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Isolated Sphenoid Allergic Fungal Rhinosinusitis, A Tertiary Hospital Experience

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Abstract:

Objective:

To present the different clinical manifestations and diagnostic strategies of isolated sphenoid allergic fungal rhinosinusitis (ISAFRS), in order to prevent delayed diagnosis and providing early management.

Methods:

This study is a retrospective clinical study, conducted between January 2008 to November 2019. It was done in the ENT department of two institutes: King Fahad specialist Hospital and Qatif Central Hospital, Saudi Arabia. Only patients with sole involvement of allergic fungal rhinosinusitis in the sphenoid sinus were included.

Conclusion:

The incidence of isolated sphenoid allergic fungal rhinosinusitis is rare. However, it's clinically important because untreated ISAFRS can cause significant complications. The clinical features of ISAFRS are ambiguous and nonspecific which make its diagnosis more difficult. Post-nasal discharge and headache refractory to the medical management is the most common symptom of ISAFRS. CT scan is still the cornerstone of radiological diagnosis of ISAFRS. Endoscopic sinus surgery is the standard care of management.

Keywords: sphenoid sinus, Allergic fungal rhinosinusitis, Allergic fungal sinusitis, non-invasive fungal sinusitis, endoscopy.

abbreviation:

isolated sphenoid allergic fungal rhinosinusitis (ISAFRS), Allergic fungal rhinosinusitis (AFRS)

Introduction

Fungal rhinosinusitis is classified histopathologically according to Hora in 1965, into invasive and noninvasive fungal rhinosinusitis which depend on whether the fungal hyphae invades to the epithelium tissue (invasive) or limited to the superficial epithelium (non-invasive) [1,2].

Non-Invasive Fungal Rhinosinusitis is divided into 2 subgroups; Allergic fungal rhinosinusitis (AFRS), and Fungal Ball. AFRS is the most common type of fungal sinus disease. It is believed that AFRS is an immunological reaction to fungal antigen rather than a fungal infection. Interestingly, it is common in immunocompetent younger patient with atopic background, with similar findings and presentation as in chronic rhinosinusitis [3].

The incidence of Isolate sphenoid lesion is only 1-2.7% of all sinus diseases [4,5]. However, ISAFRS is much rarer. Early detection and management of ISAFRS is crucial due to the important vital structures surrounding it. The sphenoid sinus lies in proximity to 13 vital structures—including the dura, pituitary gland, optic nerve, cranial nerves III, IV, V, and VI, cavernous sinus, internal carotid artery, sphenopalatine ganglion, sphenopalatine artery, and pterygoid canal [6,7]. The main focus of this study is to present the different clinical manifestations and diagnostic strategies of isolate sphenoid allergic fungal rhinosinusitis, in order to prevent delayed diagnosis and providing early management. It was conducted at King Fahad Specialist Hospital (KFSHD), and Qatif Central Hospital, Eastern region, Saudi Arabia.

Method

This is a retrospective study which was conducted in the otolaryngology department of King Fahad specialist Hospital and Qatif Central Hospital, Saudi Arabia, from January 2008 to November 2019. Patients included were: 1-Isolate sphenoid allergic fungal rhinosinusitis which were confirmed by computed tomography (CT) and/or magnetic resonance imaging (MRI);2-intra-operative evidence of the thick allergic mucin and fungal mud within the sphenoid sinus.

Result

A diagnosis of isolated sphenoid allergic fungal rhinosinusitis had been made in 6 patients with the age ranging between 15-50 years old. 4 out of 6 were males and the 2 remaining were females. The most common symptoms were headache and nasal discharge. Even though CT scan was the most important tool in the diagnosis, the conformation of the diagnosis was made either intraoperatively or by fungal culture. The management was a combination of endoscopic wide sphenoidotomy to remove the thick impacted mucin and fungal mud followed by a short course of steroids.. The only organism found was Aspergillum in these patients. Summarization of all cases found in [Table1].

Patient No.	age	Sex	Presenting symptoms	Diagnosis	Culture result
1	25	Male	Nasal blockage, Chronic nasal discharge	Allergic fungal rhinosinusitis	Aspergillum
2	27	Female	Occipital headache	Allergic fungal rhinosinusitis	Aspergillum
3	40	Male	Occipital headache + facial pain	Allergic fungal rhinosinusitis	Aspergillum
4	47	Male	Headache + Post nasal discharge	Allergic fungal rhinosinusitis	Aspergillum
5	50	Female	Allergic rhinitis symptoms + headache	Allergic fungal rhinosinusitis	Aspergillum
6	15	Male	Headache + Post nasal discharge	Allergic fungal rhinosinusitis	Aspergillum

Table1: data review of the patients with isolated sphenoid allergic fungal rhinosinusitis.

Discussion

Fungal sinusitis is commonly classified into invasive and non-invasive categories [8-9]. Invasive fungal sinusitis is further sub-divided into acute fulminant invasive and chronic invasive categories, the latter including chronic granulomatous and chronic invasive fungal sinusitis. On the other hand, non-invasive fungal sinusitis is divided into allergic fungal rhinosinusitis (AFRS) and fungal ball. The categorization of fungal sinusitis is based on distinctive histopathological features with supportive clinical, radiological and mycological criteria [10-11]. The sphenoid sinus is located within the sphenoid bone deep in the base of skull. Isolated sphenoid lesions are rare and presented only in 1-2.7% of all sinus lesions [4-5]. However, sphenoid sinus is surrounded by many vital structures which can be injured by any sphenoid sinus lesion. These includes the pituitary gland, optic nerve and chiasm, middle cranial fossa, internal carotid artery, cavernous sinus, the dura, pterygoid canal and nerve and cranial nerve III, IV, V1, V2, and VI [6-7]. The exact mechanism of spread of fungal infection only to sphenoid sinus is unknown. It has been hypothesized that ostial closure creates an anaerobic environment favorable for growth of Aspergillus. Bent and Khun criteria is the most used criteria to diagnose AFRS even though there are other criteria's available [12] (table2). The clinical presentation of ISAFRS is often nonspecific and vague; thus, diagnosis may be delayed in many cases [13]. Up to date, headache refractory to the medical management is the most common symptom of isolated sphenoid sinus lesion; it presents in 70 to 90% of patients [14-15].

In this series of 6 patients, the most presenting feature was headache followed by nasal discharge. History and physical examination have little benefit in establishing the correct diagnosis. Imaging studies (CT scanning and/or MRI) and Nasal endoscopy are essential for a thorough evaluation and management [16-17].

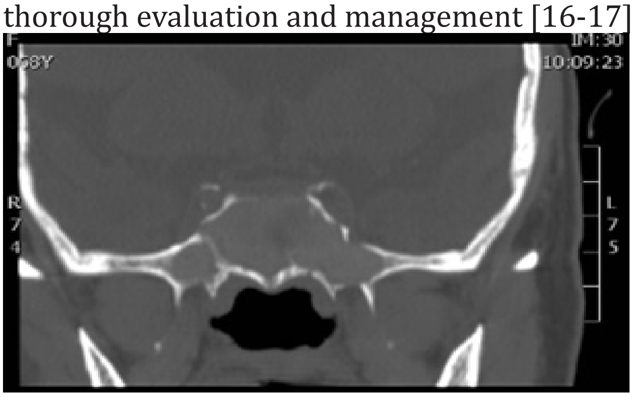

Fig.1: A computed tomography (CT) scan, coronal view showing a heterogeneous opacity filling the sphenoid sinus

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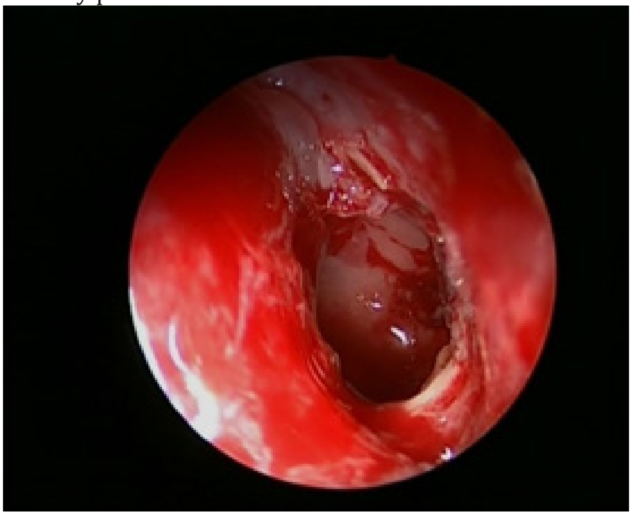
All patient did CT scan which provided valuable information regarding the diagnosis of ISAFRS and its relation to bony erosion. MRI should only provide for patient with suspicion of invasion to surrounding structures. MRI provides more precise information regarding its relationship to the cavernous sinus, dura, optic nerve, carotid artery and pituitary gland [18]. Endoscopic surgery has become the fundamental approach for ISAFRS. It includes wide adequate sphenoidotomy to remove all the thick allergic mucin and fungal mud and to ventilate and aerate the sphenoid sinus followed by a systemic and topical steroid treatments

Fig.2: (A) Intraoperative endoscopic view of the allergic mucin and fungal mud filling the sphenoid sinus.

(B) Endoscopic view of the Post operative wide sphenoidotomy procedure



There are few reports about complication of ISAFRS. Actually, the main complication of allergic comes after sphenoid sinus involvement. The main complications are visual disturbances, diplopia and cavernous sinus thrombosis. [11,12] We have reported one case in our series with cavernous sinus thrombosis as a complication of isolated sphenoid allergic fungal sinusitis. Left sphenoidotomy was done and she was treated with Meropenem, Vancomycin, Amphotericin B and Enoxaparin and improved.

Table2: Bent and Kuhn Diagnostic Criteria

Major Criteria	Minor Criteria
Type I hypersensitivity (IgE testing, skin testing or clinical history)	Unilateral disease
Nasal polyps	Asthma
Characteristic radiology (CT findings)	Bone erosion/expansion on CT
Presence of eosinophilic mucin without invasion	Fungal cultures
Positive fungal stain	Eosinophilia
	Charcot–Leyden crystals in mucin

Conclusion

Even though isolated sphenoid allergic fungal rhinosinusitis is rare, it‘s clinically important because untreated ISAFRS can cause significant complications. The clinical features of ISAFRS are ambiguous and nonspecific which make its diagnosis more difficult. Refractory headache and nasal discharge are the most common symptom of isolated sphenoid sinus lesion. CT scan is still the cornerstone of radiological diagnosis of ISAFRS. Endoscopic sinus surgery is the standard care of management. Post-operatively, the majority of patient had good results with an exception of 1 patient who developed cavernous sinus thrombosis.

References

1. Hora, J.F. Primary aspergillosis of the paranasal sinuses and associated areas. Laryngoscope 1965, 75, 768–773. [CrossRef] [PubMed]
2. Montone, K.T. Pathology of fungal rhinosinusitis: A review. Head Neck Pathol. 2016, 10, 16–46. [CrossRef] [PubMed]
3. Rinaldi, M.G. Zygomycosis. Infect. Dis. Clin. North Am. 1989, 3, 19–41
4. Hnatuk LA, Macdonald RE, Papsin BC. Isolated sphenoid sinusitis; the Toronto Hospital for sick children experience and review of the literature. J Otolaryngol 1994;23:36–41.
5. Lew D, Southwick FS, Montgomery WW, Weber AL, Baker AS. Sphenoid sinusitis. A review of 30 cases. N Engl J Med 1983;309:1149–54.
6. Grosjean P, Weber R. Fungus balls of the paranasal sinuses: a review. Eur Arch Otorhinolaryngol. (2007) 264:461–70. doi: 10.1007/s00405-007-0281-5
7. Chakrabarti A, Denning DW, Ferguson BJ, Ponikau J, Buzina W, Kita H, et al. Fungal rhinosinu

sitis: a categorization and definitional schema addressing current controversies. Laryngoscope (2009) 119:1809–18. doi: 10.1002/lary.20520.
8. DeShazo RD, Chapin K, Swain RE (1997) Fungal sinusitis. N Eng J Med 337:254–259
9. De Shazo RD, O'Brien M, Chapin K, Soto-Aquilar M, Gardner L, Swain R (1997) A new classification and diagnostic criteria for invasive fungal sinusitis. Arch Otolaryngol Head Neck Surg 123:1181–1188.
10. Rupa V, Jacob M, Mathews MS (2001) Increasing diagnostic yield in allergic fungal sinusitis. J Laryngol Otol 115:636–638.
11. Veress B, Malik OA, el-Tayeb AA, el-Daoud S, Mahgoub ES, el- Hassan AM (1973) Further observations on the primary paranasal aspergillus granulomas in Sudan: a morphological study of 46 cases. Am J Trop Med Hyg 22:765–772.
12. Bent JP 3rd, Kuhn FA. Diagnosis of allergic fungal sinusitis. Otolaryngol Head Neck Surg. 1994;111(5):580–8)
13. Cakmak O, Shohet MR, Kern EB. Isolated sphenoid sinus lesions. Am J Rhinol 2000;14:13–9.
14. Wyllie JW, Kern EB, Djalilian M. Isolated sphenoid sinus lesions. Laryngoscope 1973;83:1252–65.
15. Martin TJ, Smith TL, Smith MM, Loehrl TA. Evaluation and surgical management of isolated sphenoid sinus disease. Arch Otolaryngol 2002;128:1413–9.
16. Lawson W, Reino A. Isolated sphenoid sinus disease: an analysis of 132 cases. Laryngoscope 1997;107:1590–5.
17. Wang ZM, Kanoh N, Dai CF, et al. Isolated sphenoid sinus disease: an analysis of 122 cases. Ann Otol Rhinol Laryngol 2002;111:323–7.
18. Lee LA, Huang CC, Lee TJ. Prolonged visual disturbance secondary to isolated sphenoid sinus disease. Laryngoscope 2004;114:986–90.
19. Herrmann BW, White FV, Forsen JW. Visual loss in a child due to allergic fungal sinusitis of the sphenoid. Otolaryngol Head Neck Surg. 2006;135(2):328-9.
20. Bozeman S, Deshazo R, Stringer S, Wright L. Complications of allergic fungal sinusitis. Am J Med. 2011;124(4):359-68.

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