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Short Communication

Surgical Managment of Intracranial Invasive Aspergillosis in Immunocompetent Patients: Results from 3 Case Reports

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Abstract

Cerebral aspergillosis is a severe disease most commonly suspected in immunodeficient patients.

The objective of this study is to determine the role of surgery in management of intracranial aspergillosis. We report three cases of immunocompetent patients presenting with posterior fossa aspergillosis, sphenoidal extended to sellar region aspergillosis and post operative aspergillosis without extracerebral involvement. Microbiology and histological examination were carried out to provide the diagnosis. The patients underwent a surgical procedure associated with medical treatment or not. In one case, surgical treatment was efficient. The outcome was good in two cases.

Conclusion:

Rapid diagnosis of invasive aspergillosis applying radiological and surgical procedures and immediate ignition of antifungal can be life saving.

Keywords:
Invasive aspergillosis; abscess; immunocompetent patient; surgical treatment.

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Introduction

Cerebral aspergillosis is a severe parasitic disease which is rare in an immunocompetent individual. The invasive form with multiple visual involvements is usually seen with immunosuppression. New therapeutic agents such as voriconazole and capsofungine which are more safe and efficacious have changed the outcome of this fatal cerebral infection.

Case 1

A 47 year old patient with no previous medical history presented with features of raised intracranial pressure, statokinetic cerebellar syndrome as well as left sided hemiparesis. The diagnosis of posterior fossa space occupying lesion was made. Neuroradiologic investigations demonstrated posterior fossa lesions. Magnetic resonance imaging and spectroscopy were in favor of a multiple infective process (Figure 1). Stereotactic biopsy was carried out on the patient and parasitological and histological examinations of the specimen concluded to a filamentous fungal infection of Aspergillus type. Culture and staining techniques categorized the species as Aspergillus fumigatus (Figure 2).

The patient was placed on intra veinous amphotéricin B but this was complicated with acute active hydrocephalus warranting external ventricular drainage (Figure 3). Subsequently, he developed staphylococcal meningitis as day 8 post op, treated with intra veinous vancomycin. The patient developed renal insufficiency and hyperosmolar non ketotic coma for an unknown diabetes for which amphotéricine B therapy was stopped. His neurological status deteriorated with a Glasgow coma scale (GCS) 7/15. Posterior fossa surgery was performed with excision of the fungal abscess (Figure 4) and Voriconazol

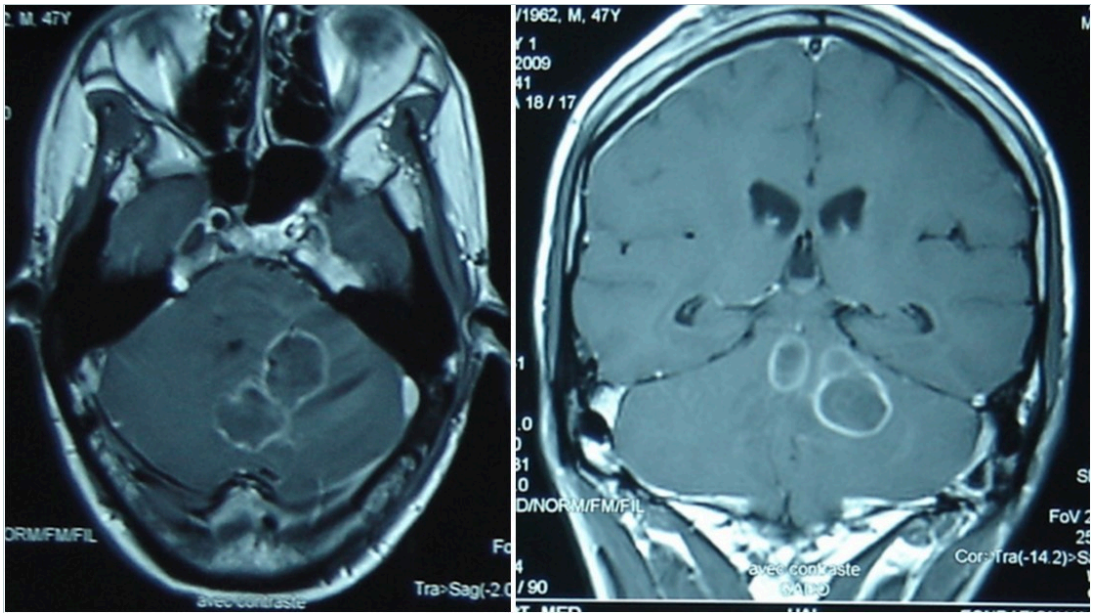


Figure 1. cerebral MRI axial T1-weighted (A) and coronal (B), showing multiple well circumscribed posterior fossa lesions

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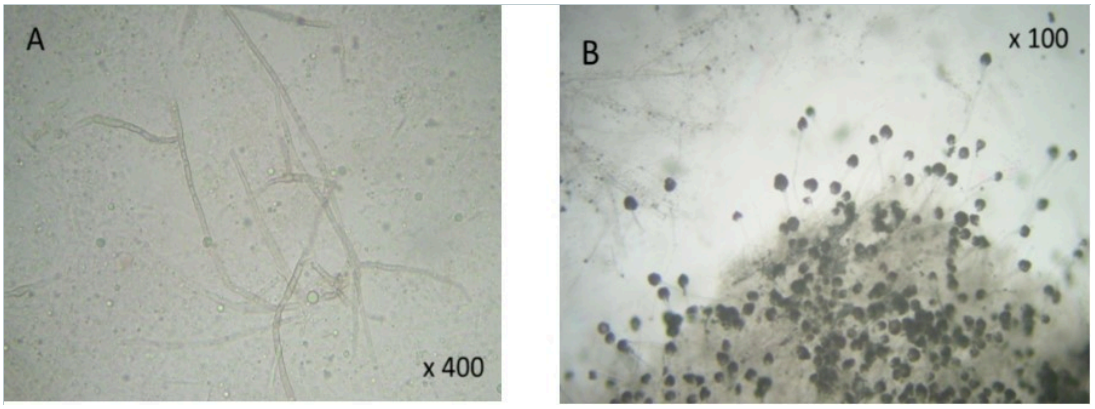


Figure 2. (A) filamentous fungal infection of Aspergillus type. (B) Culture and staining techniques categorized the species as Aspergillus fumigatus

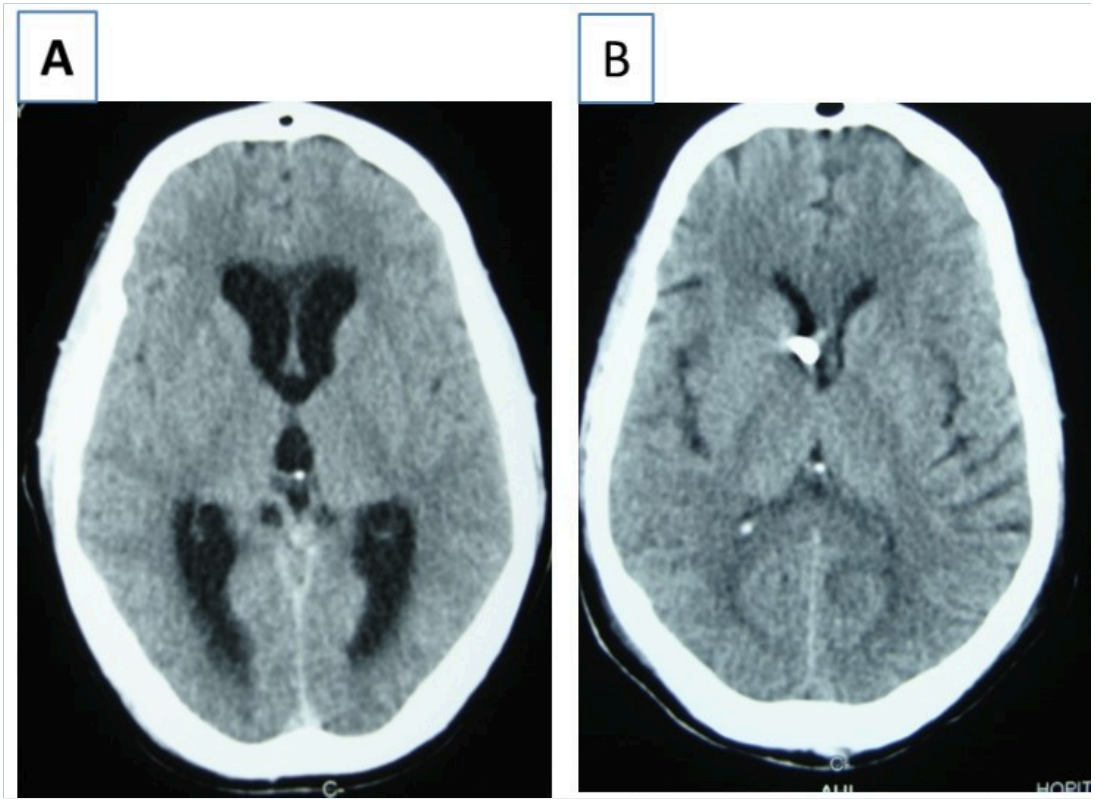


Figure 3. cerebral CT scan with axial view showing acute hydrocephalus (A) and control after external ventricular drainage (B)

was instituted postoperatively for fungal therapy with improvement of the neurological status to GCS 13/15. But the patient succumbed to acute cardiac failure.

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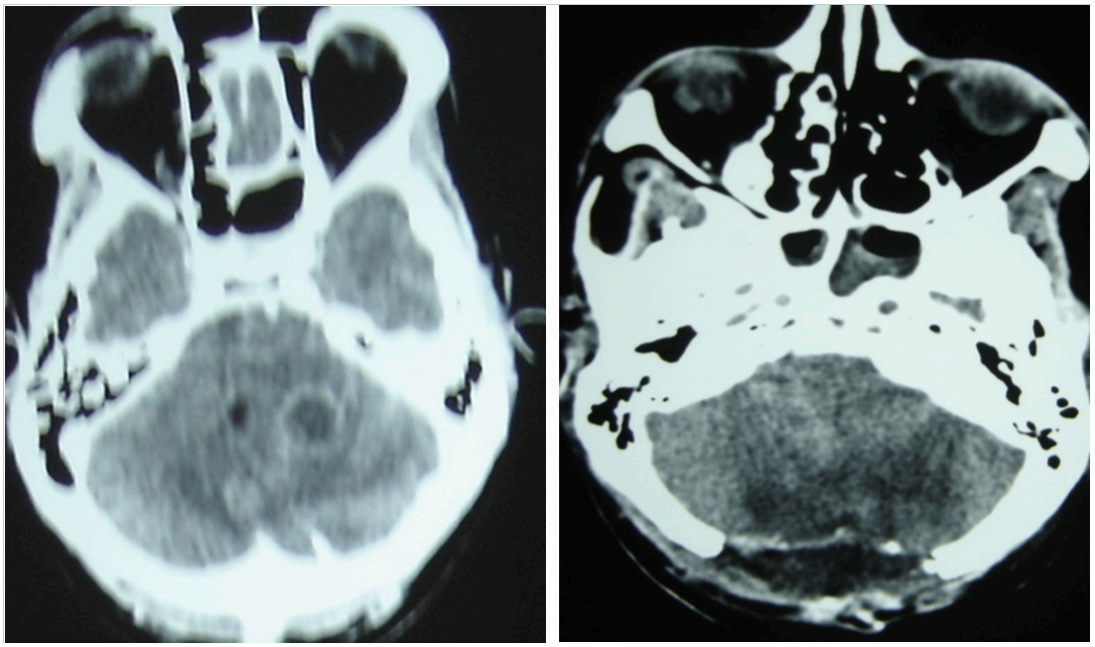


Figure 4. cerebral CT scan pre operative (A) and post operative (B) after posterior fossa surgery with total removal of abscesses

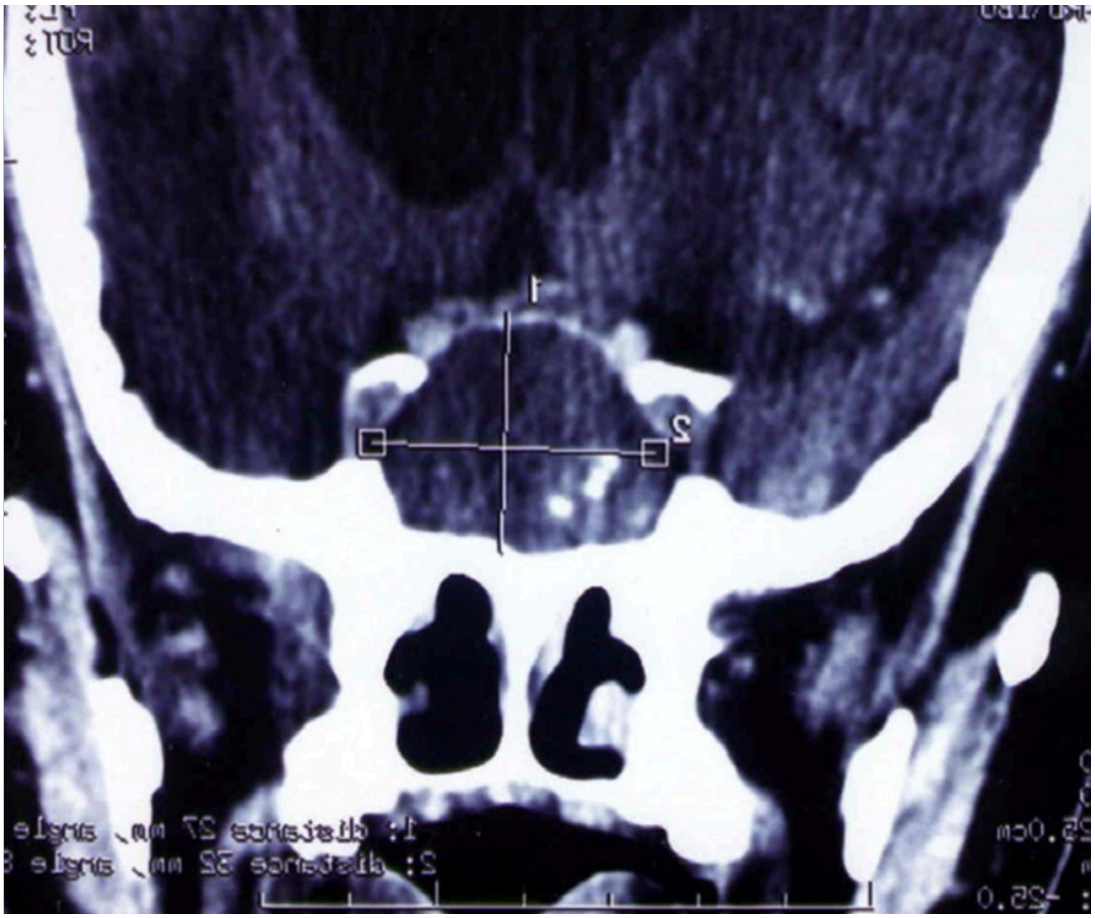


Figure 5. CT scan showing a hypodense mass enlarging the sphenoid sinus and sellar region with calcification like images and bone erosion of the sellar floor

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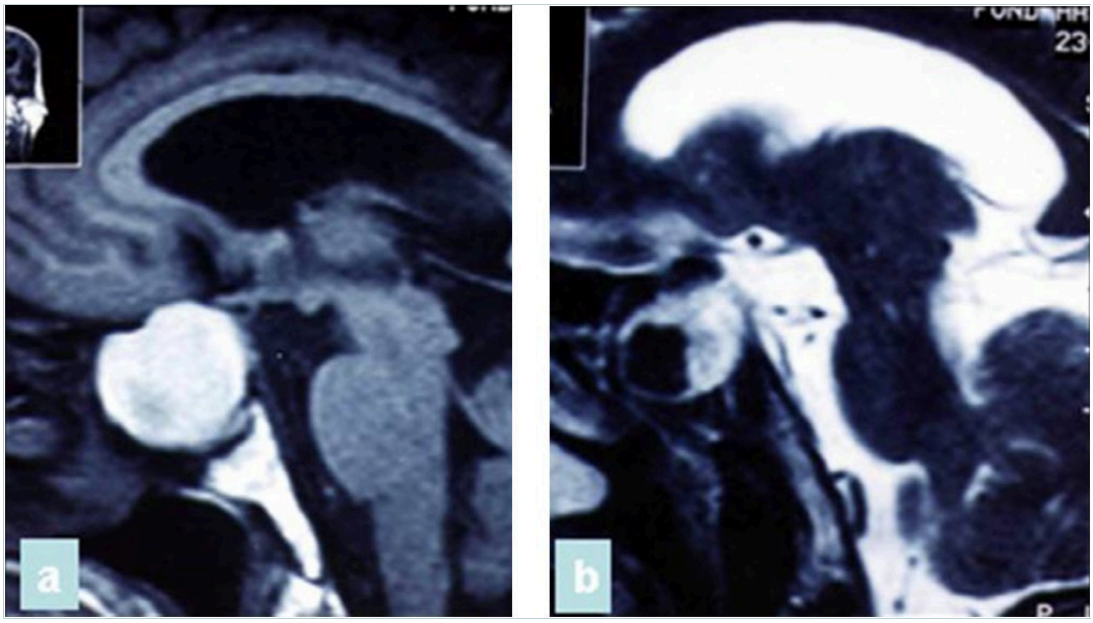


Figure 6. (a) Sagittal T1-weighted MRI showing a well circumscribed hyperintense process in the sphenoidal sinus and sellar region; (b) parasagittal T2-weighted MRI showing a regular hypointense zone into the hyperintense process which is specific to aspergillus infection and corresponds to iron accumulation

Case 2

A 65 year-old man presented with progressive visual decrease and ptosis in the left eye. Neurological examination revealed paresis of the 3rd left cranial nerve. Fundoscopy revealed bilateral papillary paleness and visual acuity was: 4/10 at left; 7/10 at right. No signs of endocrine insufficiency or hypersecretion were assessed. There was no evidence of sinusitis. Chest X-ray, routine laboratory investigations and hormonal blood tests were normal. A CT scan showed a hypodense mass enlarging the sphenoid sinus and sellar region with calcification like images and bone erosion of the sellar floor (Figure 5). MRI showed a mass of 26 mm x 33 mm x 25 mm in the sphenoidal sinus and sellar region, with hypersignal intensity in T1-weighted (Figure 6A) and T2-weighted sequences, and hyposignal zone in T2-weighted sequences (Figure 6B). Imaging investigations were suggestive of an unusual pituitary macroadenoma. The patient underwent a transnasal transsphenoidal approach for excision of the mass. A yellow-brownish gluey material with gummy debris was aspirated from the sphenoid sinus, which was completely cleaned. The sellar floor was eroded which allowed a view of the intact inflammatory dura. An intra-operative presumptive diagnosis was made of caseating granuloma (i.e tuberculosis). The post-operative course was uneventful: the patient recovered from ptosis and visual acuity improved at discharge. Mycobacterium tuberculosis could not be cultured from specimens; and cultures on Sabouraud's medium did not isolate Aspergillus. Pathologic findings were of non invasive aspergillosis, with many septated fungal hyphae being present without tissue invasion. The patient was not given antifungal drugs because the intrasphenoidal material was completely aspirated. At 6 month and 18 months follow up, the patient had no neurological complaint. No recurrence was observed on control CT scans.

Case 3

A 45 year-old woman, operated 6 months before for left sphenoid wing meningioma revealed by raised intracranial pressure, with hemiplegia. She underwent surgery, with simpson I resection. The post operative outcome was good and the patient was discharge. Six months later, she presented a swelling on surgical site of skin incision. Blood check found inflammation with raised C-Reactive Protein. CT scan permitted to suggest brain abscess and she was operated in emergency with bone flap removal and the abscess complete excision. Bacteriologic and Histologic examination of the pus, revealed aspergillus flavius. The patient was treated by amphotéricin B because it was the antifungal available in the hospital

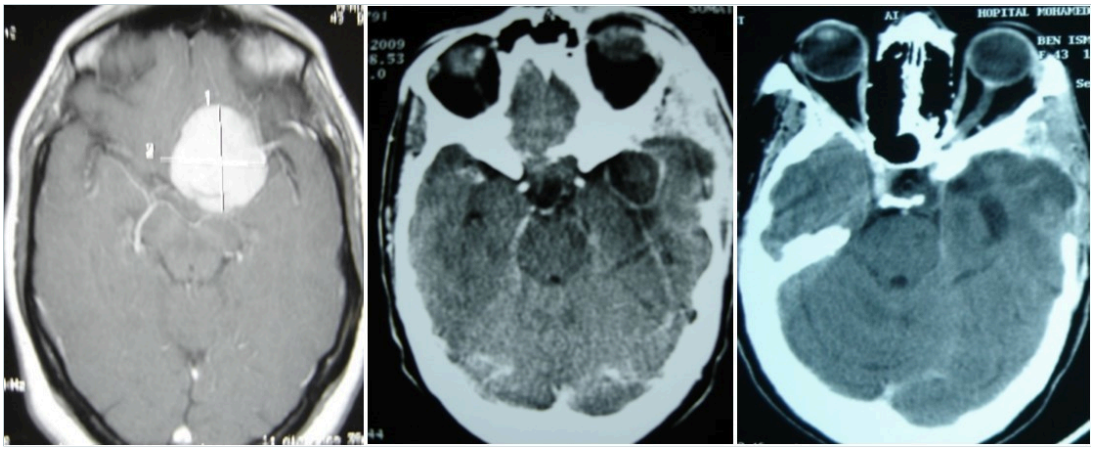


Figure 7. (A) pre operative MRI, axial T1 weighted with enhancement of sphenoid wing meningioma. (B) Ct scan showing a brain abscess in post op area. (C) CT scan after removal surgery and 2 months medical treatment.

officine. Two months treatment was necessary to control cerebral aspergillosis (Figure 7) and the patient was discharged with good outcome.

Discussion

Cerebral aspergillosis is one of the common sites secondary to invasive aspergillosis from hematogenous dissemination [1,8] or contiguous spread aspergillus from paranasal sinuses [2,3]. Pulmonary involvement is rarely seen in an immunocompetent patient unlike the immunosuppressed. The quest for blood supply especially the thalamic perforators explains its localizations around the substancia nigra. Posterior fossa lesions without other sites are rare, like in our case 1. The clinical presentation is that of a posterior fossa space occupying lesions. Supra tentorial lesions are pleomorphic. They may present with functional neurological syndrome or raised intracranial pressure with sepsis syndrome. Risk factors for cerebral aspergillosis in immunocompetent patients described in literature include old age, diabetes, alcoholism, illicit drug abuse and brain surgery like case 3 [6,9]. Our patient case 1, presented with undiagnosed diabetes which was confirmed on admission. Brain CT scan with contrast may not suggest the diagnosis because the lesions are not located in the substancia nigra [6]. Only MRI with spectroscopy could suggest an infectious process rather than tumour. This indicated stereotatic biopsy in our patient as a first step followed by bacteriological and histological examinations of the specimen which confirmed the diagnosis. Amphotéricin B is the reference drug in our department for its efficacy, availability and cost. Voriconazol was substituted because of the side effects in our patient. Side effects are well known drawbacks of amphotéricin B therapy. With introduction of vancomycin for treatment of post op staphylococcal meningitis, renal failure was the consequence of its toxicity, warranting the stoppage of the therapy. But with neurological deterioration our patient was operated upon with excision of the focus of infection in the posterior fossa, duro plasty and introduction of voriconazole.

In the literature, surgery was indicated in compressive (symptomatic) lesions or for diagnostic biopsy [3,5,8].

The treatment of choice for sino-orbital aspergillosis or sphenoidal is surgical excision of the aspergilloma, granulation tissue of the involved sinus for ventilation and drainage, as early as possible [1,5,7,8]. Furthermore, there was shown a beneficial effect of pre-surgical treatment with antifungal therapy [9,10]. In patients for whom total removal cannot be achieved, intensive therapy with antifungal agents must be started immediately. But for case 1, pre operative medical treatment was not satisfactory.

For the patient 3, it should be noted that all bacteriological samples performed in the theatre especially to identify nosocomial risks are unsuccessful.

Conclusion

Cerebral aspergillosis is a serious disease; the diagnosis of which should be suspected in case of immunosuppression with search for primary focus in the lungs or paranasal sinuses. Therapy with antifungal agents still remains delicate. Surgical removal of sphenoid sinus aspergillosis cases proved to be efficient. Other sites infections must be completed by antifungal treatment [4]

Competing Interests

The authors have declared that no competing interests exist.

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