

Isolated sphenoid sinus changes – history, CT and endoscopic finding

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Abstract

This study reviews the records of 21 patients with isolated sphenoid sinus disease who were treated by rigid endoscopic sphenoidotomy at the Nose and Sinus Unit, Department of Otolaryngology of Beilinson Medical Center, Israel.

Diagnosis was made on the basis of history, rigid nasal endoscopy and computed tomography (CT) scan. The most frequent symptom was headache; no instances of 'pathognomonic' headache were found.

Sphenoidotomy was performed through the area of the natural ostium. The pathological finding was infection in 11 patients, cyst in four patients, polyps in three patients, mucocoele in two, and inverted papilloma in one patient.

Surgical results were very good. Endoscopic sphenoidotomy proved to be safe, with minimal blood loss, reduced operating time, decreased morbidity, and short post-operative hospitalization.

Key words: Sphenoid sinus; Endoscopy

Introduction

For many years the sphenoid sinus has been the most neglected of the paranasal sinuses (Levine, 1978), because it is the least accessible to the surgeon, being located deep within the skull, in the sphenoid bone. However, the development of the rigid nasal endoscope and the introduction of functional endoscopic intranasal sinus surgery by Messerklinger (1978) and Stammberger (1986a and 1986b) have changed the surgical approach to the sphenoid sinus (Stankiewicz, 1989). Wigand (1981) described an endonasal endoscopic approach that involved as a first step removing a portion of the middle turbinate to expose the ethmoid sphenoid complex. The approach to the sinuses described by Kennedy (1985) and Stammberger (1986a and 1986b) leaves the middle turbinate undisturbed because visualization of the operative field is usually excellent with an endoscope and the intact middle turbinate protects the cribriform plate from inadvertent injury by manipulation of instruments in this area.

Isolated sphenoid sinus disease is uncommon (Kron and Johnson, 1983; Wyllie *et al.*, 1983; Ghorayeb, 1987), and symptoms are generally nonspecific. However, with the increasing use of routine CT in otolaryngology, ophthalmology and neurology, it is being reported today with greater frequency (Rothfield *et al.*, 1991; Gilain *et al.*, 1994).

The purpose of the present study was to evaluate the clinical signs, diagnostic procedures and surgical

approaches in 21 patients with isolated sphenoid sinus disease treated at the Nose and Sinus Unit, Department of Otolaryngology, Beilinson Medical Center, Israel.

Materials and methods

Patients

The Nose and Sinus Unit, Beilinson Medical Center, is the centre for nose and sinus diseases in the country which has a population of five million. Patients with special sinus problems (including sphenoid diseases) are referred to our unit from other centres. During the years 1992 to 1994, 1820 endoscopic sinus operations were performed in our unit, out of which the clinical records of 21 patients with isolated sphenoid sinus disease who were diagnosed and treated by endoscopic intranasal sphenoidotomy were reviewed. Diagnosis was made on the basis of history, nasal endoscopic examination, and CT scan.

The study included 21 patients, 12 women and nine men; ages ranging from 16 to 76 years (mean, 41 years), suffering from headache, cough, postnasal drip and epistaxis. Thirteen patients were referred by an otolaryngologist, seven patients complaining of headache by a neurologist, and one patient with headache referred by an ophthalmologist (Table I). The follow-up period ranged from four months to three years.

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TABLE I
SYMPTOMS AND PATHOLOGY*

Diagnosed by:	Symptoms				Pathology				
	Headache	PND	Cough	Epistaxis	Polyps	Cyst	Infection	Mucocoele	Inverted Papilloma
Otolaryngologist	9	3	7	1		1	9	2	1
Neurologist	7				3	3	1		
Ophthalmologist	1						1		
Total	17	3	7	1	3	4	11	2	1

PND = postnatal drip

*According to referring physician

Symptoms included one or more of the following: headache (retro-orbital, parietal, occipital, or frontal); postnasal drip; cough and epistaxis. Headache was the most frequent complaint (17 patients) (Figure 1, Table I).

Pre-operatively, examination to identify pathological findings in the sphenothmoidal recess was performed with a rigid, 0- and 30-degree, 4-mm Storz nasal endoscope. Before examination, lidocaine four per cent and adrenaline 1:100 000 were topically applied to the nasal cavity. No abnormalities were noted in 16 patients. Purulent discharge was identified in the sphenothmoidal recess in four patients and polyp in one. In cases of purulent discharge, bacteriological examination was performed and antibiotic treatment administered according to the bacterial sensitivity. Most patients were treated empirically by antibiotics before they were referred to us. CT scans of the paranasal sinuses in the coronal plane were available for all patients. The scan included window settings to demonstrate both bone and soft tissue. In all patients CT confirmed the presence of isolated sphenoid sinus diseases (Figure 2). One patient had bilateral sphenoid disease. One patient had presented with opacification and bone erosion suggesting mucocoele formation.

Surgical methods

The procedure was performed under local anaesthesia in all patients. Cotton saturated with lidocaine four per cent and adrenaline 1:100 000 was applied to the nasal cavity for 10 minutes. Afterwards under a 0-degree, 4-mm rigid nasal endoscope, the middle concha, septum and lateral nasal wall were infiltrated with lidocaine two per cent and adrenaline 1:100 000. The middle concha was pushed towards the lateral wall, and the sphenothmoidal recess was visualized. When the posterior part of the middle or superior concha hid the sphenothmoidal recess, the posterior inferior part of this concha was removed very carefully to prevent bleeding from the sphenopalatine artery. The sinus was entered at the area near the natural ostium close to the septum, and the opening enlarged inferiorly and laterally. Polyps, when present, were removed, and a biopsy specimen was taken when indicated. Antibiotics were given post-operatively only when purulent discharge was seen during the operation. The average operative time was one hour; blood loss was approximately 20 ml.

Results

The average post-operative hospitalisation time was two days. No major post-operative complications

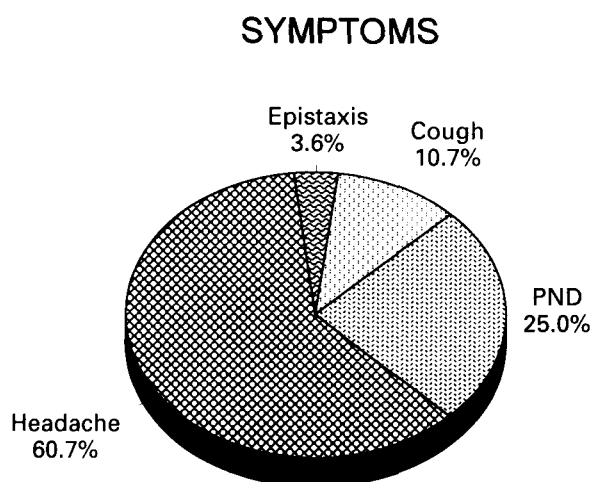


FIG. 1

Symptoms of 21 patients with isolated sphenoid sinus disease. PND = postnasal drip.

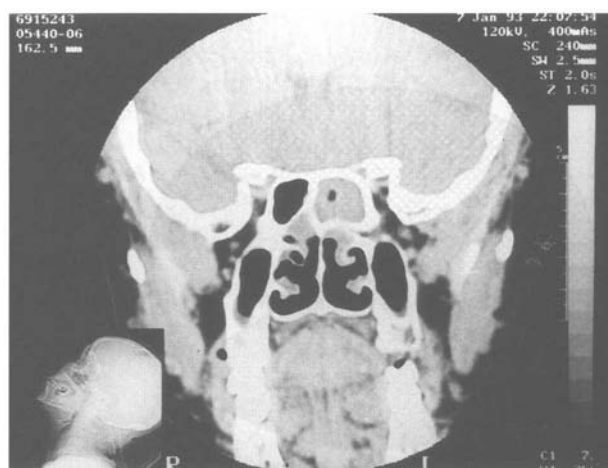


FIG. 2

CT scan showing opacification in the left sphenoid sinus.

SPHENOID SINUS PATHOLOGY

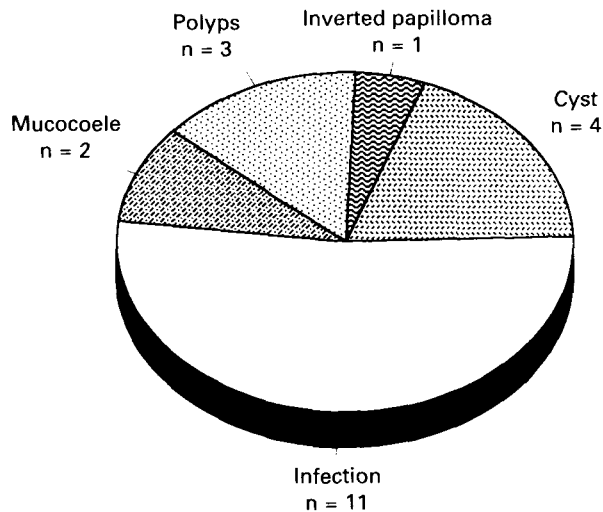


FIG. 3

Pathological findings in 21 isolated sphenoid sinus disease patients.

were noted. In one patient bleeding started three hours after surgery and was controlled by anterior tamponade. Occipital headache in two patients was relieved by analgesics and disappeared after 10 days. Two patients were readmitted four and five days post-operatively because of fever and headache which were treated with intravenous antibiotics according to bacterial isolation and sensitivity.

The pathologic examination revealed infection in 11 patients, simple cysts in four patients, polyps in three patients, mucocoele in two patients and inverted papilloma in one patient (Figure 3). In nine patients (41 per cent) bacterial culture was positive; *Staphylococcus aureus* was isolated in four patients, *Klebsiella* sp. in two and *Pseudomonas aeruginosa*, *Pneumococcus* and *Citrobacter diversus* in one patient each (Figure 4). Symptoms disappeared in all patients except one with headache in

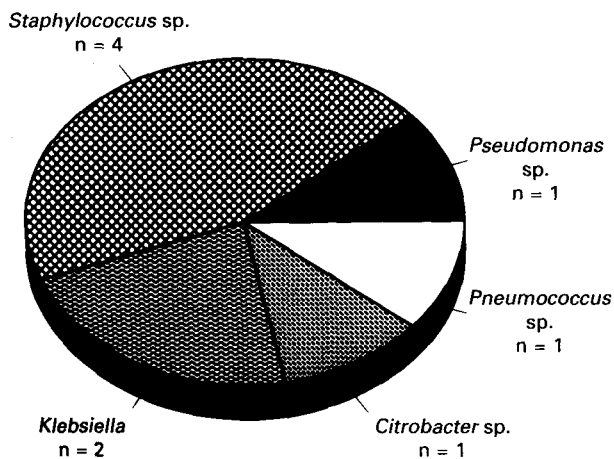


FIG. 4

Bacteriological findings in infected sphenoid sinus.

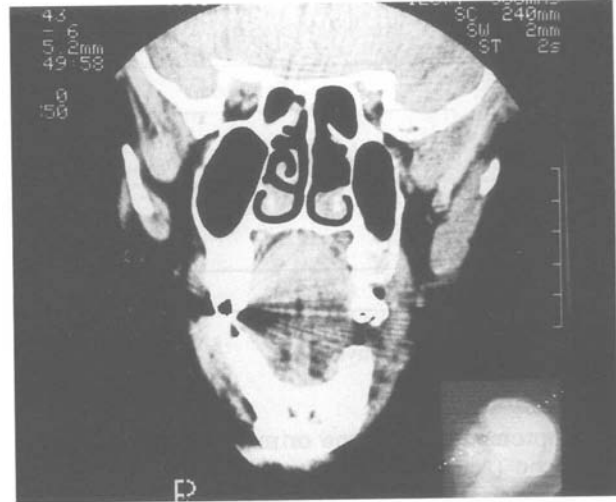


FIG. 5

CT scan of the same patient in Figure 2 showing the post-operative wide opening of the left sphenoid sinus

whom no pathological sinus findings were noted on endoscopic examination or post-operative CT. One patient underwent re-operation because of obstruction of the opening to the sphenoid sinus. Post-operative CT of the same patient in Figure 2, showed a wide opening in the healed sphenoid sinus (Figure 5).

Discussion

Isolated sphenoid disease is rare. In 1983, Wyllie *et al.* reviewed the Mayo Clinic records and identified only 45 affected patients over a 37-year period. Until recently, series of not more than six patients were reported (Kron and Johnson, 1983; Ghorayeb, 1987). In the last decade, however, the incidence of isolated sphenoid disease has apparently increased. In 1991 Rothfield *et al.* found 13 patients in five years; in 1994 Gilain *et al.* found 12 patients in five years, and in the present study we describe 21 cases of isolated sphenoid disease treated in our department over three years. This change is most probably because of improved diagnosis a result of the routine use of CT scanning in otolaryngology, ophthalmology and neurology (Rothfield *et al.*, 1991).

No pathognomonic signs or symptoms were demonstrated amongst the patients in this study. Symptoms included headache (retrobulbar, parietal, occipital and frontal), postnasal drip, cough and epistaxis. This finding agrees with the reports of Rothfield *et al.* (1991) and Gilain *et al.* (1994), but not with Levine (1978), who described a typical 'pathognomonic' headache.

The pathological diagnosis of isolated sphenoid sinus disease has also changed in recent years. In the past, most of the patients had tumours (Rothfield *et al.*, 1991) whereas in our report, none of the 21 patients had neoplasia. Most had bacterial infections, as demonstrated on culture of the sinus discharge. *Staphylococcus aureus*, was found in four out of nine patients with positive culture in the present work.

Staphylococcus aureus was also found to be the predominant organism in positive cultures of sphenoid sinusitis in the literature (Kron and Johnson, 1983; Hnatuk *et al.*, 1994). Kron and Johnson (1983) found that staphylococci were the most prevalent organisms accounting for seven out of 11 positive cultures.

On the basis of this finding, we recommend that patients with suspected bacterial sphenoiditis be treated with an agent effective against *Staphylococcus* spp. although physicians should be aware that Gram-negative bacteria can be the causative factor as well.

For many years surgical access to the sphenoid sinus was problematic. The most popular approach was through the sublabial transeptal; other routes were the transethmoidal and transpalatal. The disadvantages of all of these were septal perforation, post-operative incisor anaesthesia, scarring and prolonged hospitalisation.

The development of the rigid nasal endoscope improved the treatment of sinus disease, and made the approach to the sphenoid sinus safer (Wigand, 1981). Endoscopic sphenoidotomy has been proven effective for diagnosis and treatment of most sphenoid disorders. It can be performed under local anaesthesia, with a minimum of patient discomfort, or under general anaesthesia. The approach to the sphenoid sinus in cases of isolated sphenoid disease is through the area of the natural ostium.

None of our patients had septal perforation or other complications. Only one underwent re-operation because of obstruction of the opening to the sphenoid sinus.

In conclusion, endoscopic sphenoidotomy is an effective and safe direct surgical technique for isolated sphenoid disease. It is associated with minimal blood loss, reduced operating time, decreased morbidity and short post-operative hospi-

talisation (average two days). Surgical results are very good.

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