CLINICAL VIGNETTE

Sinus Mass

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Case

A 54-year-old female presented with six months of increasing nasal allergy symptoms and sinus headaches exacerbated after ankle surgery. The patient had been recuperating from an ankle surgery and was spending increased time with her dogs. The patient thought her sensitivity to dogs was responsible for her symptoms. Over-the-counter remedies including antihistamines, decongestants, and saline sinus irrigation failed to resolve symptoms. The patient presented for evaluation.

Past medical history included environmental allergies, chronic fatigue syndrome, fibromyalgia, gastroesophageal reflux disease, and hyperlipidemia. There was no history of immune disorders. There was no history of diabetes. Her last hemoglobin A1C was 5.3.

Physical exam showed findings of rhinosinusitis.

The patient was treated with amoxicillin-clavulanate antibiotic therapy without improvement. Intranasal corticosteroids also failed to relieve her symptoms. A sinus CT was ordered (Figure 1).

Findings

There is sclerosis and thickening of the left sphenoid sinus walls with complete opacification of the left sphenoid sinus. There is an osseous defect, which extends through the posterior wall of the left sphenoid sinus into the prepontine space. Soft tissue density extends through the left sphenoethmoidal junction. A few small foci of calcification noted within the anterior aspect of the sphenoid sinus. The nasal septum is deviated to the right by 3 mm with a small rightward projecting osseous spur.

ENT consultation was obtained. CT scan was interpreted to show an S-shaped septal deviation, a completely opacified left sphenoid sinus, osteogenesis consistent with chronic sinus disease, and coarse calcification within the sphenoid sinus consistent with fungus disease. The erosion of the skull base was seen to extend posteriorly through the clivus on sagittal images. The osseous defect extended to the posterior wall of the left sphenoid sinus space. The soft tissue density filled the sphenoethmoidal junction. The dura was thought to be intact. Fungal etiology was favored over neoplasm, given the osteogenesis of chronic inflammation, and the presence of heavy metal deposits suggestive of fungus.

Endonasal endoscopic surgery was performed. The patient required left partial maxillectomy, left total ethmoidectomy, middle turbinate resection, sphenoid sinusectomy, partial resection of the clivus, resection of skull base lesion, and reconstruction of skull base defect. Findings included an erosive fungus ball in the left sphenoid sinus causing destruction of the clivus to the dura. The fungus was completely removed. Cultures of mucopurulent material were sent. Biopsies around the clivus erosion site were taken to rule out invasive fungal disease and malignancy. The defect was repaired with dural matrix.

Pathology reported fungus ball consistent with Aspergillus species. Biopsies showed evidence of chronic sinusitis and chronic inflammation without evidence of invasive disease or neoplastic disease. No eosinophils or granulomas were seen. Fungal culture was negative.

Discussion

Fungal rhinosinusitis includes both inflammatory and infectious conditions of the nose and paranasal sinuses. Clinical manifestations encompass a broad spectrum from simple, harmless colonization to rapidly fatal invasive disease. Fungal rhinosinusitis may be categorized into non-invasive and invasive forms. Non-invasive conditions include localized fungal colonization, fungal ball, and allergic fungal rhinosinusitis. Invasive forms include acute and chronic invasive fungal rhinosinusitis, and a rare granulomatous invasive fungal rhinosinusitis that affects immunocompetent patients almost exclusively in the Middle East, Africa, and India.[1]

The immune state of the host largely determines the nature of the disease produced by the fungus. With normal immune function, the fungus is unable to penetrate the epithelial layer. With immunosuppressed states, such as diabetes mellitus, chemotherapy, or chronic corticosteroids, fungi are able to penetrate the usual mucosal barriers and invade host tissues.[1] Non-invasive fungal rhinosinusitis is much more prevalent than invasive disease. Of the invasive fungal disease forms, acute invasive is more common than chronic invasive fungal rhinosinusitis.

Fungus ball is defined as a dense accumulation of fungal elements within a paranasal sinus without tissue invasion. The maxillary sinus is the most commonly involved (84%), followed by the sphenoid sinus (14%), and rarely, the ethmoid or frontal sinus.[2] Fungus ball is more common in middle-age

or older women who have normally functioning immune systems.

Patients present with nonspecific symptoms typical of chronic rhinosinusitis, including purulent nasal discharge, facial pain or pressure, chronic nasal obstruction, fetid smell perception, and postnasal drainage. Often, only one sinus cavity is involved. Fungus ball has a distinct radiographic CT appearance with hyperattenuation filling a single sinus, and metallic dense spots within, representing heavy metals (iron and manganese) and calcifications in the center of the hyphae masses. The sinus mucosa surrounding the fungus ball is typically hypoattenuated. The surrounding bony walls may be expanded and thin or sclerotic and thickened. In advanced cases, bone erosion and remodeling can be seen.[2-4] The fungal ball itself is typically hypointense on T1-weighted and T2-weighted images due to relative dehydration compared with normal mucosa, and will fail to enhance with contrast. These two features distinguish the fungus ball from neoplastic processes.[1]

Diagnosis is confirmed at surgery. Within the sinus, mucopurulent, cheesy, or clay-like material is seen.[2] Chalk-like concretions are found with inflammation of the sinus mucosa. Microscope exam shows nonspecific chronic inflammation without mucosal invasion. Histologically, the dense collections are made up of intertwined fungal hyphae, most commonly Aspergillus. There is no predominance of eosinophils, granulomas, or allergic mucin. Fungal cultures fail to grow in as many as 65% of cases.[5]

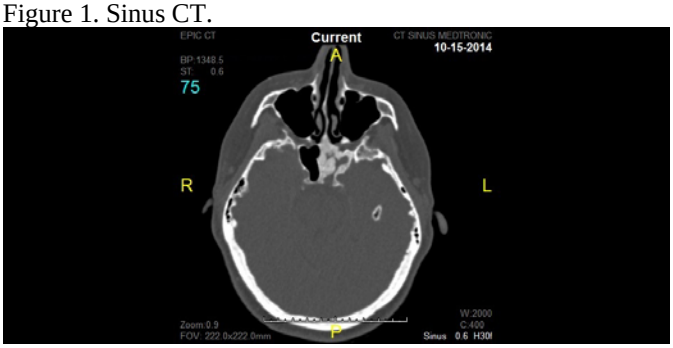
Treatment of choice is endonasal endoscopic surgical removal of all the fungal content of the sinus. The natural sinus ostium is surgically opened in order to allow proper ventilation and complete evacuation of fungal debris with 95-100% surgical cure rates.[2,5,6] Bone erosion is not associated with progression or relapse.[6] Recurrence is uncommon, obviating the need for either topical or systemic antifungal therapy. Glucocorticoids are of no benefit in most cases.[5,7] Surgical revision may be needed in instances where the surgically created antrostomy becomes stenosed.[1]

Summary

A fungal ball is a dense collection of hyphae growing at the surface of the sinus mucosa without tissue invasion. The clinician must have a high degree of suspicion when dealing with a unilateral rhinosinusitis persisting despite maximal medical therapy, especially in elderly women with associated facial pain and postnasal drainage. Treatment of choice is endonasal endoscopic sinusotomy. It is important to perform a biopsy of the sinus mucosa adjacent to fungal elements to confirm non-invasive disease. Antifungal medication is not necessary in uncomplicated forms. Host factors producing any degree of immunosuppression should be corrected and alert the clinician to rule out any form of invasive disease.

Figure

Figure 1. Sinus CT.



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