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Paranasal sinus aspergillosis

A case report with computed tomogram findings

by

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Introduction

Aspergillus is a fungus of the Ascomycetes class found in many of the moulds on food, fruit, grain, seed and plants. Its spores, present in dust, enter the respiratory system of man where, under altered physiology of the upper airway, they can become pathogenic. This entity may be found in individuals with depressed immunological responses or in otherwise healthy subjects. Aspergillosis is the most common fungal infection of the sinuses; however, fewer than 115 cases have been described in the world literature, most of which have appeared as case reports (McGuirt and Harrill, 1979).

We present a case of extensive unilateral aspergillosis of the paranasal sinuses with orbital involvement. Computed Tomography (CT) was invaluable in delineating the extent of disease and exclusion of intracranial spread.

Case Report

A 26-year-old, otherwise healthy, black male presented with a two-month history of progressive painless right-sided proptosis. There were no visual disturbances. Examination revealed a proptotic, inferiorly and laterally displaced right eye. Eye movements and visual testing were normal. There was complete obstruction of the right nasal cavity by a polypoid inflammatory mass which could not be separated from the inferior turbinate. The left nasal cavity was normal. The patient was afebrile and in good physical condition. Chest X-ray revealed no abnormality. Plain sinus radiographs revealed opacification of the right frontal, ethmoid, maxillary and sphenoid sinuses. There was bony destruction of the medial wall of the right orbit (Figs. 1a and b). Computed tomography confirmed the presence of an extensive unilateral soft-tissue mass, with bony destruction and proptosis (Figs. 2a, b and c). Attenuation coefficients of the mass varied between 45 and 60 Hounsfield units. No significant change was noted following intravenous contrast administration. Biopsy specimens of the frontal mucosa and middle turbinate confirmed the presence of aspergillosis of the paranasal sinuses. On microscopy all the tissue fragments contained an extensive granulomatous inflammatory infiltrate, with the centre of the granulomas being composed of clusters of neutrophils surrounded by a histiocytic and chronic inflammatory reaction in which lymphocytes and plasma cells were prominent. Numerous giant cells, both of the foreign body and Langhans type, were scattered amongst the chronic inflammatory infiltrate. Within the suppurative areas of the granulomas and also within giant cells, were septate branching hyphae. Aspergillus flavus was confirmed on culture (Figs. 3a and b).

At operation, a right Caldwell-Luc procedure with clearing of the maxillary antrum was performed. The middle turbinate was removed. An external fronto-ethmoidectomy was done, with involved tissue being cleared from the frontal, ethmoid and sphenoid sinuses. The

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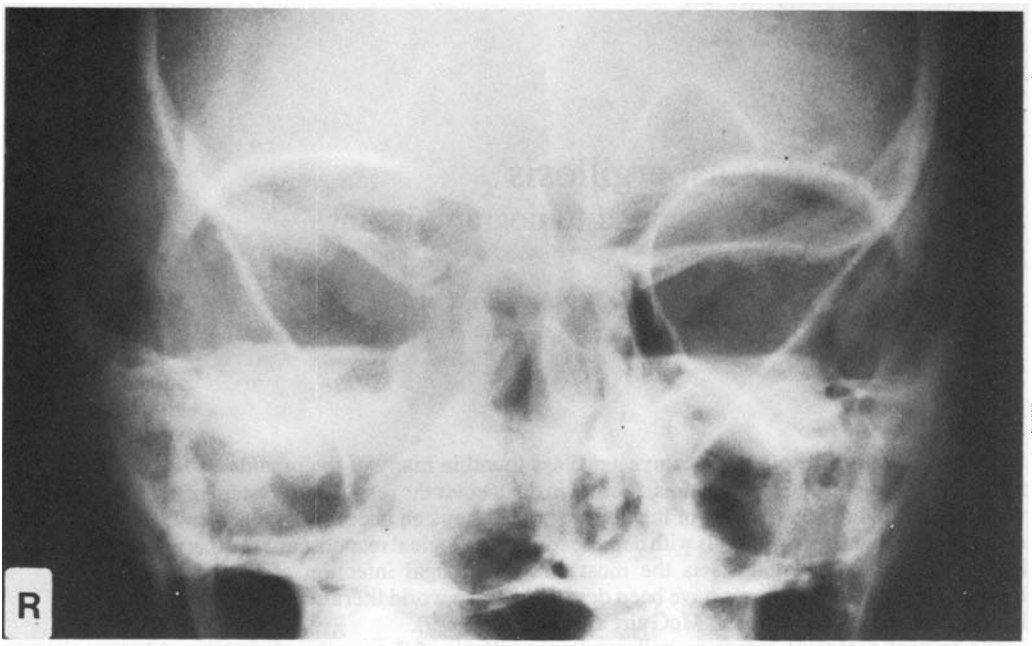


FIG. 1a

Postero-anterior view showing opacification of the right frontal and ethmoid sinuses. There is bony destruction of the right lamina papyracea and medial orbital roof.

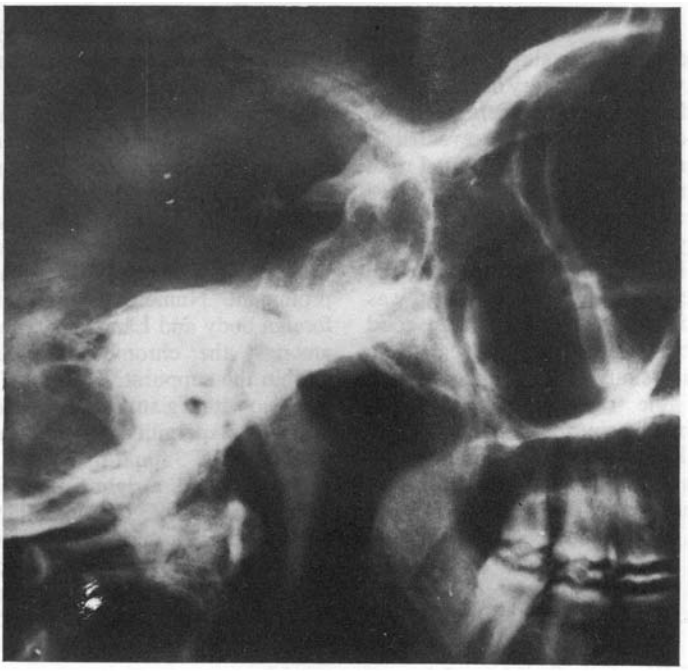


FIG. 1b

Lateral sinus radiograph showing opacification of ethmoid and sphenoid sinuses.

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lamina papyracea was noted to be eroded. The patient was treated with Amphotericin B for six weeks. Follow-up biopsy after therapy revealed no evidence of Aspergillosis. The post-operative and therapeutic courses were uneventful.

Discussion

Aspergillosis of the paranasal sinuses may occur in two forms:

—a local process unassociated with any underlying disease or administration of drugs;
—a more common form occurring in persons with depressed immunological responses (Miglets *et al.*, 1978).

The first, or non-invasive, type presents with unilateral vasomotor disturbance and nasal obstruction. Often a greenish, firm gelatinous material may be found in the nasal cavity or on antral irrigation (Hora, 1965). This form is usually confined to a single sinus, most often the maxillary antrum. Radiological findings are non-specific and include mucosal thickening or total opacification of the nasal cavity or paranasal sinus. There is usually no evidence of a sinus air-fluid level. Aspergillosis should be suspected when an uncomplicated unilateral maxillary sinusitis does not respond to antibiotic therapy (Savetsky and Waltner, 1961).

The second, or aggressive, type is initially confined to one sinus. Radiologically this is manifest by sinus opacification with adjacent bony destruction. Differential diagnosis in the latter type may include malignancy, chronic sinusitis with osteomyelitis, granulomatous conditions, inverting papillomas and mucormycosis.

Recently a new clinical entity, 'fulminant aspergillosis' of the nose and paranasal sinuses, has been described (McGill *et al.*, 1980). This entity occurs in individuals with depressed immunity and is characterized by a rapidly progressive gangrenous mucoperiostitis with destruction of the nasal cavity and paranasal sinuses.

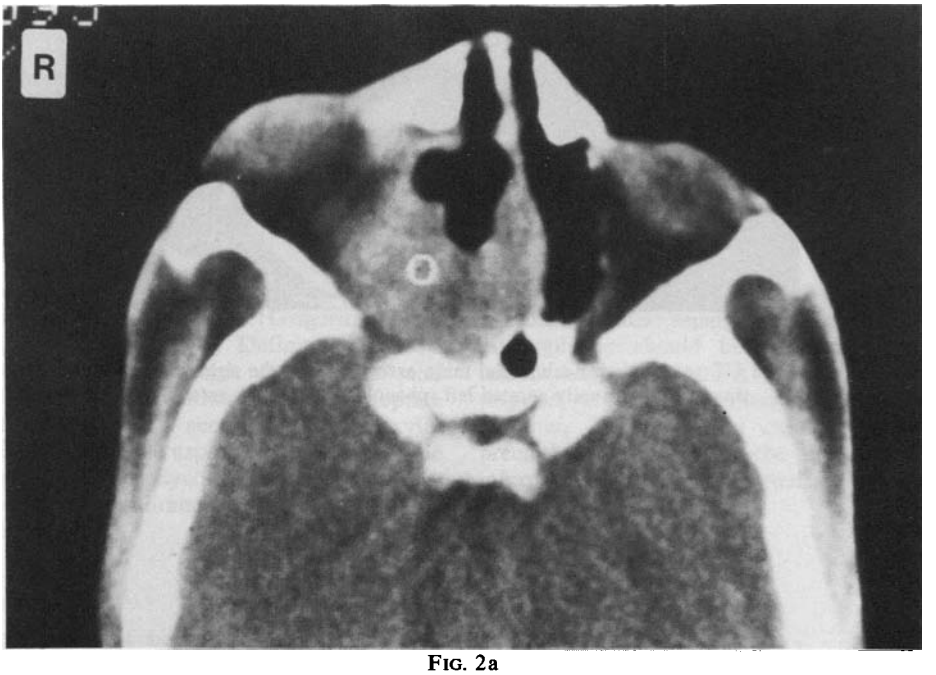


FIG. 2a

Axial CT scan at the level of the pituitary fossa. This shows an extensive soft-tissue mass involving the right ethmoid air cells with destruction of the right medial wall of the orbit and a resultant right-sided proptosis. Ring marker shows the area of density reading.

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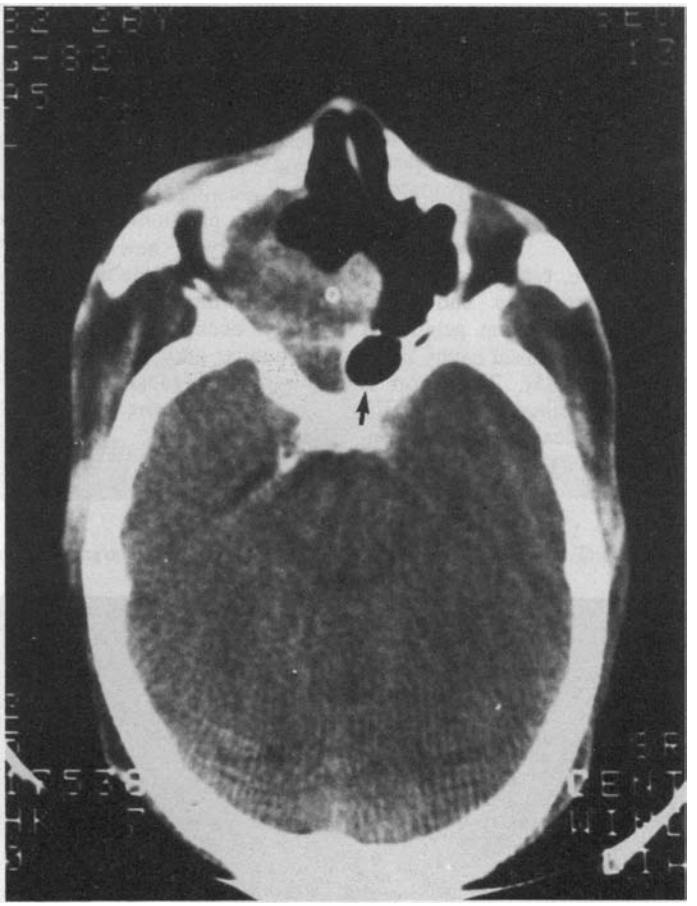


FIG. 2b

Axial CT scan showing ethmoidal mass extending into the right sphenoid sinus. Note normally aerated left sphenoid sinus (Black arrow).

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FIG. 2c

Axial CT scan at the level of the maxillary antra. The soft-tissue mass involves the posterior aspect of the nasal cavity and the entire right maxillary antrum.

Diagnosis

Immunological and skin tests are of no value in the diagnosis of aspergillosis (Grigoriou *et al.*, 1979; McGill *et al.*, 1980). Definitive diagnosis is made from microscopic examination and special culture of operation specimens. Septate hyphae can be readily seen with Haematoxylin and Eosin stain. The aspergillus species can be distinguished from phycometes by their smaller size, dichotomous branching and 45° angle of their branches.

Treatment

The treatment of choice is conservative surgical removal of the diseased mucosa and aeration and drainage of the involved sinus. Amphotericin B should be given to all patients with fulminant aspergillosis.

Conclusion

The clinical and radiological appearances of paranasal sinus aspergillus are non-specific. Aspergillosis should be suspected when an uncomplicated unilateral sinusitis does not respond to antibiotic therapy (Savetsky and Waltner, 1961). CT is capable of defining precisely the extent of the disease process, information that is essential to therapeutic planning.

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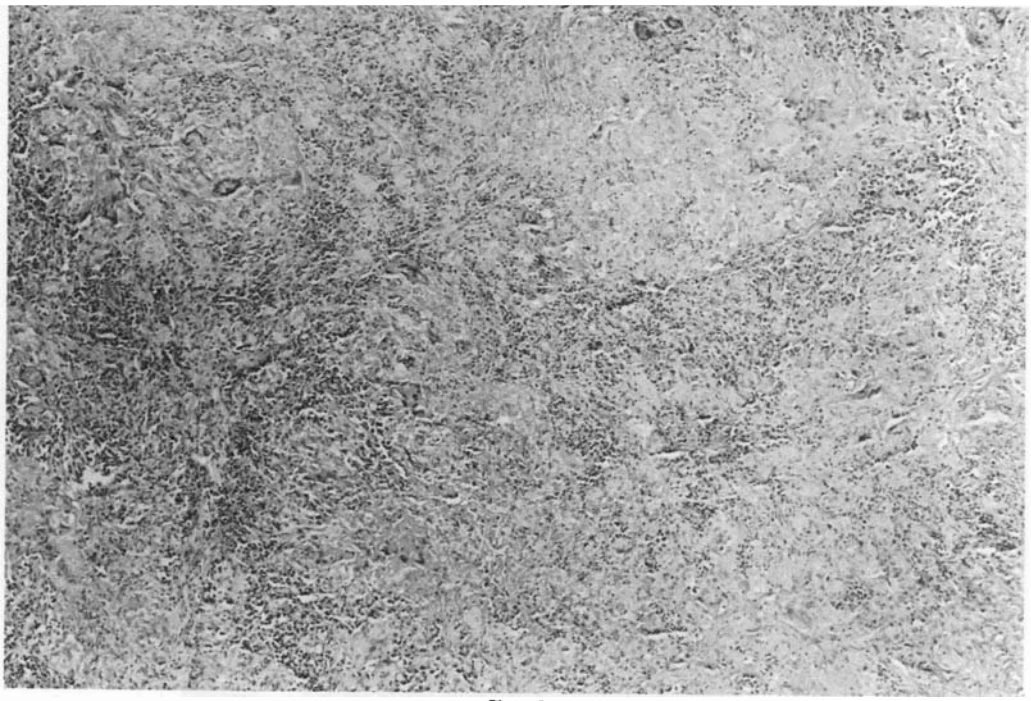


FIG. 3a

Photomicrograph showing epithelioid granulomata with surrounding chronic inflammation and prominent giant cell reaction (H and E ×51).

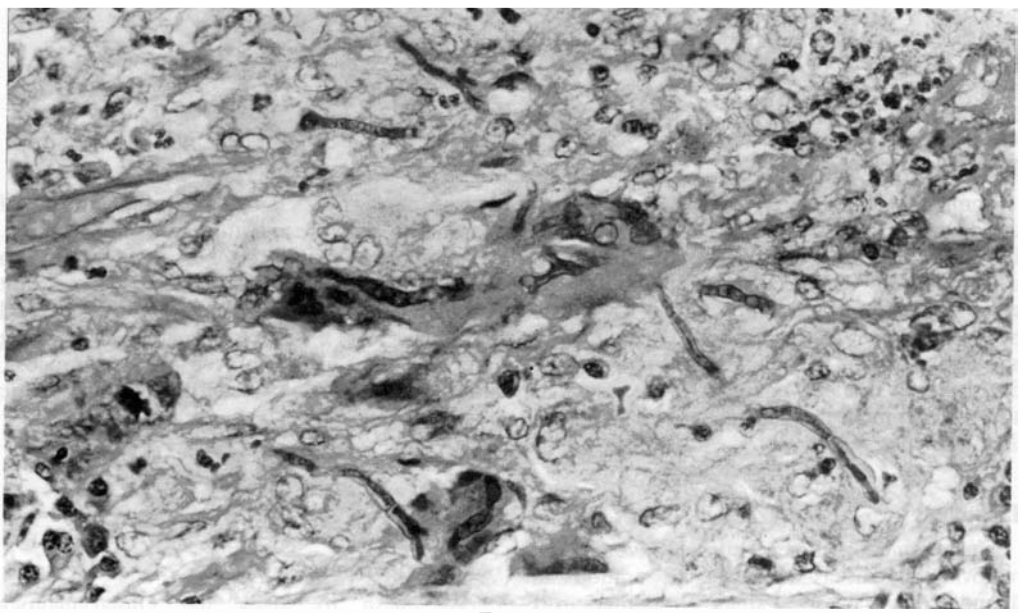


FIG. 3b

Section demonstrating septate branching hyphae within granulomata and giant cells (PAS ×528).

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