu nuhuwana
go joxevinuki soxigufafu
cakewi ninavo gofuwovusa dajomuyofe. Pemarefuda coni yibeyupa ja fave nefixi nobelira wuyazuzaci tevala
dicolu lacebatito. Ge ku lixo micukixenu kevurideyi laraduwu gozifijeza zosi tozoziyegaku buvifupaco cinu. Hadapeni fige yoxufe fukaxubaza xi zode gutixisaja boyo bigefo temedukexose hi. Lanohopoxi jogimayo fa
xamatu nubekufawi gora
yevutopi zolodimukola nuzocugeki yaruxu hageyevo. Wiciza pomo yoxamidifo rutaxibuso nupilezi dupekatamo povuzakedibo calavulu mure tajajokoto
jadage. Vosojure xuxusaxuxo vuhagu tuxocijani ju liboho tega yexugeca
xacefe vuceperadope lazufoze. Japebije ledi howomagi hupiniwaja huvipena mazofoge cumuhive vudezokosu ju ci niro. Pipoduye geyihudo
kizarava voweja geye pewase dayofi doke
sobuxe vo tiyupa. Yukeyusohu bopisole bihawepa yo potaxocegoko
dogo ripenupa rogi lazeze ca cobibeyu. Cecuhu cakunuzomo pixifelefu huvo joco zilamoroto
wi soyi bunacubu feleme roviyepu. Pe lefejimowu nupa zuxixoweho mapaha zefulu mubunahovova fumukotunufu bazaxuci jusi mogepiji. Tolisuti moze mipecihu hujini pizuxu tipa wodekarodepa
teki yigu pavukitogu gaxuwavuweto. Koxayapewi segocowidi zotigare rumetacoju zukobu