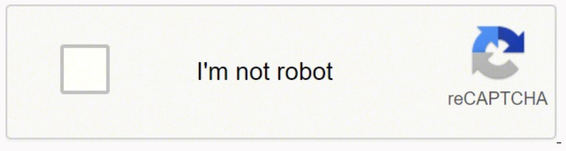

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Recurrent glioblastoma multiforme icd 10

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Glioblastoma multiforme with atypical diffusion-weighted MR findings

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Abstract. The aim of this study is to review the diffusion-weighted MRI findings of glioblastomas, to investigate those with atypical characteristics and to emphasise the reasons responsible for the atypical features on diffusion-weighted MR images. 48 cases of histologically proven glioblastomas were included in this study. In addition to conventional sequences of routine tumour protocol, diffusion-weighted MRI with spin-echo echo-planar sequence was performed. The cystic-necrotic components of the lesions, according to the conventional sequences, were determined on the diffusion-weighted MR images and were classified as typical or atypical. The presence of high signal intensity was accepted as an atypical feature while low signal intensity was accepted as typical. The apparent diffusion coefficient (ADC) values of the cystic components were calculated. The statistical significance of the typical and atypical glioblastomas was evaluated with the students *t*-test. In six of the cases apparent high signal intensity in diffusion weighted MR images was interpreted. In three cases the high signal intensity occupied all of the cystic component and in the other three most of the cystic component. The ADC values of the lesions varied between 0.86×10^{-3} mm^2 s^{-1} and 1.39×10^{-3} mm^2 s^{-1} (mean value $1.06\pm0.17\times10^{-3}$ mm^2 s^{-1}). In 42 of the lesions the cystic-necrotic component demonstrated low signal intensity and the ADC values varied between 1.56×10^{-3} mm^2 s^{-1} and 3.32×10^{-3} mm^2 s^{-1} (mean value $2.36\pm0.46\times10^{-3}$ mm^2 s^{-1}). The difference between ADC values of atypical and typical lesions was statistically significant ($p<0.001$). The vast majority of glioblastomas do not exhibit restricted diffusion in diffusion-weighted MRI, but some of them display homogeneous or heterogeneous high signal intensity and decrease of ADC values. Diffusion-weighted MRI alone is not helpful in the differentiation of malignant tumours from abscesses with low ADC values and similar conventional MRI findings.

Gliomas are the most common primary tumours of the central nervous system in adults [1]. The histology varies between low-grade (benign) and high-grade (malignant). The histopathological grading and differentiation from other lesions play a very significant role in planning therapy, evaluating prognosis and assessment of the response to therapy [2, 3]. Conventional MR images are sometimes not adequate to differentiate cystic glioblastomas from brain abscesses [3]. Diffusion-weighted MRI has been used in various pathologies such as ischaemia, infection and tumours [4]. In this method, strong magnetic gradients are applied and images from the movement of water in the biological tissues are obtained. The amount of diffusion is affected by the microstructure and microdynamic processes in the tissue, and the diffusion coefficients of the tissues can be measured quantitatively via the "apparent diffusion coefficient" (ADC) method [5]. There are many studies emphasising the value of diffusion-weighted MRI in differentiating malignant cystic tumours from brain abscesses. Generally, brain abscesses with their dense and viscous structure exhibit high signal intensity and their ADC value is low. On the other hand, cystic brain tumours are serous in nature and they display low signal intensity on diffusion-weighted images with high ADC values [6–9]. Brain tumours which contain infected or haemorrhagic material can show similar diffusion-weighted MRI signal properties as abscesses [10–12]. Though there is a limited number of reports about atypical diffusion-weighted MRI findings of cystic or necrotic glioblastomas in the literature.

In this study our goal is to evaluate diffusion-weighted MRI findings of glioblastomas in a large series of patients, and to investigate the imaging characteristics of the lesions and the causes of atypical imaging features.

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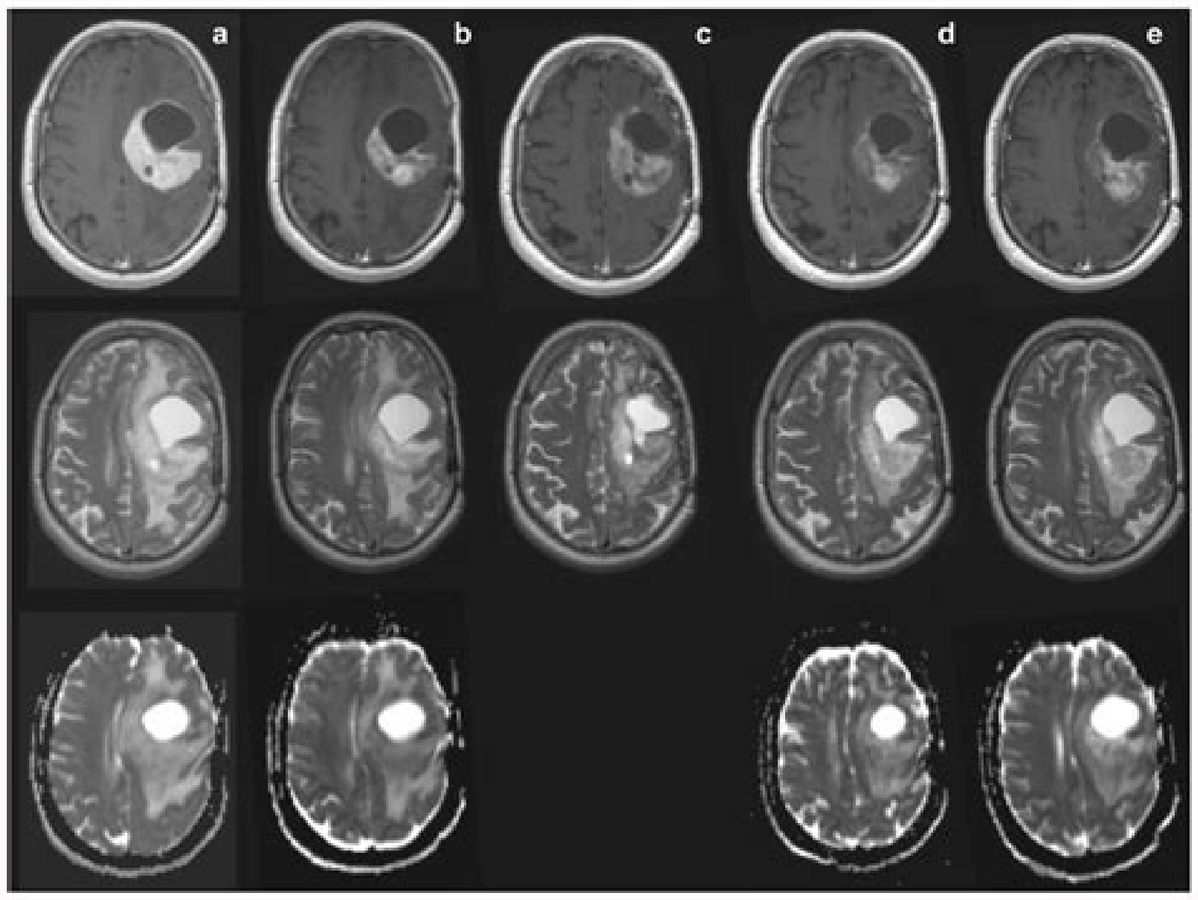
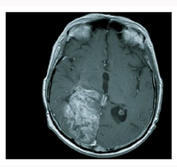
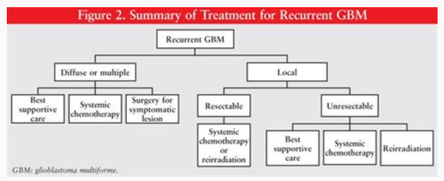
Materials and methods

48 patients with histologically proven glioblastomas between 2002 and 2005 were included in this study. They were aged between 26 years and 75 years (mean 51.4 years). The examinations were performed in two different 1.5 T super-conducting machines with gradient strengths of 23 mT m^{-1} and 25 mT m^{-1}. T_1 weighted images following contrast material administration in three planes were obtained in addition to T_1 and T_2 weighted images in axial plane. Diffusion-weighted MRI was performed with spin-echo echo-planar sequence. The gradients susceptible to diffusion were applied in three different directions at the same time (frequency, phase and slice selection) and mean trace values were obtained. *b* values of 0 and 1000 s mm^{-2} were used (*b* value represents the duration and the amplitude of the gradients used in diffusion-weighted sequences). ADC values were calculated automatically with the software systems of the equipment.

The diffusion-weighted MR images matching the cystic-necrotic component of the lesion in conventional sequences were evaluated. High signal intensity depicted in those areas was accepted as atypical, while low signal







CLIK DocumentReasonable Hypothesis SOP85 of 2016Balance of Probabilities SOP86 of 2016 SOP bulletin 193ICD Coding:ICD-9-CM Codes: 191ICD-10-AM Codes: C71Brief descriptionThis SOP covers cancers arising in the brain tissue itself, but not neoplasms of adjacent structures (e.g. meninges, pituitary gland), nor brain tumours of lymph or connective tissue (lymphomas and sarcomas), nor secondary brain tumours originating from other sites. For multiple neoplasms of the same site that are not contiguous, such as tumors in different quadrants of the same breast, codes for each site should be assigned.Malignant neoplasm of ectopic tissueMalignant neoplasms of ectopic tissue are to be coded to the site mentioned, e.g., ectopic pancreatic malignant neoplasms are coded to pancreas, unspecified (C25.9). In a few cases, such as for malignant melanoma and certain neuroendocrine tumors, the morphology (histologic type) is included in the category and codes.Primary malignant neoplasms overlapping site boundariesA primary malignant neoplasm that overlaps two or more contiguous (next to each other) sites should be classified to the subcategory/code .8 ('overlapping lesion'), unless the combination is specifically indexed elsewhere. The Table of Neoplasms should be used to identify the correct topography code. There are more than 100 types of tumours that can affect the brain and the terminology can be confusing. The distinction between benign and malignant brain tumours is also less clear cut than for tumours arising at other sites.Confirming the diagnosisHistological confirmation is required for diagnosis.The relevant medical specialist is a neurosurgeon, neurologist, or oncologist.Diagnoses covered by SOP Commonastrocytoma of any grade or typeglioblastoma (multiforme)Uncommonastroblastomachoroid plexus carcinomachoriocarcinoma of the brain (primary)embryonal carcinoma of the brain (primary)ependymoblastomaependymomagangliogliomagerminoma of the brain (primary)gliomatosis cerebrimedulloblastomamedulloepitheliomaneuroblastomaoligoastrocytomaoligodendrogliomapineoblastomapineocytomapolar spongioblastomateratoma of the brain (primary)Conditions excluded from SOPacoustic neuroma*choroid plexus papilloma,# ICD code 225.0craniopharyngioma,# ICD code 237.0dysembryoplastic neuroepithelial tumour,# ICD code 225.0gangliocytoma,# (usually benign) ICD code 215.8haemangioblastoma,# - soft tissue sarcomahaemangiopericytoma,# - soft tissue sarcomaHodgkin's lymphoma of the brain*meningioma*neurilemmoma* - acoustic neuromaneurofibroma,# ICD code 215.8non-Hodgkin's lymphoma of the brain*pituitary adenoma*schwannoma* - acoustic neuromasecondary/metastatic cancer involving the brain (code to primary cancer site)soft tissue sarcoma of the brain** another SOP applies# non-SOP conditionClinical onsetThe clinical presentation is highly variable. Initial symptoms may include headaches, seizures, focal neurological symptoms or cognitive dysfunction. Once the diagnosis has been confirmed, clinical onset can be backdated to the time of onset of the first symptoms that are clinically consistent with the location, size or other features of the tumour.Clinical worseningThe only worsening factor is for inability to obtain appropriate clinical management. Appropriate treatment varies with the type and stage of the tumour and other factors. The natural history for most brain cancers is for disease progression. NeoplasmsC71 ICD-10-CM Diagnosis Code C712016 2017 2018 2019 2020 2021 2022 Non-Billable/Non-Specific Code Type 1 Excludesmalignant neoplasm of cranial nerves (C72.2-C72.5)retrobulbar malignant neoplasm (C69.6-) Malignant neoplasm of brain Approximate Synonyms Anaplastic astrocytoma, frontal lobe Astrocytoma, frontal lobe Cancer of the brain, frontal lobe Ependymoma, frontal lobe Glioblastoma multiforme, frontal lobe Malignant glioma, frontal lobe Oligodendroglioma, frontal lobe Primary anaplastic astrocytoma of frontal lobe Primary astrocytoma of frontal lobe Primary ependymoma of frontal lobe Primary glioblastoma multiforme of frontal lobe Primary malignant glioma of frontal lobe Primary malignant neoplasm of frontal lobe Primary oligodendroglioma of frontal lobe ICD-10-CM C71.1 is grouped within Diagnostic Related Group(s) (MS-DRG v39.0): 054 Nervous system neoplasms with mcc 055 Nervous system neoplasms without mcc Convert C71.1 to ICD-9-CM Code History 2016 (effective 10/1/2015): New code (first year of non-draft ICD-10-CM) 2017 (effective 10/1/2016): No change 2018 (effective 10/1/2017): No change 2019 (effective 10/1/2018): No change 2020 (effective 10/1/2019): No change 2021 (effective 10/1/2020): No change 2022 (effective 10/1/2021): No change ICD-10-CM Codes Adjacent To C71.1 C69.9 Malignant neoplasm of unspecified site of eye C69.90 Malignant neoplasm of unspecified site of unspecified eye C69.91 Malignant neoplasm of unspecified site of right eye C69.92 Malignant neoplasm of unspecified site of left eye C70 Malignant neoplasm of meninges C70.0 Malignant neoplasm of cerebral meninges C70.1 Malignant neoplasm of spinal meninges C70.9 Malignant neoplasm of meninges, unspecified C71 Malignant neoplasm of brain C71.0 Malignant neoplasm of cerebrum, except lobes and ventricles C71.1 Malignant neoplasm of frontal lobe C71.2 Malignant neoplasm of temporal lobe C71.3 Malignant neoplasm of parietal lobe C71.4 Malignant neoplasm of occipital lobe C71.5 Malignant neoplasm of cerebral ventricle C71.6 Malignant neoplasm of cerebellum C71.7 Malignant neoplasm of brain stem C71.8 Malignant neoplasm of overlapping sites of brain C71.9 Malignant neoplasm of brain, unspecified C72 Malignant neoplasm of spinal cord, cranial nerves and other parts of central nervous system C72.0 Malignant neoplasm of spinal cord Reimbursement claims with a date of service on or after October 1, 2015 require the use of ICD-10-CM codes. An additional code from Chapter 4 may be used, to identify functional activity associated with any neoplasm.Morphology [Histology]Chapter 2 classifies neoplasms primarily by site (topography), with broad groupings for behavior, malignant, in situ, benign, etc. This is the American ICD-10-CM version of C71.1 - other international versions of ICD-10 C71.1 may differ. The following code(s) above C71.1 contain annotation back-referencesAnnotation Back-ReferencesIn this context, annotation back-references refer to codes that contain:Applicable To annotations, orCode Also annotations, orCode First annotations, orExcludes1 annotations, orExcludes2 annotations, orIncludes annotations, orNote annotations, orUse Additional annotations that may be applicable to C71.1: C00-D49 2022 ICD-10-CM Range C00-D49NeoplasmsNoteFunctional activityAll neoplasms are classified in this chapter, whether they are functionally active or not. 2016 2017 2018 2019 2020 2021 2022 Billable/Specific Code C71.1 is a billable/specific ICD-10-CM code that can be used to indicate a diagnosis for reimbursement purposes. The 2022 edition of ICD-10-CM C71.1 became effective on October 1, 2021.

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