Classical imaging finding in callosal glioblastoma multiforme

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Accepted 25 November 2021

DESCRIPTION

A 60-year-old man presented to our hospital with complains of headache, fatigue and anhedonia for past 1 month. According to his relative, who accompanied him to the hospital, he in his premorbid state was quick tempered and energetic; however, for last few days he seemed irritated and depressed without any obvious cause. The relative also stated that he had difficulty in concentrating at work, became indecisive and was forgetful about the recent events. He added that during the last 3 days the patient became unaware of his personal hygiene and started spending time in empty rooms or in bed. He was becoming unresponsive when people tried to talk to him and could walk only for a few steps. The relative denied any similar episode in the past, history of fever, trauma or any systemic illness. On physical examination, the patient seemed uninterested in his well-being and demotivated. On repetitive questioning, he uttered a few incomprehensible words. The neuropsychological tests revealed zero forward and backward digit spans. His verbal memory evaluation tests were remarkably poor. Pupillary response to the light was sluggish and there was extension on plantar reflex performed on his right leg. The patient was haemodynamically stable. He was admitted for further evaluation of his neurological deficits and depression. MRI of the brain under mild sedation was performed for further evaluation. The MRI revealed an ill-defined butterfly-shaped heterointense mass lesion involving the corpus callosum (figure 1A,B). The mass was located next to the corpus callosum fibres, referred to as Probst bundles. Susceptibility-weighted images revealed the blooming artefacts in the lesion which represented internal haemorrhages (figure 1C,D). The lesion also demonstrated irregular peripheral post-contrast enhancement and internal areas of necrosis (figure 2A–C). The imaging diagnosis of the glioblastoma multiforme (GBM) was suggested, and the biopsy result confirmed the same. The patient was referred for radiotherapy; however, unfortunately, he succumbed to death.

The word 'glioma' refers to the wide variety of neoplastic lesions arising from glial cells inside the

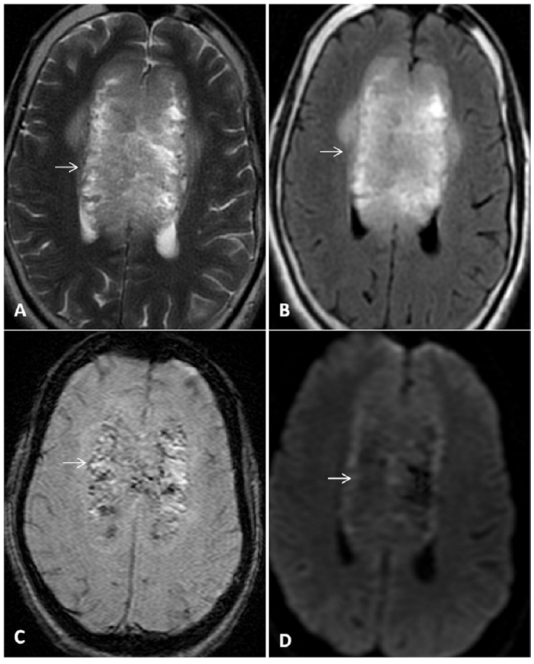

Figure 1 Unenhanced MRI, axial planes through corona radiata. (A) T2-weighted image demonstrates ill-defined heterointense midline lesion involving the corpus callosum (white arrow). (B) Fluid-attenuated inversion recovery image showing heterogeneous hyperintense signals involving the anterior part and body of corpus callosum (white arrow). (C) Gradient echo sequences image depicts multiple foci of blooming within the lesion suggestive of intralesional haemorrhage. (D) Diffusion-weighted imaging shows diffusion restriction predominantly in the periphery of the lesion marking the tumour margins (white arrow).

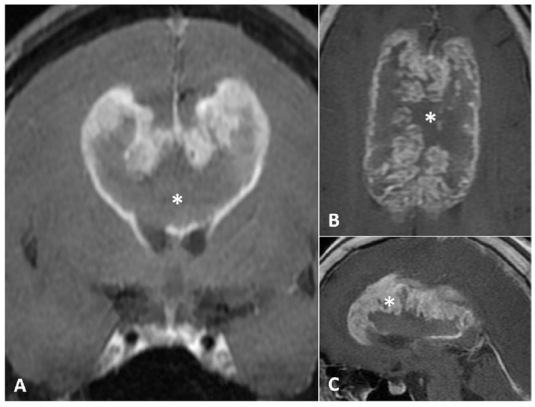

Figure 2 Contrast-enhanced MRI. (A) Coronal plane demonstrates a peripherally enhancing butterfly-shaped lesion with irregular margins and showing internal non-enhancing areas compatible with necrotic part of the lesion involving anterior part and body of corpus callosum (asterisk). Midline crossing by the mass is also evident with involvement of both frontal lobes. (B) Axial image through corona radiata shows the involvement of the corpus callosum (asterisk). (C) Mid-sagittal image illustrates the involvement of the anterior part, body and posterior part of the corpus callosum in its entire length (asterisk).

To cite: Sharma R, Tiwari T, Goyal S. *BMJ Case Rep* 2021;**14**:e246679. doi:10.1136/bcr-2021-246679

brain. The most malignant among all is the GBM, classified by WHO as category-IV lesion with the highest malignant characteristics. These lesions are typically ill-defined and infiltrative with multiple morphological forms; hence, the name 'glioblastoma multiforme'.[1] The lesions arise from glial cells at the grey-white matter junction and extend preferentially along the white matter tracts. These lesions typically cross the midline to involve the contralateral cerebral hemisphere. Although GBM can arise anywhere, the supratentorial location is quite common.

Learning points

- Glioblastoma multiforme (GBM) demonstrates a variety of neurological, neuropsychiatric and cognitive symptoms due to involvement of cerebral hemispheres and corpus callosum; however, thorough clinical history and physical examination may point towards localisation of involved brain structures.
- Various symptoms such as new-onset psychosis, depression, memory difficulty, ataxic gait, abulia, mutism, progressive right leg paresis indicate corpus callosum involvement. Cotard's syndrome (having the delusional belief of non-existence or dead or putrefying) is the feature of infiltration of the splenium of corpus callosum. Visual memory deficits are the feature of the involvement of the posterior most parts of the corpus callosum.
- MRI is the modality of choice for the brain tumour evaluation and characterisation, including the GBM. Classical imaging findings of callosal GBM include a butterfly-shaped lesion with internal necrotic/haemorrhagic areas and irregular peripheral postcontrast enhancement which typically crosses the midline.

The isolated corpus callosum GBM is a relatively unusual variant (butterfly glioblastoma makes only around 3% of all GBM), which is limited to the commissural fibres of the corpus callosum. This lesion shows the classic butterfly appearance on the MRI scan. The GBM can cause a myriad of symptoms ranging from non-specific headaches to paresis and seizures due to motor pathways and depression, mutism, ataxia and Cotard's syndrome due to corpus callosum involvement.[2] The prognosis remains poor, despite all the advancements in the treatment.[3]

Contributors Dr RS and Dr TT contributed to design, conception, planning, data acquisition and data interpretation. Dr SG contributed to data acquisition and data interpretation.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Consent obtained directly from patient(s).

Provenance and peer review Not commissioned; externally peer reviewed.

Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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