ORIGINAL RESEARCH PAPER

Otorhinolaryngology

DARK SECRETS OF THE WASP,WHEN HEADACHE HIDES A FUNGUS: A CASE REPORT OF ISOLATED SPHENOIDAL SINUSITIS

KEY WORDS: Sphenoid, Sinusitis, FESS, Non Invasive, Fungal

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ABSTRACT

Background: Isolated sphenoidal fungal sinusitis is an uncommon condition that often presents with nonspecific symptoms, particularly chronic headache, leading to frequent misdiagnosis as a primary headache disorder. Its deep anatomical location and subtle presentation contribute to delayed diagnosis. Risk factors such as diabetes mellitus and occupational fungal spore exposure increase susceptibility, while CT imaging demonstrating the characteristic double-density sign is pivotal for early diagnosis. **Case Presentation:** A 44-year-old male farmer and mill worker with diabetes mellitus, hypertension, and hypothyroidism presented with a two-year history of occipital and vertex headache, nasal blockage, and recurrent upper respiratory tract infections. Neurological evaluation and MRI brain were normal, with minimal response to prolonged symptomatic treatment. CT paranasal sinuses revealed isolated sphenoidal fungal sinusitis with a double-density sign. Endoscopic sphenoidotomy yielded greenish-white cheesy material, and histopathology confirmed Allergic Fungal Rhinosinusitis. **Conclusion:** Refractory chronic headache should prompt consideration of isolated sphenoidal fungal sinusitis, with early CT imaging and ENT evaluation enabling timely diagnosis and management.

INTRODUCTION

Isolated sphenoidal fungal sinusitis is a rare and often under-recognized clinical entity, primarily because of its vague and non-specific symptomatology. It accounts for only 2.7–3.0% of all paranasal sinus diseases.[1]

Persistent headache is the most frequently reported presenting complaint seen in approximately 88% of cases. Other reported presenting manifestations include rhinorrhea in 46%, and nasal congestion in 26% of patients [2]

An atypical headache that is typically exacerbated by head movements and may worsen with actions such as coughing, walking, or bending forward that does not respond adequately to conventional analgesics is a characteristic feature of isolated sphenoid sinusitis [3]. The pain can be severe enough to disturb sleep and is often poorly relieved by routine analgesic medications [4]. In sphenoiditis, vertex headache is common, but pain can be localized in frontal, temporal, periorbital, or occipital regions or can be vague or occur anywhere in the craniofacial region.[5]

Isolated sphenoid sinusitis accounts for less than 3% of all sinus infections, underscoring its rarity in clinical practice [6]. Isolated sphenoid sinus inflammatory diseases (ISSIDs) are responsible for about 75% of isolated sphenoid sinus opacifications. ISSID lesions included bacterial sphenoiditis (42.9%), fungus ball (21.4%), invasive fungal sphenoiditis (14.3%), mucocele (14.3%), and retention cysts (7.1%).[7]

Anatomically, the sphenoid sinus is situated in proximity to several critical neurovascular structures, including the cavernous sinus, optic nerve, internal carotid artery, and cranial nerves III, IV, V, and VI. Consequently, extension of infection or inflammation beyond the confines of the sphenoid sinus may result in significant intracranial or orbital complications.About 64% patients with sphenoid sinus disease will have visual complaints due to cranial nerve involvement[8].

Although inflammation associated with fungal balls (FB) typically remains confined to the sinus cavity without direct involvement of the mucosa or bony walls, it may nevertheless cause pressure-related thinning and resorption of the sinus wall.

Fungal rhinosinusitis is classified into non-invasive (saprophytic colonization, fungal ball, allergic fungal rhinosinusitis) and invasive forms (acute invasive, chronic invasive, chronic granulomatous invasive). Non-invasive disease is usually seen in immunocompetent individuals and carries a favourable prognosis, whereas invasive disease occurs predominantly in immunocompromised patients and is associated with high mortality (50–80%).

Aspergillus flavus is the most common causative organism in India. Other species are Candida and Zygomycota.[9].

The spread of inflammation and/or infection from the sphenoid sinus to the orbit and cavernous sinus causes 5 distinct clinical entities: (1) preseptal cellulitis, (2) orbital cellulitis, (3) subperiosteal abscess, (4) orbital abscess, and (5) cavernous sinus thrombosis[10]

Given that advanced invasive fungal infection of the sphenoid sinus is associated with considerable mortality, prompt recognition and timely initiation of appropriate management are essential to improve survival outcomes.

Case Presentation:

We present the case of a 44-year-old farmer and mill worker with diabetes mellitus, hypertension and hypothyroidism presented with a two-year history of persistent occipital and vertex headache without spontaneous remission. In addition to the headache, the patient reported symptoms of nasal blockage and intermittent episodes of upper respiratory tract infections. Specifically, he denied nausea, vomiting, photophobia, phonophobia, aura, visual disturbances, or focal neurological

deficits. The patient received analgesics and antimigraine therapy for one year without significant improvement.

MRI brain was unremarkable, excluding intracranial pathology.

Given the persistence of symptoms and lack of response to conventional therapy, further evaluation was undertaken. A computed tomography (CT) scan of the paranasal sinuses was performed, which revealed isolated sphenoidal sinusitis. The imaging demonstrated a characteristic double-density sign within the sphenoid sinus, raising strong suspicion for a fungal etiology.

The patient underwent endoscopic sphenoidotomy for both diagnostic confirmation and therapeutic management. Intraoperatively, fungal debris, a greenish-white, cheesy material, was found, further raising suspicion of fungal aetiology. Histopathological analysis confirmed the diagnosis of fungal sinusitis, and a final diagnosis of Allergic Fungal Rhinosinusitis (AFRS) was made.

Histopathology demonstrated broad, irregularly septate, right-angle branching fungal hyphae with Splendore–Hoeppli reaction, necrosis, and bony trabeculae, confirming fungal sinusitis.

DISCUSSION

Sphenoid sinusitis is the rarest of all types of involvement of the paranasal sinuses, and fungal sinusitis is considered to be a comparatively less common etiology. Due to its deeper anatomical location at the skull base, sphenoid sinusitis is commonly misdiagnosed as a primary headache syndrome. It is considered to be more challenging to make a diagnosis of sphenoid sinusitis because of its anatomical complexity and its intimate association with numerous other critical anatomical structures. Symptoms of diplopia, nasosinusitis, retro-orbital pain, vertex headache, and decreased visual acuity are considered to be non-specific.

Anatomical association of the sphenoid sinus with numerous other neurovascular structures, including the cavernous sinus (CS), pituitary gland, internal carotid artery, cranial nerves, and numerous other vital neurovascular structures, makes it of immense importance that pathology of this region is diagnosed and addressed without any delay. The spread of infection or inflammation from the sphenoid sinus to other anatomical structures is considered to be fatal. Its deep anatomical location often delays diagnosis.

In this paper, we present a case of isolated sphenoid fungal sinusitis that presents as a chronic headache.

Fungal infection of the paranasal sinuses is seen to be more common in individuals who have compromised immune status. Other predisposing factors for this infection include humid environment, poor nasal ventilation, as well as long-term use of corticosteroids and antibiotics. In addition to this, the anatomy of the sphenoid sinus as well as its poor airflow makes this area susceptible to infection with fungi [2].

Clinical Significance

This case also serves to emphasize the need to consider the possibility of paranasal sinus pathologies, such as isolated sphenoidal fungal sinusitis, in the differential diagnosis of a patient with intractable headache who does not respond well to conventional medical treatment. Due to the insidious nature of the presentation, a considerable time lag may elapse between the onset of the disease and the final diagnosis and treatment. Such a lag may result in the occurrence of serious life-threatening complications related to the proximity of the sphenoid sinus to the neurovascular structures in the head.

The occurrence of intractable vertex and occipital headaches warrants a strong suspicion of fungal sinusitis in the differential diagnosis. Therefore, a high index of suspicion is required in the diagnosis of fungal sinusitis to improve the outcome and possibly save the life of a patient.

CONCLUSION

This case emphasizes the need to consider paranasal sinus pathology, particularly isolated sphenoidal fungal sinusitis, in patients with chronic headache unresponsive to conventional treatment.

Occupational exposure and immunocompromised states, such as diabetes, may increase susceptibility.

Early CT imaging can be crucial for diagnosis, especially when the double density sign is present.

Images

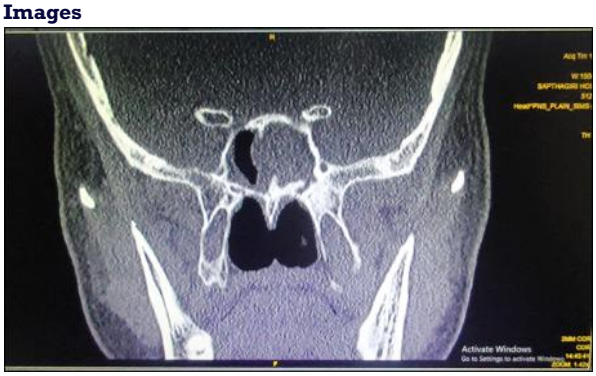

Figure 1 – Pre-operative Image Showing Mass in Left Sphenoidal Sinus on Coronal Ct Scan of Nose and Paranasal Sinuses.

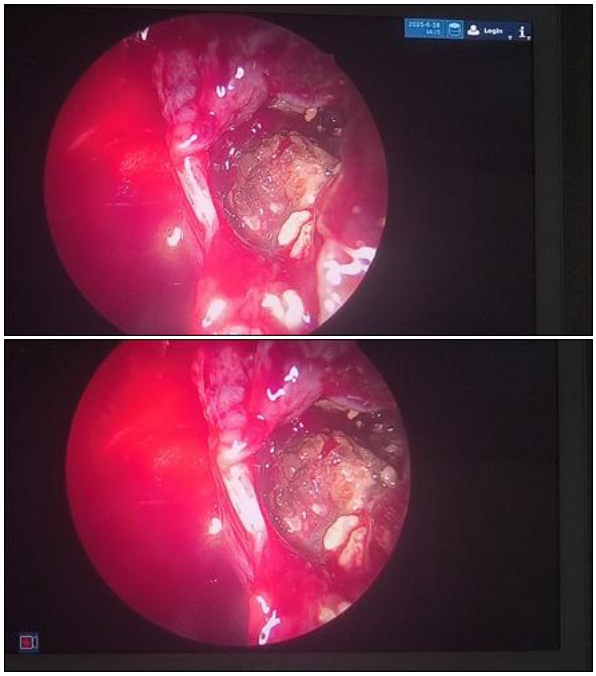

Figure 2 – Per-op Images Showing Black Fungal Ball On Endoscopic Sphenoidotomy.

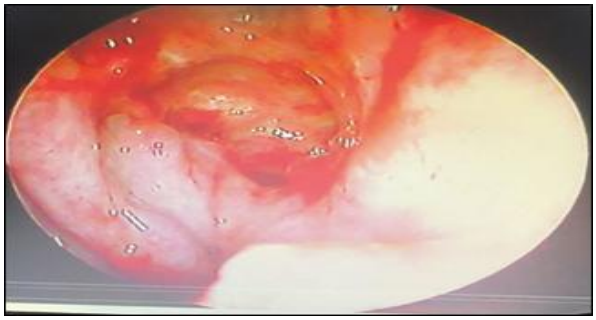

Figure 3 – Post-operative Image Showing Clear Sphenoidal Sinus on Endoscopy 1 Month Later.

REFERENCES

1. Ishak NL, Subha ST, Abu Bakar S. Isolated sphenoid sinusitis: A big headache. Malays Fam Physician. 2019 Apr 30;14(1):29-30. PMID: 31289629; PMCID: PMC6612268.)
2. Sphenoid Sinus Fungus Ball: Retrospective Analysis of 6 Cases First Diagnosed in the Neurology Department. Front. Neurol. 9:745. doi: 10.3389/fneur.2018.00745
3. Aditomo R. Atypical headache by isolated sphenoid fungal sinusitis: A rare case. Int J Surg Case Rep. 2024 Jul;120:109838. doi: 10.1016/j.ijscr.2024.109838. Epub 2024 May 31. PMID: 38823230; PMCID: PMC11169457.
4. Friedman A, Batra PS, Fakhri S, Citardi MJ, Lanza DC. Isolated sphenoid sinus disease: etiology and management. Otolaryngol Head Neck Surg. 2005 Oct;133 (4):544–550. doi:10.1016/j.otohns.2005.04.023
5. Ruoppi P, Seppä J, Pukkila M, Nuutinen J. Isolated Sphenoid Sinus Diseases: Report of 39 Cases. Arch Otolaryngol Head Neck Surg. 2000;126(6):777–781. doi:10.1001/archotol.126.6.777
6. Mohd Ariffin N I N, Kamarudin I K, Md Shukri N. Unveiling the mystery: Isolated sphenoid granulomatous fungal sinusitis causing nonspecific headache. Polish Annals of Medicine. 2025: 1–4. https://doi.org/10.29089/paom/201137
7. Fadda GL, D'Eramo A, Grosso A, Galizia A, Cavallo G. Isolated Sphenoid Sinus Inflammatory Disease-A Report of 14 Cases. Iran J Otorhinolaryngol. 2020 Mar;32(109):101-107. doi: 10.22038/ijorl.2019.39416.2304. PMID: 32219076; PMCID: PMC7085922.
8. Sreelatha AV, Marfatia H, Chatterjee C, Bhagat P. Isolated sphenoid sinusitis: rare, but vision compromising condition. Acta Scientific Otolaryngology. 2023; 5(12):09-13. doi:10.31080/ASOL.2023.05.0621.
9. Chakrabarti A, Das A, Panda NK. Overview of fungal rhinosinusitis. Indian J Otolaryngol Head Neck Surg. 2004;56(4):251-258. doi:10.1007/BF02974381. Deutsch PG, Whittaker J, Prasad S. Invasive and Non-Invasive Fungal Rhinosinusitis-A Review and Update of the Evidence. Medicina (Kaunas). 2019 Jun 28;55(7):319. doi:10.3390/medicina55070319. PMID: 31261788; PMCID: PMC6681352
10. Goldman A. Complications of sphenoid sinusitis. Oper Tech Otolaryngol Head Neck Surg. 2003;14(3):216-218. doi:10.1016/S1043-1810(03)90029-7