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52.1 Epidemiology and Clinical Presentation

- Fungal disease of the pituitary and parasellar region can present as a fungal abscess or as an invasive fungal sinusitis. Rhino-orbito-cerebral involvement is typically an extreme form of invasive fungal sinusitis seen in patients with mucormycosis. Allergic fungal sinusitis (AFS) is another manifestation of sinonasal fungal disease that is typically not invasive.
- Fungal sellar abscesses can be caused by a wide variety of species, including *Aspergillus* (most common), *Candida*, and *Brucella* species [1–5].
- Invasive fungal sinusitis accounts for 6–12 % of chronic sinusitis. It commonly presents with facial swelling, fever, and nasal congestion [6, 7].
- Invasive fungal sinusitis is typically caused by *Aspergillus* species or mucormycosis and may invade through the skull base. Isolated sphenoid sinus aspergilloma is a distinct entity that typically presents with postnasal drip and headache [8–12].
- Rhinocerebral mucormycosis and rhino-orbital-cerebral mucormycosis are lethal diseases that typically develop in immunocompromised patients. Uncontrolled diabetes mellitus is a major risk factor. Isolated sphenoid sinus mucormycosis with visual loss has been reported [13, 14].
- Common clinical manifestations in patients with rhino-orbital-cerebral mucormycosis are exophthalmia, rhinorrhea, altered mental status, and ophthalmoplegia [15].
- Pituitary apoplexy, internal carotid artery thrombosis, cavernous sinus thrombosis, and stroke have all been described in association with invasive mucormycosis [16, 17].

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Fig. 52.1 Allergic fungal sinusitis. (a) Sagittal T1-weighted precontrast image. (b) Sagittal CT image with contrast enhancement. (c) Coronal T1-weighted gadolinium-enhanced image. There is expansion

of the sphenoid sinus containing heterogeneous-appearing, hyperdense, and partly calcified material

52.2 Imaging Features

- Fungal pituitary abscesses are typically rim-enhancing lesions on CT scans or MRI, often with associated sinus disease (Figs. 52.1 and 52.2). Bony erosion may be seen on CT. Fungal abscesses are typically hypointense or isointense on T1-weighted MR images and are T2 hypointense, which has been attributed to an increase in paramagnetic substances in the fungal elements. Diffusion-weighted imaging may be used to support the diagnosis of pituitary abscess [5].
- Rhinocerebral mucormycosis is characterized by a poorly circumscribed and invasive mass, typically arising in the nasal cavity and ethmoid sinuses and extending into the orbit(s), frontal lobes, and/or temporal lobes. Bony erosion on CT images is quite common. On MRI, T1 isointensity and variable T2 signal are common [18].
- Other less common findings include pneumocephalus and thrombosis of the internal carotid artery or cavernous sinus. The “black turbinate sign” may be pathognomonic for mucormycosis when it is seen on MRI [19].

52.3 Histopathology

- The most common causes of fungal abscesses are *Aspergillus* and *Candida* species.
- Mucormycosis is caused by fungi of the order Mucorales, most commonly the *Rhizopus* species.
- Typical staining for diagnosis of fungal disease includes hematoxylin and eosin (H&E), Gomori’s methenamine silver, and periodic acid–Schiff stains.
- Histologically, *Aspergillus* species are characterized by hyaline, uniform, septate, and dichotomously branched

hyphae. Purulent, necrotizing inflammation is commonly observed.

- Grossly, mucormycosis is characterized by black, necrotic lesions and occasional tumefaction [15].
- Histologically, mucormycosis is characterized by broad-based and nonseptate hyphae with irregular branching that may occur at right angles. Vascular invasion and necrosis are common. Pyogenic inflammation and suppurative necrosis are commonly observed.

52.4 Clinical and Surgical Management

- Transsphenoidal surgery is the mainstay of treatment for achieving biopsy, cultures, and drainage or resection of sellar region fungal abscesses [20].
- In patients with invasive fungal sinusitis and rhinocerebral mucormycosis, early diagnosis and intervention are critical. Management typically consists of aggressive surgical debridement, glucose control, and antifungal therapy.
- Following surgical management and diagnosis, long-term antifungal agents are administered. The most common agents include amphotericin B, caspofungin, itraconazole, and voriconazole.
- Most patients with fungal pituitary abscesses treated in a timely manner will have a good long-term outcome [5, 20].
- On the other hand, outcomes for patients with invasive fungal sinusitis are poor, with an overall survival rate of less than 50 % [6].
- Outcomes in patients with invasive rhinocerebral mucormycosis are extremely poor, with a majority of patients dying from the disease.

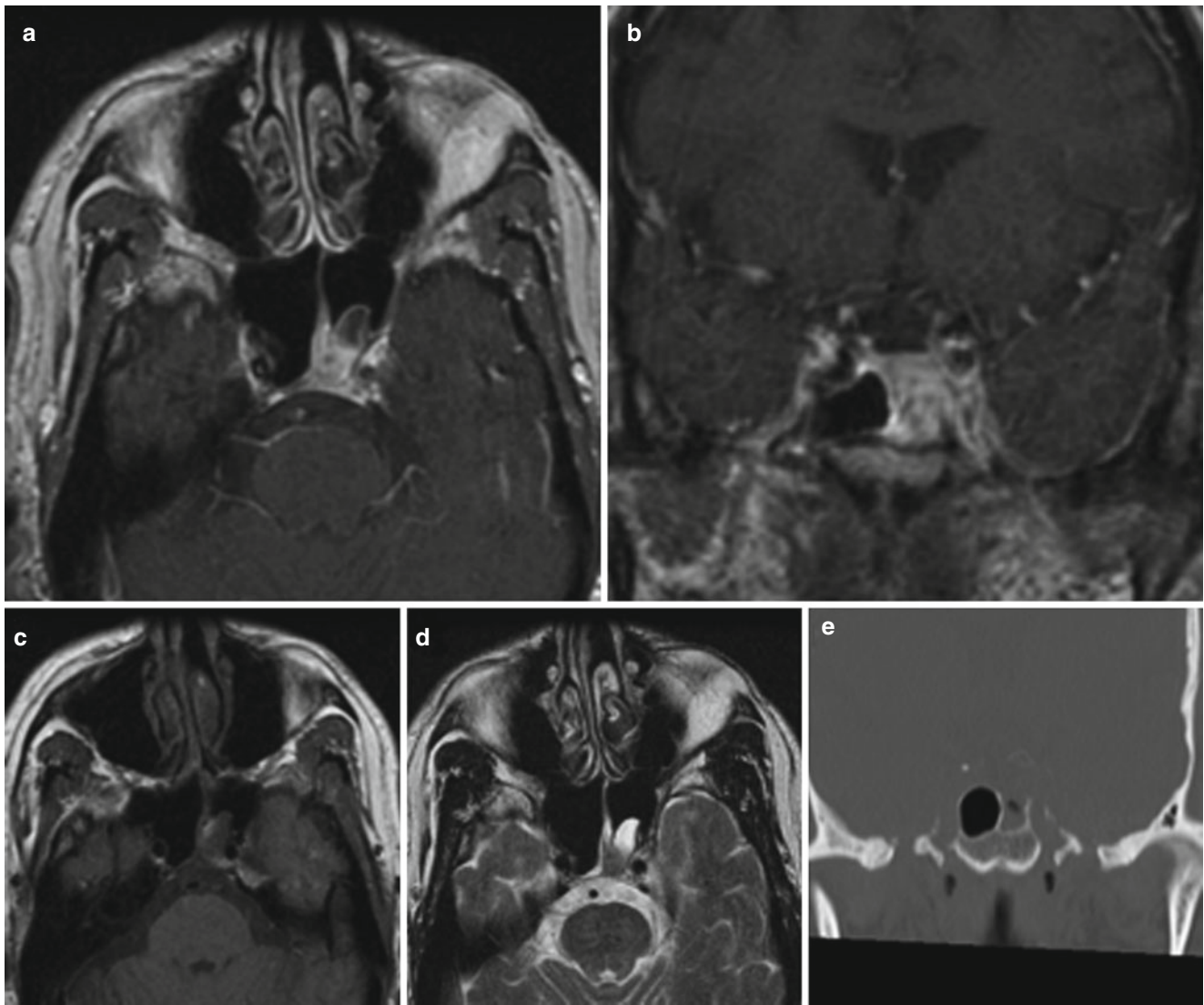


Fig. 52.2 Invasive fungal sinusitis. (a) Axial T1-weighted gadolinium-enhanced image. (b) Coronal T1-weighted gadolinium-enhanced image. (c) Axial T1-weighted precontrast image. (d) Axial T2-weighted

image. (e) Coronal CT image in bone window. On (a–c), enhancing tissue is present along the superior medial margin of the left sphenoid sinus. Image (d) reveals erosion through the roof of the left sphenoid

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