

peer reviewed CASE REPORT

## Fungal sinusitis: a case report

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### Abstract

This case report discusses fungal sinusitis in a healthy elderly woman. Her clinical history, radiological findings, the epidemiology and treatment options for fungal sinusitis are discussed.

### Keywords

Aspergillosis, sphenoid sinuses, ethmoid sinuses, calcification, erosion, computed tomography.

### Case report

An elderly female patient consulted a neurosurgeon because of progressive headaches which were not responding to any form of treatment. She had a previous neck injury. The neurosurgeon requested a computed tomography (CT) scan of her brain and a magnetic resonance imaging (MRI) scan of her cervical spine.

In view of a possible allergy to iodine enhanced CT scans were not possible. The CT scan showed opacification with calcification in the left sphenoid sinus which extended towards the posterior aspect of the left ethmoidal sinuses (Figures 1 and 2). There was erosion of the anterior wall of the left sphenoid sinus and of some of the adjacent ethmoid air cells (Figure 3). It was suggested that the patient should receive 'allergy' preparation for contrast enhanced imaging as the neurosurgeon

requested an enhanced CT brain scan. This second CT scan included the maxillary sinuses. The findings were: opacification with calcification of the left sphenoid sinus as well as the posterior aspect of the ethmoid sinus; the left maxillary antrum demonstrated enhancement (Figure 4). No other lesions were demonstrated. She was referred to an ear, nose and throat (ENT) specialist. She underwent endoscopic surgery and a large amount of fungal debris was removed from the affected sinuses. It was surrounded by an active inflammatory process. Histology reports revealed a benign inflammatory ethmoid polyp and colonies of *aspergillus* fungal organisms of the left ethmoid biopsy.

### Discussion

Fungal sinusitis is a rapidly progressive fungal infection of the sinuses. The infection can cross mucosa to involve blood

vessels, bone, adjacent soft tissues, orbit and intracranial cavities<sup>[1]</sup>. Early diagnosis of fungal sinusitis may help prevent life-threatening complications in patients, especially immunocompromised ones<sup>[2]</sup>. The most common symptoms of fungal sinusitis are headaches, nasal obstruction and purulent rhinorrhoea<sup>[3]</sup>. Patients can however also present with an acute onset of fever, epistaxis, sinus pain, cough, nasal mucosal ulcerations and crusting. Some patients present with periorbital swelling, proptosis and mental status changes<sup>[1]</sup>. The patient discussed in this case report presented with common symptoms of headaches.

Fungal sinusitis generally features complete or partial opacification of the sinus. It can include areas of bone erosion as well as adjacent soft tissue infiltration. The most common location is the maxillary and ethmoid sinuses, but it is found in the

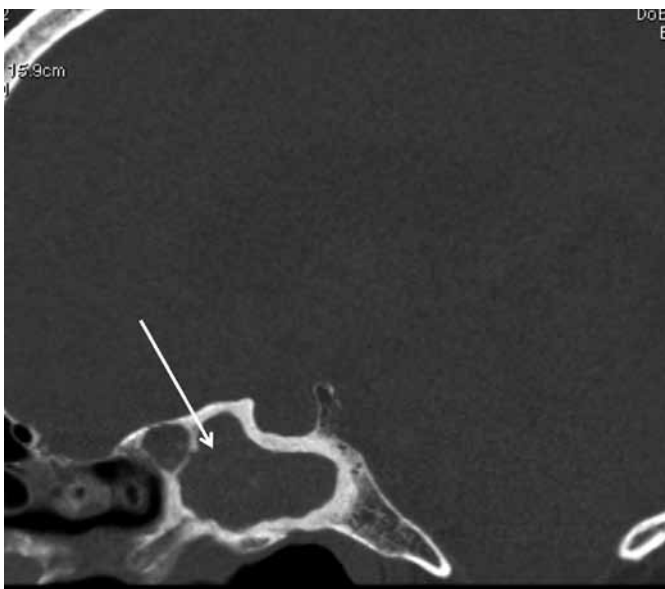


Figure 1: Sagittal CT image of sphenoid sinus demonstrating opacification and bone sclerosis (arrow).

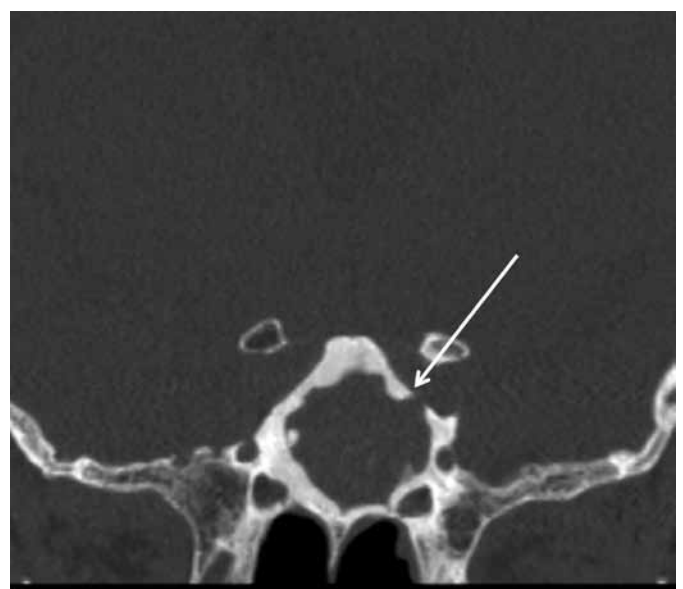


Figure 2: Coronal CT image of sphenoid sinus demonstrating opacification and bony erosion and sclerosis (arrow).



Figure 3: Axial CT image of ethmoid and sphenoid sinus demonstrating opacification and calcification (arrow), as well as bony sclerosis.

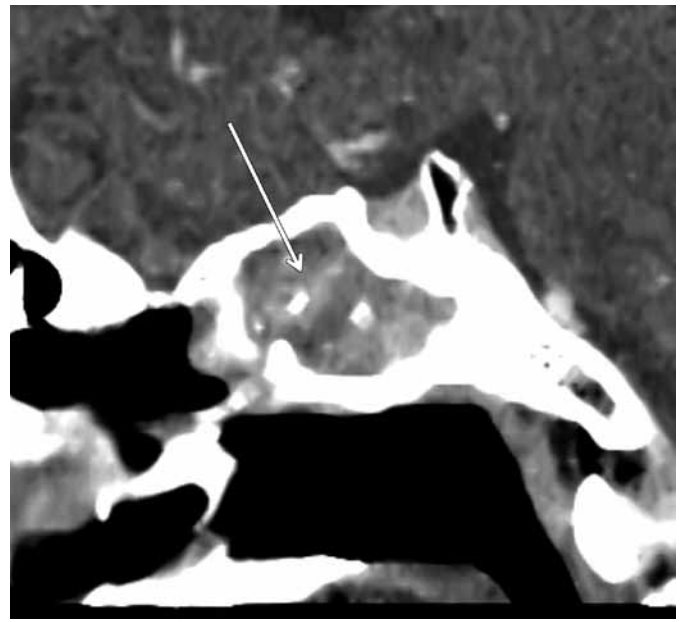


Figure 4: Sagittal CT image of sphenoid sinus after administering contrast, demonstrating enhancement (arrow).

sphenoid sinuses as well<sup>[1]</sup>. Involvement of the frontal sinuses is rare<sup>[4]</sup>.

CT findings of unenhanced scans include: complete or partial soft tissue opacification of the affected sinus, thickening of nasal cavity mucosa, increased density of secretions suggest fungal colonization and focal areas of bone erosion of the sinus walls<sup>[1]</sup>. Calcifications are almost always seen in the sinuses of patients who had a CT scan<sup>[3]</sup>. These calcifications are not always observed on plain x-rays<sup>[3]</sup>. Calcifications in the sinuses of patients with fungal sinus infection can be as high as 77% compared to only 3% of patients with non-fungal sinusitis. The calcifications usually have irregular margins with fungal sinusitis and are usually situated in the centre of the sinus. Linear and nodular shaped calcifications were found in both fungal and non-fungal sinusitis, whereas fine punctate calcifications were only found in fungal sinusitis<sup>[2]</sup>. Punctate calcifications were demonstrated on this patient's CT scan. Enhanced CT scans might demonstrate enhancement of the peri-antral soft tissues and adjacent musculature<sup>[1]</sup>.

Fungal sinusitis is usually diagnosed in unhealthy individuals. The saprophytic fungi become invasive in patients with a mixture of predisposing conditions. The predisposing conditions include: diabetes mellitus, diabetic ketoacidosis, leukaemia and bone marrow transplantation, severe malnutrition, malignancy-related neutropenia, end-stage renal disease, prolonged corticosteroid or antibiotic use, chronic

immunosuppressive therapy and hemochromatosis<sup>[1]</sup>.

Studies have shown that *aspergillosis* of the sinuses often develops in patients who are otherwise healthy<sup>[3]</sup>. This patient had no other underlying illnesses, and would be described as a healthy individual. *Aspergillosis* should be confirmed with histology and not only by the CT scan as it could be misdiagnosed as a neoplasm<sup>[2]</sup>. Even though the CT appearances of fungal sinusitis are not pathognomonic, they are adequately characteristic to suggest the likelihood of the disease<sup>[4]</sup>. The most common organisms that cause fungal sinusitis are mucorales and genus/species *Aspergillus fumigatus*<sup>[1]</sup>.

The surgical features include necrotic tissue with discoloration due to the presence of fungus<sup>[1]</sup>. Microscopic features are: fungal hyphae that invade the mucosa, submucosa and blood vessels, prominent tissue necrosis. Mucormycosis and *aspergillosis* often invade the arteries and adjacent soft tissues causing associated inflammatory infiltration<sup>[1]</sup>.

Since fungal sinusitis is a rapidly progressive disease it can be fatal unless the suitable surgical-medical therapy is instituted. The prognosis for a patient with only sinus involvement is fair, with intracranial and orbital involvement being the most feared complication. With intracranial involvement the prognosis is poor<sup>[1]</sup>.

The treatment consists of radical debridement (until histopathologically normal tissue is reached), antifungal therapy and the treatment of any underlying condi-

tions that could be responsible for the patient's immunocompromised condition<sup>[1]</sup>.

## Conclusion

CT findings of calcifications can help in differentiation between fungal and non-fungal sinusitis<sup>[2]</sup>. CT scan of the sinuses plays a huge role in the diagnosis of fungal sinusitis. Even though fungal sinusitis is usually diagnosed in patients that are immunocompromised it is also seen in otherwise healthy patients, like the patient in this case report. If treated soon and radically, the patient's prognosis is fair.

## References

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