



CASE REPORT

Tumour-like lesion of the central nervous system: an elusive cause

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Abstract

Introduction: Several central nervous system (CNS) disorders may present with a tumour-like mass mimicking brain tumour, including infections and vasculitis of the CNS.

Case Report: We report the case of a previously healthy 61-year-old woman presenting with paraphasia. MRI showed a large left temporal, ill-defined lesion with heterogeneous signal intensity on both T1W and T2W images, and heterogeneous contrast enhancement, surrounded by oedema, suggestive of a high-grade glioma. Surgery was performed, but the pathology of the tissue was negative for neoplastic tissue and suggested chronic inflammation. Two months later she presented with progressively worsening neurological signs, and a repeat MRI revealed extensive re-growth of the lesion. In the absence of a definitive diagnosis, a second surgical approach was undertaken. Pathological examination now suggested, additionally, chronic non-granulomatous vasculitis. Pseudotumor form of primary angiitis of the CNS was considered. However, after specific DNA probing, *Aspergillus fumigatus* was found present in both the biopsy tissue and peripheral blood samples.

Discussion: *Aspergillus fumigatus* is a common fungus that rarely infects the CNS. Immunocompromised patients are more commonly infected, although there have been several reports in immunocompetent patients, usually presenting as a mass lesion. Due to the unspecific imaging appearance pseudotumor masses pose a real diagnostic challenge.

Keywords: Pseudotumor, Vasculitis, *Aspergillus fumigatus*

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Introduction

Several central nervous system (CNS) disorders may present with a single mass lesion mimicking brain tumour, and the distinction may not be straightforward. A tumour is suspected in the presence of a focal mass with signal alteration, displacing or infiltrating adjacent structures. Misinterpretation of the neuroimaging may lead to significant delay in medical treatment or may prompt overly aggressive surgical intervention. Unfortunately, many tumour-like lesions may mimic clinical and imaging features of brain neoplasm, including CNS infections, tumefactive pseudotumoural demyelinating lesions, metabolic disorders and vasculitis of the CNS [1].

We report the case of a woman with a rapidly growing tumour-like mass illustrating the differential diagnosis complexity in the distinction between tumour and pseudotumour lesions of CNS.

Case Report

A 61-year-old teacher presented with speech difficulties mostly noticed by her husband: she occasionally replaced

the syllables in a word or said a different word than intended. The symptoms began a few weeks before and progressively worsened. Her medical history was unremarkable. There was no history of recent systemic illness or immunosuppressive therapy. She sought medical attention for unrelated symptoms, and upon mentioning the paraphasia, an MRI was ordered. Cerebral MRI revealed a large left hemispheric, ill-defined lesion with heterogeneous signal intensity on both T1W and T2W images, surrounded by oedema. Post-contrast study showed heterogeneous enhancement (Figure 1).

Brain glioma was suspected and the patient underwent surgical resection. Control MRI confirmed the successful removal of most of the tumour, but areas of nodular contrast enhancement remained, suggesting residual tumour. Histology of the frozen sections, however, revealed areas of normal nervous tissue and areas of necrosis and extensive macrophage infiltration, suggestive of non-vasculitic chronic inflammation or ischaemic infarction, without evidence of neoplastic tissue.

The patient was discharged 18 days after admission, asymptomatic. Her speech difficulties re-emerged and started progressing again during the following weeks. On

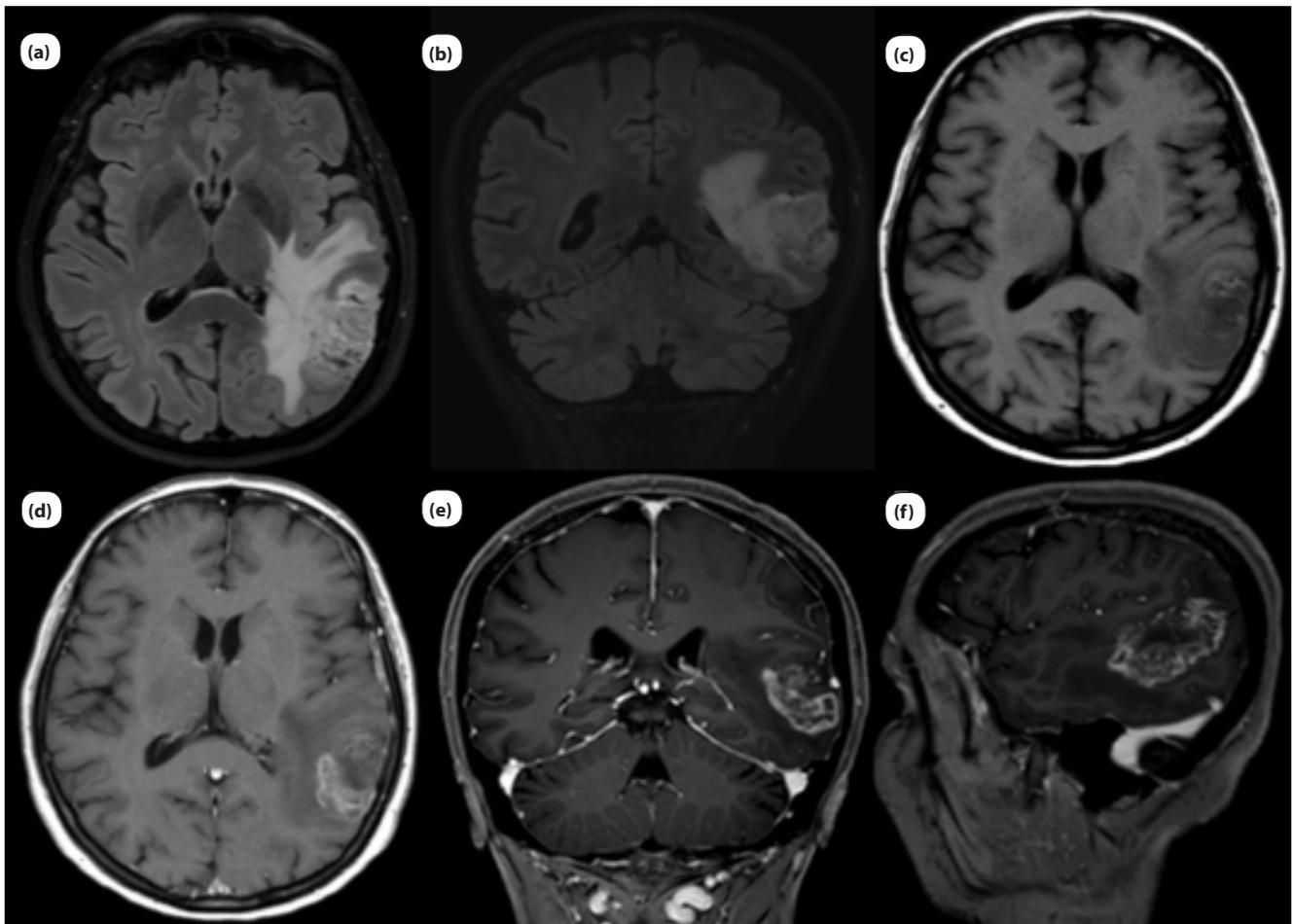


Figure 1. (a) and (b): axial and coronal FLAIR images showing a left hemispheric ill-defined iso- to hyperintense lesion with surrounding edema. (c) T1W image showing predominantly isointense lesion with surrounding hypointense oedema. (d to f) Contrast-enhanced T1W images showing heterogeneous enhancement. FLAIR -fluid attenuated inversion recovery.

neurological examination, two months after surgery, she had predominantly sensory aphasia, with frequent paraphasia and comprehension deficits, acalculia, right/left confusion, perseveration, apraxia for gesture imitation and right hand agraphesthesia. She scored 9 on the Mini Mental State Examination (MMSE). There were no other abnormalities in the remainder neurological examination. Physical examination and investigations ruled out any sinus or ear pathology, immunodeficiency states and systemic disease.

Brain MRI showed re-growth of the lesion, extending through the left temporo-parietal region, with perilesional oedema and mass effect over the adjacent structures. During this period, a reappraisal of the frozen sections was requested. Considering the diagnostic uncertainties, with inconclusive histology, it was decided that more tissue was necessary for examination. She underwent brain surgery again with sample collection, and histology of the frozen sections was now suggestive of chronic non-granulomatous vasculitis, with extensive necrosis and lymphocytic (T predominant) infiltrate. No microorganisms were detected. Bacteriological, mycological and mycobacteriological cultures were negative.

Isolated angitis of the central nervous system was suspected, considering the findings of vasculitic infiltration and ischaemic infarction. However, after multidisciplinary discussion, the sections were re-examined and tested for bacterial, mycobacterial, fungal and viral agents. The sections from the second intervention tested positive for *Aspergillus fumigatus* DNA. Blood samples were negative for *Aspergillus precipitans* and Aspergillus-specific IgE, but were positive for Aspergillus-specific IgG and Aspergillus DNA was identified by PCR.

The diagnosis of CNS Aspergilloma was established and the patient was started on voriconazole and caspofungin. Unfortunately, the therapy was unsuccessful and the patient died a few months later.

Discussion

Fungal infections of the CNS pose difficult diagnostic dilemmas. Symptomatic CNS mycoses carry even higher risk of mortality and morbidity than viral or bacterial CNS infections [2].

Aspergillus fumigatus is a ubiquitous fungus that can rarely infect the CNS. It can present as meningitis, intracranial aneurysms, multiple infarctions, haemorrhage or space occupying granulomas. Aspergillosis of the CNS is rare and mostly affects immunocompromised patients, but there have been several reports in immunocompetent patients [3-6]. In the latter, it usually presents as a mass lesion [5]. Isolated CNS aspergilloma with no extracranial focus makes the diagnosis difficult, as was our case.

Aspergillus CNS infection does not have a specific imaging pattern and hence poses a diagnostic challenge. It has been shown to exhibit heterogeneous signal intensity that

is predominantly hypointense on T1 and hyperintense on T2 images and heterogeneous peripheral enhancement on post-contrast study. Histopathology found abundant inflammatory cells along with only few scattered fungal hyphae [7]. However, aspergillus abscesses have been shown to have a relative paucity of hypha centrally, with a dense population of fungal elements in the periphery [8]. The biopsy specimens in our case may have missed the fungal hypha because the samples were collected too centrally.

The angiotropic nature of the fungus produces a necrotizing angitis, with secondary ischemia and haemorrhage. The absence of the usual characteristics of vascular invasion by fungal hyphae, vascular thrombosis and granuloma formation on microscopic evaluation hindered the diagnosis [9]. Considering the findings of non-granulomatous vasculitis, the alternative diagnosis of primary angitis of the CNS (PACNS), presenting as a pseudotumour, was suggested. Vasculitis of the CNS usually occurs secondary to systemic vasculitis [1], but our patient did not show any signs or symptoms of a systemic inflammatory disease. Tumour-like mass lesions have been reported in patients with primary angitis of the CNS. PACNS manifests as a solitary pseudotumour in up to 15% of cases. Although pathologically vasculitis is more often granulomatous, it can be lymphocytic [10]. As in our case, the imaging features did not allow a reliable differentiation from neoplastic lesions in a subset of 38 patients with PACNS reported by Molloy et al [10].

Early recognition of the correct nature of the lesion is crucial for the appropriate medical and neurosurgical treatment, although the prognosis of intracerebral aspergillosis remains poor, with very high mortality [11].

Abbreviations

CNS: Central nervous system; MMSE: Mini Mental State Examination; PACNS: Primary angitis of the Central nervous system.

Competing interests

The authors declare no conflict of interest.

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