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Abstract

Background: Sphenoid sinusitis is a rare entity. It is characterized by a variety of clinical presentations. The most common presentation is headache. The sphenoid sinus is located at the skull base at the junction of the anterior and middle cerebral fossae and the sphenoid bone starts at three years old and reaches its full shape in the mid-teens [2,3]. The anatomic position of sphenoid sinus is superiorly the sella turcica, laterally the sphenoid sinus can have two prominences including the carotid canal and the optic canal. In the cavernous sinus, the most medial structure is the internal carotid artery.

Results: Twenty seven cases were studied at tertiary hospital of King Fahad Specialist Hospital Dammam; 12 (44.4%) bacterial sphenoid sinusitis, 4 (14.8%) allergic fungal sinusitis, 4 (14.8%) fungal balls, 2 invasive sphenoid sinusitis, 3 pediatric (2 sphenoid sinusitis and 1 allergic fungal sinusitis), 1 rhinosinusitis and 1 mucopyocele (Table 1).

**Keywords:** Sphenoid sinus; Bacterial sinusitis; Fungal sinusitis; Fungal ball; Mucocele

Introduction

Isolated sphenoid in ammatory lesions are relatively rare and as a result of their nonspecific clinical presentation, they are difficult to diagnose at first presentation [1]. The sphenoid sinuses are located at the skull base at the junction of the anterior and middle cerebral fossae and the sphenoid bone starts at three years old and reaches its full shape in the mid-teens [2,3]. The anatomic position of sphenoid sinus is superiorly the sella turcica, laterally the sphenoid sinus can have two prominences including the carotid canal and the optic canal. In the cavernous sinus, the most medial structure is the internal carotid artery.

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Discussion

Pathologies of isolated sphenoid in ammatory disease

Bacterial sphenoid rhinosinusitis: Bacterial Sphenoid rhinosinusitis was the most common isolated sphenoid in ammatory disease.

The symptoms and signs of the patients with isolated sphenoid in ammatory disorders are nonspecific. However, the most presenting symptom is the headache, representing around 60% of cases [4-6]. Twelve percent of the presenting symptoms include problems and problems due to involvement of other cranial nerves. The imaging studies are essential in the diagnosis of isolated sphenoid lesions. Computerized Tomography (CT) scan is the gold standard tool for the diagnosis as it may show different pathologies in differentiation between neoplasm from in ammatory disease and fungal from bacterial infections. Magnetic Resonant Imaging (MRI) is used if there is a suspicion of extension to the CNS (Central Nervous System) or the orbit.

Pathology	Number of Cases	Percentage (%)
Bacterial Sphenoid sinusitis (acute/chronic)	12	44.4
Allergic Fungal Sinusitis (AFS)	4	14.8
Fungal ball	4	14.8
Pediatric: 2 sphenoid sinusitis, 1 AFS	3	11.1
Mucocele, Mucopyocele	2	7.4
Total	27	100

Patients and Methods

A retrospective study of all patients diagnosed with isolated sphenoid in ammatory diseases at a tertiary hospital of King Fahad specialist hospital Dammam, KSA from 2008 to 2017 was done. The presenting signs and symptoms, radiological studies, operative findings and clinical outcomes were retrospectively reviewed and analyzed and full description of some selected cases are presented in this report. This study was reviewed and approved by the Institutional Review Board (IRB) at our institution.

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lesion, occurring in 12 patients of our series. The commonest pathogens include *Staphylococcus aureus*, aerobic gram-negative bacilli and anaerobes [8-12]. These patients presented with headache, rhinorrhea, nasal obstruction and blurred vision. The most common presenting symptom of sphenoid sinus disease was mainly headache. In the majority of previous reports, headache was non-specific in site, as well as quality [13]. Physical examination and endoscopic findings in cases may show mucopurulent secretion at the spheno-ethmoidal area, edema of the spheno-ethmoidal recess mucosa and polypoid tissue in the spheno-ethmoidal recess. The CT scan of the sinuses shows opacification in the sphenoid sinus, with thickening in the mucosal wall and air-fluid level (Figure 1). Management of patients with

**Allergic fungal rhinosinusitis (AFS):** Allergic fungal sinusitis is reported among 4 cases in our series. It is a non-invasive sinusitis usually found in immune-competent patients with a strong inflammatory response to the fungal infection. This common finding results in a thick mucin that may cause bony decalcification. Additionally, there marked bone resorption and mucosal thickening of these patients showed the presence of polyps and allergic mucin. Diagnosis of cases were based on Bent and Kuhn's diagnostic criteria which depend on the disease characteristic histologic, radiographic and immunologic features including type I hypersensitivity, the presence of nasal polyposis, characteristic findings of heterogeneous hyperdensities that are often unilateral and asymmetric as shown in one of our cases (Figure 3), positive fungal stain or culture and an eosinophilic mucin [14]. AFS can easily compress the cranial nerves. It had been documented that cranial neuropathies occur in 10% of cases of AFS with bone erosion [15]. Treatment of AFS includes endoscopic sphenoidotomy to clear polyps and allergic mucin as shown in Figure 4 and the use of corticosteroids to improve the ventilation and drainage of sinuses through addition of corticosteroids. Histopathology is pathognomonic as it shows allergic mucin containing fungal components without any tissue invasion. Post-operatively, immunotherapy might be beneficial.

**Fungal ball:** Also, our series of cases includes 4 cases of fungal ball. It is a non-invasive fungal infections, involves mostly maxillary sinus. Internationally, it represents nearly 10% of chronic non-invasive

sinusitis. The primary causative organism is *Aspergillus*. Clinically it is characterized by non-specific symptoms such as headache, which is the commonest symptom, followed by purulent rhinorrhea and nasal obstruction. The gold standard technique for its diagnosis is CT scan. Figure 5 shows CT findings of one of our series. Fungal ball appears as hyper-attenuating in CT due to dense hyphae with evidence of chronic inflammation with sclerosis and thickening of the wall of the paranasal sinuses. Half of cases reported intra-sinus metallic calcifications [16]. MRI shows fungal ball as isointense on T1 and marked

serious intracranial and orbital complications. Histopathology and microbiology are important tools for definite diagnosis. Endoscopic wide sphenoidotomy is the treatment of choice for isolated sphenoid inflammatory diseases.

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## Conclusion

Isolated sphenoid inflammatory disease is rare. Because of the relation of the sphenoid sinus to important vital structures of the skull base, early diagnosis and treatment is important and can avoid