CASE REPORT

Acute Isolated Sphenoid Sinusitis in Recurrent Retropharyngeal Abscess

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ABSTRACT

Isolated sphenoid sinusitis is uncommon, reported in less than 3% of all cases of sinusitis. Retropharyngeal abscess is treatable but poses risks of complicated infection to the surrounding structures, albeit unlikely, even into the sphenoid sinus. We present the case of a 75-year-old male with a history of left retropharyngeal abscess five months ago, who presented again with persistent left-sided headache, not resolving with analgesic. Computed tomography showed features of recurrent retropharyngeal abscess with lytic bone erosion of the sphenoid floor and the presence of collection within. The patient has fully recovered after undergoing drainage of the retropharyngeal abscess and sphenoidotomy. This is the first reported case of a direct extension of retropharyngeal abscess causing isolated sphenoid sinusitis.
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INTRODUCTION

Sphenoid sinusitis usually occurs in conjunction with infection of the other paranasal sinuses. Rarely does it happen in isolation, with an estimated 3% of sinus infections (1). Isolated Sphenoid Sinusitis (ISS) can be a retropharyngeal abscess (RPA) complication due to its anatomical proximity to the sphenoid sinuses.

RPA involves purulent collection in between the prevertebral fascia and the constrictor muscles. The condition was known to affect children primarily, but it has an increasing incidence in adults (2). The most dangerous complication is extension into the posterior mediastinum. However, the sinister involvement of the superior structures was recently reported (1).

Here, we reported a case of ISS in a patient with recurrent RPA, highlighting the non-specific nature of presentation that should not be disregarded to ensure a prompt diagnosis and management, which led to an excellent prognosis in our patient.

CASE REPORT

A 75-year-old male patient with underlying diabetes mellitus, hypertension, chronic kidney disease stage 3 and a previous history of left RPA 5 months ago presented to the emergency department (ED) with a one-week history of left-sided headache, throbbing in nature, radiating to the left neck and unresolved with analgesic. He also had a history of fever during the early onset of presentation, associated with non-projectile vomiting. He had five visits to the ED because of the headache since the last hospital admission. He denied any nasal symptoms. He was on T.Perindopril 8mg once daily for his hypertension. His diabetes was poorly controlled despite regular insulin injections with an HBA1c of 10. His physical examination revealed normal neurological findings and no noticeable neck swelling. Nasoendoscopy showed bulging of the left nasopharynx from its roof to the level of the soft palate. There was presence of frank purulent discharge trickling from the left sphenoethmoidal recess. Computed tomography (CT) scans showed findings of recurrent RPA with left

sphenoid sinusitis (Fig. 1).

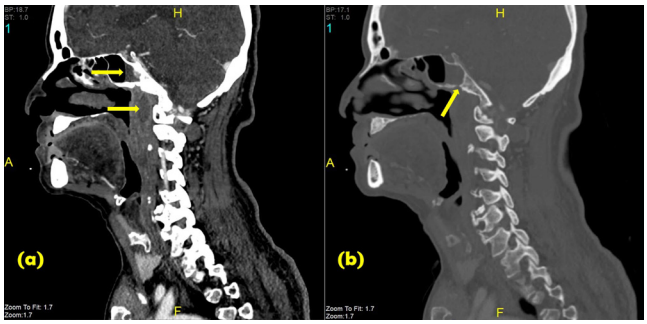

Fig. 1: Reconstructed sagittal image in soft tissue window (a) showing retropharyngeal rim enhancing collection extending down to the inferior margin of C1 vertebral level with an air-fluid level in the sphenoid sinus with layering of different fluid densities within. Bone window image (b) shows an irregularity with lytic bone erosion noted at the inferior aspect of the clivus and floor of the left sphenoid sinus.

Intravenous (IV) *ceftriaxone* (2g 12 hourly) and *metronidazole* (500mg 8 hourly) were initiated. The patient underwent an incision and drainage of the left nasopharynx retropharyngeal abscess and endoscopic trans-nasal sphenoidotomy for drainage of the sphenoid collection. 6 ml of pus was drained from the sphenoid and 5 ml from the nasopharynx. Upon entering the sphenoid cavity, the mucosa appeared oedematous and erythematous; however, no apparent ulceration or bony exposure was seen (Fig. 2).

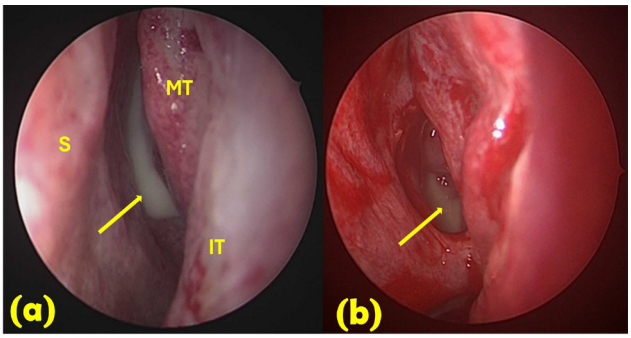

Fig. 2: (a) Intraoperative endoscopic appearance shows frank purulent discharge from left sphenoid ostium (arrow). (b) Left endoscopic trans-nasal sphenoidotomy was performed to facilitate complete drainage of pus collection seen within the left sphenoid sinus (arrow). S, septum; MT, middle turbinate; IT, inferior turbinate.

The patient received a total of 14 days of IV *ceftriaxone* and seven days of IV *metronidazole* and continued with oral *ciprofloxacin* for another four weeks as an outpatient. A significant clinical improvement was achieved. He was seen during subsequent follow-ups and fully recovered from the headache.

DISCUSSION

The sphenoid sinus, located within the sphenoid bone, lies beneath the sella turcica, which houses the pituitary gland. It is flanked laterally by the cavernous sinuses, placing it close to several vital structures. These include the optic nerves, carotid arteries, oculomotor nerve, abducens nerve, trochlear nerve, and the V1 and V2 branches of the trigeminal nerve. Due to this anatomical relationship, sphenoid sinus diseases can lead to serious complications, such as ocular conditions, cranial nerve dysfunction, and intracranial issues like meningitis or brain abscesses (1). Isolated sphenoid sinusitis secondary to retropharyngeal abscess is a rare occurrence. The most common sphenoid sinusitis is due to infection at the posterior ethmoid. The term isolated sphenoid sinusitis was coined when the other sinuses were normal.

Understanding the deep neck space infection is essential to analyse the uncommon presentation leading to RPA complications. The retropharyngeal space, extending from the skull base (superior boundary) to the mediastinum at the second thoracic vertebra (inferior boundary), is a key infection pathway. It is bordered by the alar fascia anteriorly and the prevertebral fascia posteriorly, which separate it from the danger and prevertebral spaces, respectively (3).

RPA is rare in adults, which can be due to inoculating trauma such as iatrogenic instrumentation, endotracheal intubation, foreign body or in the condition of an associated disease (1). RPA may rupture if left untreated or treated inadequately. The RPA can directly spread superiorly to the base of the skull and clivus and subsequently spread into the sphenoid sinus. Hematogenous spread of the infection through venous or lymphatic pathways may reach the sphenoid sinus, causing sinusitis (1). However, the complication of RPA to the sphenoid sinus appears undocumented in the literature and has not been reported yet because of its rarity.

Most cases reported ISS as the cause of RPA via direct extension or lymphatic route. Infection in the sinus can cause lymphadenitis to retropharyngeal nodes, which can substantially turn into a deep neck abscess (1). Subsequently, involvement of the longus colli muscle was postulated to be associated with prevertebral abscess.

The typical presentation of ISS is unusual headaches of varying locations and intensities that are not relieved by analgesics. In our case, the patient presented with intermittent and unresolved headaches, which required various types of analgesia. Afferent fibres of the trigeminal nerve, which innervate the sphenoid sinus, are accountable to these contrasting sites. Nasoendoscopy is a valuable diagnostic tool for paranasal sinus pathologies. However, the findings in patients with ISS may not be apparent. According to Sethi et al., the typical appearance of the sphenoethmoidal recess does not exclude sphenoid pathology. In up to 50% of patients, nasoendoscopy could not identify pathological abnormalities surrounding the sphenoid ostium (4).

A CT scan is essential in diagnosing patients suspected of

sphenoid sinusitis. Most of the time, ISS is an incidental finding during a radiological investigation, as per our case. Typical ISS findings include air-fluid level in the sinus, opacification, sclerotic bone and thickened sphenoid mucosa (5). The differential diagnosis for sphenoid sinus opacification includes a wide range of conditions, such as inflammatory diseases, infection, neoplasms, and benign cysts.

The main treatment principle is prolonged antibiotic therapy with immediate surgical intervention to drain the collection. Antibiotics alone typically do not produce a good result. Surgical drainage of the collection is vital to isolate the causative organism that will benefit from the choice of antibiotic to increase the efficacy of the medical therapy. The broad-spectrum antibiotic may be considered if no causative organism was isolated (5). In the literature, sphenoid sinusitis was reported to commonly be caused by Gram-positive organisms such as S*taphylococcus aureus, Staphylococcus epidermidis,* and *streptococci*. Some affected patients showed Gram-negative bacteria such as *Proteus, Pseudomonas Aeruginosa, Escherichia coli* and *Haemophilus Influenza*, anaerobic bacteria species as well as fungi (*Chlamydia* and *Aspergillus*) (5). As in our case, common isolation of the causative organism may not be possible despite ample samples being sent.

In summary, an acute ISS, a rare complication of RPA, was successfully treated with prompt medical and surgical intervention.

CONCLUSION

As a complication of retropharyngeal abscess, isolated sphenoid sinusitis requires prompt and aggressive treatment of sphenoid sinus and deep neck infections. Early diagnosis and appropriate intervention are paramount to reducing morbidity in patients.

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