

SUMMARY

We have presented two unusual cases of nasogastric tube perforation of the posterior nasopharynx. Complications included subcutaneous emphysema, pneumomediastinum, and pleural effusion. Both patients recovered. Recommendations to improve nasogastric tube safety include gentle placement using lubricant and an appropriately sized tube, confirmation of tube placement before any infusion, and awareness of patients at increased risk of mucosal injury.

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Invasive Aspergillosis of the Sphenoid Sinus Manifested as a Pituitary Tumor

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ASPERGILLUS species are common fungi that can be isolated from various sources including soil, building materials, leaves, and foodstuffs. The climate and agricultural economy of the southeastern United States may contribute to the endemicity of human aspergillosis in this section of the nation.¹ The fungal spores are commonly airborne and are inhaled by the host, accounting for the predilection of *Aspergillus* infections for the respiratory system. Uncommon but well recognized sites of involvement are the paranasal sinuses,^{1,2} where aspergillosis may follow a relentless and ultimately fatal course in certain hosts.³ The case reported here is unusual in that it involved only the sphenoid sinus and mimicked a pituitary tumor.

CASE REPORT

A 48-year-old woman had constant bifrontal headache for three months before admission. Her headache worsened markedly in the two weeks before admission and required narcotics on two occasions for amelioration. She began to experience imbalance, dizziness, and diplopia and became bedridden four days before admission but had no fever or history of sinusitis or nasal symptoms. She was admitted to her local hospital where a lateral skull roentgenogram showed

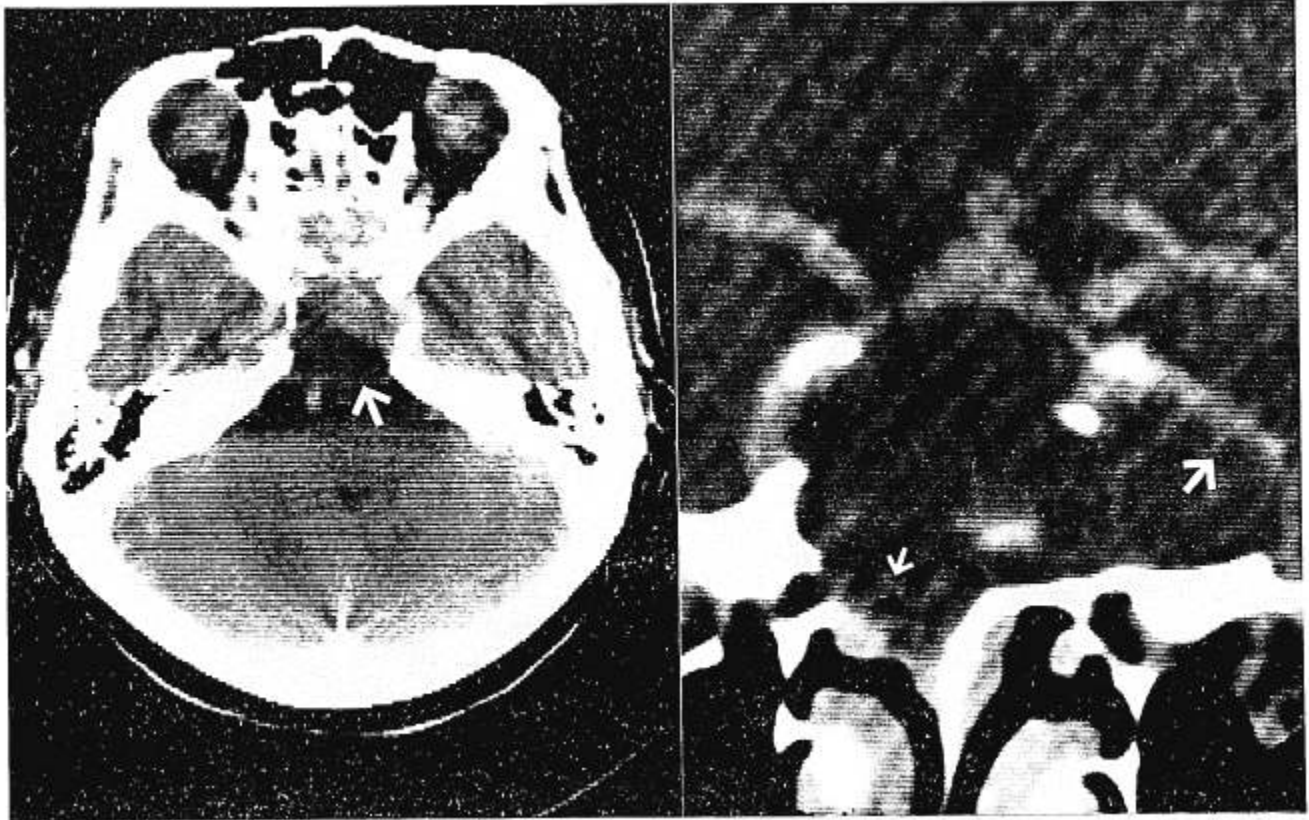
ablation of the sella turcica, dorsum sellae, and the posterior wall of the sphenoid sinus, and she was transferred to St. Thomas Hospital for further evaluation.

There were no symptoms or signs of pituitary hormone dysfunction; however, she had bilateral ptosis and a left sixth cranial nerve palsy. There was also left-sided third cranial nerve compromise manifested by restricted extraocular movements and anisocoria with both pupils reactive to light but the left less reactive than the right. Laboratory evaluation included a serum thyroxine level of 5.6 $\mu\text{g}/\text{dl}$ (normal, 4.3 to 12.4 $\mu\text{g}/\text{dl}$), serum triiodothyronine 81 ng/dl (normal, 82 to 195 ng/dl), plasma cortisol 20 $\mu\text{g}/\text{dl}$ (normal, 8 to 22 $\mu\text{g}/\text{dl}$), and serum prolactin 21.4 ng/ml (normal, 4 to 17 ng/ml). There was no evidence of diabetes mellitus. Computerized tomography (CT) showed a large mass occupying the sella turcica, the sphenoid sinus, and the wall of the posterior ethmoid sinus, extending superiorly into the base of the brain with destruction of the dorsum sellae and the right lateral wall of the sella turcica (Fig 1).

A transsphenoidal approach was used to attempt resection of a suspected nonfunctioning pituitary tumor. When the sphenoid sinus was entered a large amount of green pus exuded into the wound, and an abscess extending into the extradural space of the sella turcica was found. The sinus was irrigated and debrided by suction, but the dura of the sella turcica was left intact. Microscopic smears and cultures of the exudate identified only an *Aspergillus* species. Colonies of this isolate were yellowish-buff in color, but subcultures were nonviable so speciation could not be completed. The patient was treated with amphotericin B intravenously in a dosage of 20 mg (0.3 mg/kg) daily. Repeat CT one week later showed a persistent soft tissue density filling the sphenoid and ethmoid sinuses, with destruction of the right wall of the sphenoid sinus. At transethmoidal sphenoidectomy, the anterior wall of the

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(Left) Axial computerized tomogram of head after intravenous contrast enhancement. Homogeneous mass occupies and expands sella turcica (arrow). (Right) Coronal computerized tomogram of sella turcica after intravenous contrast enhancement shows destruction of dorsum sellae, upward displacement of circle of Willis, destruction of bone of anteroinferior wall of sella turcica (small arrow), and extension of apparent mass laterally to right where there is encroachment on cavernous venous sinus (large arrow).

sphenoid sinus was excised, and a large fungus ball and necrotic debris were removed from the sinus. There was destruction of both the intersphenoidal septum and the posterior and superior walls of the sphenoid sinus. Rifampin (600 mg/day orally) was administered postoperatively for two weeks in addition to amphotericin B. At follow-up one month later the cranial nerve abnormalities had resolved completely, and results of pituitary function tests remained normal.

DISCUSSION

Fungal infection of the paranasal sinuses is a rare cause of sinusitis in an otherwise normal host, but *Aspergillus* is the most common fungal pathogen.^{2,4} *Aspergillus* sinusitis is usually manifested by vasomotor symptoms or persistent sinusitis unresponsive to antimicrobial agents.³ Often encountered is a greenish-black, greasy exudate that on microscopy shows typical septate hyphae with dichotomous branching. The fungus prefers anaerobic conditions, which is somewhat paradoxical considering the propensity of the organism to infect the respiratory tract. It enters the sinuses as a saprophytic colonist and becomes pathogenic under conditions that impair drainage through the sinus ostia and thus contributes to diminished aeration of the sinuses.⁴ Such conditions occur with nasal polyps, mucosal thickening caused by

allergies, nasal septal deviation, and bacterial infections.⁵ Once established, the infection is manifest in one of three forms that may occur as stages of disease: (1) noninvasive, (2) invasive, and (3) fulminant.¹

Noninvasive disease is usually unilateral in a maxillary sinus, and should be suspected when sinusitis does not respond to antibiotics, decongestants, and irrigation. More aggressive non-surgical drainage and irrigation are generally adequate to resolve this problem.⁶

The invasive form is also most common in a maxillary sinus, but disease may extend into the orbit or facial bones.² Our case was unusual but not unique^{5,7} in that there was isolated involvement of the sphenoid sinus with invasion of the sella turcica and perisinusoidal bone. A paranasal mass with bony erosion may be seen roentgenographically in this form of *Aspergillus* sinusitis, and the differential diagnosis includes malignancy, mucormycosis, and chronic bacterial sinusitis with secondary osteomyelitis.⁸ Surgical drainage, irrigation, and removal of all infected material are together usually considered sufficient therapy.⁶ In

cases such as ours in which there is extension of infection from the sphenoid sinus into the sella turcica, transnasal drainage is usually effective and is safer than a transfrontal approach to the pituitary fossa.⁹

The fulminant form of invasive aspergillosis is an unusual disease seen in immunocompromised hosts.³ A dark, crusting, anesthetic lesion on the anterior turbinate or nasal septum is often the first external sign of this disease. The pathogenesis of the lesion is vascular infiltration by fungal hyphae and subsequent ischemic necrosis of the mucosa and underlying cartilage and bone. The process tends to spread relentlessly to surrounding structures, and if it invades the central nervous system, it is usually fatal. Therapy includes extensive debridement and high doses of amphotericin B.

This case is an unusual example of the invasive form of paranasal sinus aspergillosis. It was mistaken for a nonfunctioning pituitary tumor because of its location and the lack of complaints suggestive of sinusitis. Similar cases have been reported in the literature.^{7,9,10} Ramos-Gabatin et al¹⁰ described a patient with an apparent pituitary mass with suprasellar extension. Their patient had a normal sphenoid sinus lining but had a pituitary abscess caused by *Aspergillus*. The infection was cured with transsphenoidal resection plus two months' therapy with amphotericin B and flucytosine. A similar case of pituitary abscess with a fatal outcome after a transfrontal drainage procedure was reported by Goldhammer et al.⁹ In that case roentgenograms indicated sphenoid sinusitis. Yu et al⁷ reported a patient with a sphenoid sinus mass, erosion of the sella turcica, and cranial nerve palsies, accompanied by a constitutional illness. That patient had debridement and unsuccessful treatment with amphotericin B. The disease was cured when flucytosine and rifampin were added to the treatment regimen. The authors suggested that the cranial nerve abnormalities might have been caused by *Aspergillus* invasion of the vascular supply of the nerves.

The blood supply of the sella turcica and pituitary gland includes veins and at least one small artery that traverses the bone between the sphenoid sinus mucosa and the sella.¹¹ Given the propensity of *Aspergillus* to spread through and along vascular channels, perhaps these vessels

facilitate pituitary abscess as a result of infection of the contiguous sphenoid sinus.

The treatment in our patient included extensive debridement of the sphenoid and ethmoid sinuses, with provision of adequate drainage into the nasal cavity. In vitro¹² and in vivo⁷ studies suggest that the addition of rifampin and/or flucytosine to treatment with amphotericin B may be beneficial in invasive aspergillosis. Amphotericin B and rifampin were given in this case with the intention of eradicating any *Aspergillus* that had spread to the dura mater and other contiguous tissues.

SUMMARY

Aspergillus infection of the paranasal sinuses is rare but is the most common fungal infection of these structures and should be suspected when sinusitis does not respond to antibacterial drugs. Our case involved the sphenoid sinus, and was initially thought to be a nonfunctioning pituitary tumor. Treatment of *Aspergillus* sinusitis principally involves surgical debridement, reestablishment of aeration and drainage of the involved sinuses, and adjunctive antifungal chemotherapy.

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