CASE REPORT

Cranial aspergilloma masquerading as meningioma

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SUMMARY

Cranial aspergillosis may present as meningitis, cerebral abscess, cerebral infarcts/haemorrhages or extra-axial mass. Extra-axial cranial aspergilloma may mimic meningioma owing to mass-like characteristics and intense contrast enhancement on MRI there by delaying the diagnosis and further worsening the already bad prognosis in these patients. We present a 45-year-old gentleman who presented with signs of raised intracranial hypertension, secondary optic atrophy and a contrast-enhancing mass arising from the planum sphenoidale. Postoperatively, mass was diagnosed as aspergilloma on histopathology and culture. Despite antifungal treatment, patient could not be saved due to large artery infarcts in the immediate postoperative period. We discuss the clinical and MRI features that could help to have sufficient and early suspicion of fungal aetiology in these patients.

BACKGROUND

Aspergillosis is a rare cranial infection. Usually, it affects patients with a known underlying immune-compromised state like patients with haemopoietic stem cell transplant, solid organ transplant, AIDS, patients on immunosuppressive drugs, uncontrolled diabetes mellitus and those suffering with cancer.¹ Cranial aspergillosis can have varied presentations that may range from meningitis, encephalitis with cerebral abscess formation, cerebrovascular disease and very rarely as intracranial masses.²⁻³ Owing to its angio-invasive nature, cerebrovascular event secondary to cerebral aspergillosis is an unpredictable and a fatal complication. Therefore, cerebral aspergillosis carries a bad prognosis and hence, early recognition and treatment with antifungal drugs with/without surgery are of paramount importance. We present a patient with cranial aspergilloma that mimicked planum sphenoidale meningioma which led to delayed diagnosis and fatal outcome. We also discuss the clinical and radiological features that could have possibly helped in suspecting cranial fungal infection early in the patient.

CASE PRESENTATION

A 45-year-old gentleman presented with painful vision loss of both eyes along with headache and vomiting for 2 months. Vision loss started in the left eye and progressed to near complete vision loss of both eyes in 1 week. His headache was continuous, holocranial, moderate grade and throbbing type associated with occasional non-projectile vomiting. There was no history of fever, facial or limb weakness or seizures. The prior year, patient was treated for pulmonary tuberculosis for 6 months (WHO category 1). On examination,

bilateral finger counting was present at 1 m. Pupils were 4 mm in size, poorly reacting to light and accommodation. Fundus revealed bilateral secondary optic atrophy. There were no meningeal signs. Chest auscultation revealed bronchial breath sounds in the middle zone of right lung along with coarse crepitations. Rest of the examination was unremarkable.

INVESTIGATIONS

Haematological and biochemical blood investigations were normal. Chest x-ray revealed a fibrosis in middle lobe of right lung. Sputum was negative for acid-fast bacilli and fungal elements on three occasions. MRI of brain revealed T1 and T2 isointense extra-axial mass arising from planum sphenoidale, abutting both the optic nerves and extending into the basi-frontal region of brain (figure 1A,B). Mass was intensely enhancing on postcontrast T1-weighted sequences (figure 1C,D). There was mucosal thickening in the sphenoid sinuses which also showed contrast enhancement.

DIFFERENTIAL DIAGNOSIS

With signs of raised intracranial tension and characteristic MRI image of an intensely enhancing extra-axial mass arising from planum sphenoidale, only meningioma was considered as initial diagnosis.

TREATMENT

With the diagnosis of planum sphenoidale meningioma, patient underwent surgery and the mass was removed. Grossly, the mass was a greyish white, firm structure with no necrosis, haemorrhage or pigmentation.

OUTCOME AND FOLLOW-UP

On second postoperative day, patient developed right hemiplegia with comatose state. Repeat MRI of brain showed left middle cerebral artery infarct. On sixth postoperative day, histopathology report of the mass was received which showed branched septate hyphae suggestive of aspergillosis (figure 2). On the same day, intravenous voriconazole was given as twice daily infusion at 6 mg/kg body weight followed by 4 mg/kg twice daily. After some initial improvement in consciousness over 2 weeks of voriconazole treatment, patient developed acute deterioration of consciousness, hyperventilation and weakness on the left side. The patient developed sudden cardiac arrest 2 h later and died. At 4 weeks, culture of the mass revealed *Aspergillus flavus*.

DISCUSSION

Aspergillus spreads to cranium either by haematogenous route from primary lung disease or, it

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Figure 1 Axial T1-weighted and T2-weighted MRI of brain showing isointense mass in the optic chiasma region abutting both the optic nerves (A, B). Axial and sagittal postcontrast T1-weighted MRI of brain showing a broad-based homogenously enhancing mass arising from plenum sphenoidale extending into basi-frontal region. Mucosal thickening and enhancement are also seen in the sphenoid sinus (C, D).

Figure 2 Microphotograph of mass (PAS staining, $\times 100$) showing branched septate hyphae suggestive of aspergillosis.

may directly invade the cranium from paranasal sinuses by producing skull base osteomyelitis and may appear as granulomatous mass at the skull base.^{1–4} The intracranial mass secondary to sino-cranial aspergillosis mimics meningioma due to its mass-like characteristics, extra-axial location and intense contrast enhancement on MRI.^{5–7} There were only two clues to an underlying fungal aetiology in our patient: (1) associated sphenoid sinusitis and (2) isointense to hypointense signals imparted by skull base mass on both T1-weighted and T2-weighted MRI images. *Aspergillus* and other fungi appear isointense to hypointense on MRI due to their high iron content unlike meningioma that appear hypointense on T1-weighted and hyperintense on T2-weighted MRI images.⁸ *Aspergillus* is angio-invasive because of its ability to digest elastic tissue by producing elastase. This risk of vascular invasion resulting in infarcts/haemorrhage is particularly seen more often in the immediate postoperative periods possibly due to the manipulation of fungus during surgery.

Invasive cerebral aspergillosis is a devastating disease with a death rate of 85–100% despite antifungal treatment.⁹ Early

diagnosis and prompt treatment are of paramount importance. With the advent of newer drugs like voriconazole, there seems a chance to improve upon the existing very high death rate associated with invasive cranial aspergillosis.^{10 11}

Learning points

- ▶ Sino-cranial aspergillosis at skull base may mimic meningioma on MRI of brain.
- ▶ Skull base mass with associated sphenoid sinusitis should be taken as a clue in favour of underlying fungal aetiology.
- ▶ Fungal mass appears hypointense on both T1-weighted and T2-weighted MRI images due to their high iron content unlike meningioma that appears isointense on T1-weighted and hyperintense on T2-weighted MRI images.
- ▶ *Aspergillus* is angio-invasive and may produce large artery infarcts/haemorrhages especially in the immediate postoperative period possibly due to fungal manipulation.
- ▶ Cranial aspergillosis carries a bad prognosis. So, early diagnosis and prompt treatment is of paramount importance.

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