

EVALUATION AND SURGICAL MANAGEMENT OF ISOLATED SPHENOID SINUS DISEASE

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Abstract:

Sphenoid sinus pathology is an uncommon entity. In the past, the diagnosis was often difficult with conventional techniques. With the increasing use of routine computed tomography and nasal endoscopy in Otorhinolaryngology, the diagnosis will be established in most of cases. At the Department of Otorhinolaryngology-Head and Neck Surgery of Erasme Hospital, Brussels, Belgium, in a 8 years period there were 12 of isolated sphenoid sinus diseases that were been operated. The headache is the common symptom (75%), other symptoms (visual changes, cranial nerve palsies and nasal symptoms) are not usually. Surgical methods included 8 of sphenoidotomy (66,7%) and 4 of sphenoidectomy (33,3%). The approach to the sphenoid sinus in cases of isolated sphenoid sinus disease can through the area of natural ostium. There was no complication in our series. Surgical results are very good.

1. INTRODUCTION

Before the period of computed tomography was available, sphenoid sinus pathology has been the most neglected of the paranasal sinus, a missed or delayed diagnosis of isolated sphenoid sinus disease often resulted in serious complication or death. Isolated sphenoid sinus disease is a relatively uncommon disease. It may be very insidious and present with nonspecific symptoms. According to Gregory N et al, it is seen in less than 3% [7] or Wang ZM et al: 1% to 2,7% [19] of all cases of sinusitis.

Isolated sphenoid sinus disease is often very difficult to diagnose and to treat with conventional techniques [12], [16]. The history and clinical examination contribute little to establishing the correct diagnosis. In the recent time, the diagnosis is often made on the base of nasal endoscopy, computed tomography (CT). In the difficult case, magnetic resonance imaging (MRI) can be used [14], [15], [20].

The symptoms are generally non-specific.

The most common presenting symptom was headache (75%) [11], (69%) [13] and (82%) [17], followed in decreasing order by visual changes, cranial nerve palsies and nasal symptoms [4]. Isolated sphenoid sinus disease can create many serious complications [1], [2], [7], among them are invasion of the surrounding brain and orbital structures.

In the presence, with the increasing use of routine computed tomography and nasal endoscopy in Otorhinolaryngology, it is being reported with greater frequency: Dixon HS [3], Hadar T et al [8], Rothfield Re et al [16]. The recent advances in functional endoscopic sphenoid sinus surgery has allowed for relatively safe and immediated treatment of isolated sphenoid sinus disease with minimal blood loss, reduced operating time and short post-operative hospitalisation [19], [21].

There were 12 patients of isolated sphenoid sinus diseases that were been treated in a eight years period at Department of

Otorhinolaryngology-Head and Neck Surgery of Erasme Hospital, Brussels, Belgium. The purpose of this study is evaluation and surgical management of isolated sphenoid sinus disease.

2. PATIENTS AND METHODS

2.1. PATIENTS:

-All patients with isolated sphenoid sinus diseases which operated at Department of Otorhinolaryngology-Head and Neck Surgery at Erasme Hospital, Brussels, Belgium.

- Date: During 8 years, from 1/1/1995 to 31/12/2002

- In all cases, the diagnosis of isolated sphenoid sinus diseases was made on the base of signs and clinical symptoms, nasal endoscopic examination and computed tomography (CT Scan) of the paranasal sinuses.

- Study include twelve patients, eight patients were female and four male with ages ranging from 18 to 84 years (mean 51,25 years).

2.2. METHODS:

- Retrospective review to study the evaluation and surgical management of isolated sphenoid sinus diseases.

- The medical records were reviewed for symptoms, radiographic and endoscopic data preoperatively, pathological findings and bacteriological findings.

- The clinical symptoms: + Headache - Nasal drip - Epistaxis

+ Nasal obstruction - Visual symptoms

+ Anosmia - Cough - Fever

+ Neuro symptoms: cranial nerve palsies

- The pathological finding:

+ Sinusitis - Polype - Cyst

+ Tumor - Mucocoele -Papilloma

-The bacteriological finding: +Bacteriology, Aspergillus, Others.

- The follow-up period ranges from 4 months to 48 months.

- Comparison with other authors in the number of patients, date, where, symptom, pathological finding and other problems.

- Surgical methods: Sphenoidotomy or Sphenoidectomy

- Operative protocol:

The procedure was performed under general anaesthesia in all patients. Cotton saturated with cocaine four per cent and adrenaline 1:100 000 was applied To the nasal cavity for ten minutes. Afterwards, under rigid nasal endoscope, 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. Lesions were removed and taken anatopathology. The average operative time was one hour (11 cases and 1 case of two hours), blood loss was little.

- All twelve patients were submitted to functional endoscopic sinus surgery (FESS) and have been followed-up with no signs of recurrence until the present moment.

3. RESULTS

During 8 years, from 1995 to 2002, at Department of Otorhinolaryngology-Head and Neck Surgery of Erasme Hospital of Brussels, Belgium, we had twelve of patients that had been operated by endoscopic sphenoid sinus surgery. Included 8 patients of sphenoidotomy (there was a patient operated bilateral) and 4 patients of sphenoidectomy.

Table 1: The number of patients every years

| | 1996 | 1997 | 1998 | 1995 | 1999 | 2000 | 2001 | 2002 | Total |
|---------|------|------|------|------|------|------|------|------|-------|
| Patient | 0 | 2 | 1 | 2 | 0 | 1 | 2 | 4 | 12 |

There was no complication in our series

The follow-up is 4 months to 48 months.

The clinical symptoms are:

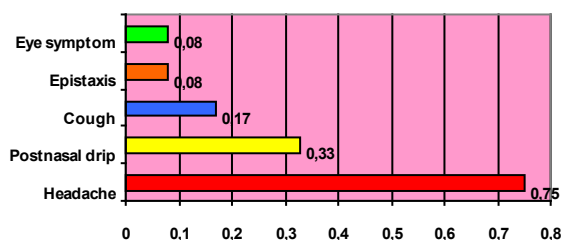


Fig1: Clinical symptoms

- Headache: headache was the most symptom presenting in 9 of 12 patients (75%). The sites of headache were: all the headache 5/9 (55,5%), vertex 2/9 (22,2%), retro-orbital 1/9 (11,1%) and frontal 1/9 (11,1%). After operation, their headaches disappeared in 6 of 9 patients (75%). There were 3 patients still headache after operation. A patient with sphenoidectomy was still headache after 5 months, nasal-endoscopy and CT scan of the sphenoid sinus are normal. Two patients with sphenoidotomy, headaches were still but a little in comparison of pre-operation, nasal-endoscopies and CT scans of the sphenoid sinuses are also normal.

- Postnasal drip: in 4/12 patients (33,3%)
- Cough: in 2/12 patients (16,7%)
- Epistaxis: in 1/12 patients (8,3%)
- Visual symptom: visual disturbances improved in 1/12 patients (8,3%). It occurred in the form edema palpebral, exophthalmic and trouble of ocular mobile
- Nasal obstruction: was the presenting symptom in 4/12 patients (33,3%)
- Fever: in 1/12 patients (8,3%)
- Anosmia: in 1/12 patients (8,3%)

Nasal endoscopy contributed significantly to the diagnosis of sphenoid pathology. Nasal endoscopic examinations were performed in all patients, included polyp in the sphenoid recess (SER) in 1 patients (8,3%), edema in the SER in 3 patients (25%), mucopus in 3 patients (25%), normal of SER in 5 patients (41,7%).

Computed tomography: all patients were investigated with coronal and axial CT scans of the paranasal sinuses. There were total or partial filling of mucous of sphenoid sinus.

Pathological findings:

Bacteriological findings: In our series, there were 5 pieces that had been done bacteriological findings, the results were: 3 pieces with Staphylococcus coagulase (-) + Propionibacterium acnes, 1 piece with Staphylococcus aureus and 1 piece with Stenotrophomonas maltophilia.

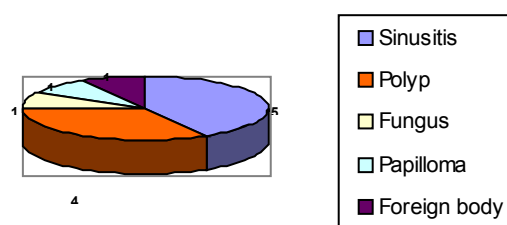


Fig 2: Pathological findings

4. DISCUSSION

Isolated sphenoid sinus disease is uncommon because sphenoid sinus is the least access to the chirurgien, being located deep within the skull, in the sphenoid bone. Any of the structures near the sinus can be compromised by pathologic processes involving the sinus. A knowledge of the relationship of the sphenoid sinus with adjacent structures is critical to understanding the various clinical symptoms and complications of sphenoid sinusitis. There are a number of structures intimately involved with the sphenoid sinus. These are cranial nerves II through VI, internal carotid artery, cavernous sinus, pituitary gland, sphenopalatine artery, nerve and ganglion and dura.

Isolated sphenoid sinus disease is frequently misdiagnosed on initial evaluation and not considered in differential diagnosis of patients with headache or visual changes.

As Proetz stated 40 years ago: “The sphenoid sinus is somewhat in the position of a man whose name begins with ‘Z’. They are always at the bottom of the list” [7].

However, with the increasing use of routine computed tomography in otorhinolaryngology and the development of the rigid nasal endoscope the diagnosis of isolated sphenoid sinus disease can be established early. The introduction of functional endoscopic intranasal sinus surgery by Messerklinger (1978) and Strammberger (1986) have changed the surgical approach to the sphenoid sinus.

In our series, in 8 years we had only 12 cases of isolated sphenoid sinus diseases. All were evaluated by computed tomography and had been operated by methods of sphenoidotomy or sphenoidectomy. Comparison with other authors in table 2:

Table 2: Isolated sphenoid sinus diseases of different authors

| Authors | Patients | Date | Where |
|--------------|----------|----------|------------------|
| HADAR T | 38 | 06 years | ISRAEL |
| KIEFF DA | 20 | | BOSTON, USA |
| LAWSON | 132 | 22 years | NEWYORK, USA |
| MARTIN TJ | 29 | 11 years | MILWAUKEE |
| ROTHFIELD RE | 13 | 05 years | PENNSYLVANIA |
| RUOPPI P | 39 | 10 years | FINLAND |
| SETHI DS | 21 | 04years | SINGAPORE |
| STOLL D | 23 | 08 years | BORDEAUX, FRANCE |
| WANG ZM | 122 | | SHANGHAI, CHINA |
| PHANVANDUNG | 12 | 08 years | ERASME, BRUSSELS |

The most frequent symptom of isolated sphenoid sinus disease was headache. Most of patients in our series had often headache (75%). It can locate at vertex, retro-orbital, parietal, occipital or frontal. In my series, headache was typical all of headache (according to Sethi [18]: retro-orbital). The different symptoms as postnasal drip, cough, epistaxis, eyes symptoms and cranial

nerves palsies were not usually. According to Kieff DA, Busaha N [11], in 20 patients studied, there were 15 patients of headache (75%), 14 patients of postnasal drip (70%), 03 patients of asymptomatic (15%). This finding agrees with the research Polak M et al [15], Rothfield Re et al [16], Wang ZM et al [19] and Zhang X et al [21]. That was denoted in table 3:

Table 3: Headache rates of authors

| Authors | Headache/Patients | % |
|----------------|-------------------|-----|
| HADAR T [8] | 29/38 | 76% |
| KIEFF DA [11] | 15/20 | 75% |
| MARTIN TJ [13] | 20/29 | 69% |
| RUOPPI P [17] | 32/39 | 82% |
| PHANVANDUNG | 9/12 | 75% |

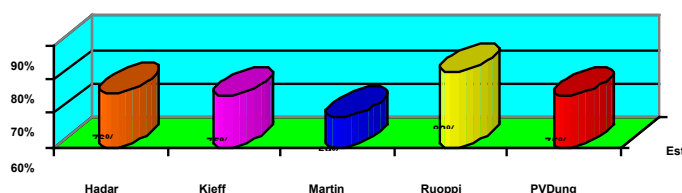


Fig 3: Comparison of headache

In the past, there were three approaches to the sphenoid sinus: transethmoidal, transeptal and transpalatal [5]. The disadvantages of all of these were septal perforation, post-operative incisor anaesthesia, scarring and prolonged hospitalization or other complications.

In the recent period, the development of the rigid nasal endoscope improved the treatment of sphenoid sinus disease. The approach to the sinus described by Kennedy (1985) and Strammberger (1986) leaves the middle turbinate undisturbed because visualisation 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 instrument in this area. The recent advances in endoscopic sphenoid surgery has allowed for relatively safe and immediate treatment of isolated sphenoid sinus disease, preventing late extension into adjacent vital structures, which is commonly fatal. Endoscopic sphenoid surgery also enables the surgeon to make a precise pathological diagnosis.

Endoscopic sphenoidotomy or sphenoidectomy has been proven effective for diagnosis and treatment of most sphenoid disorders [6].

In our series, 8 patients with sphenoidotomy (66,7%) and 4 patients with sphenoidectomy

(33,3%). The approach to the sphenoid sinus in cases of isolated sphenoid sinus disease was through the area of the natural ostium (see at operative protocol) and there were no operative complications in the series. The follow-up period ranged from 4 to 48 months.

The pathological diagnosis of isolated

sphenoid sinus disease has also changed in recent years. In the past, most of patients had tumours (Rothfield Re et al 1991: 13 patients) [16]. Today, the most is infections [8], [12]. In our series, there were 5/12 with sinusitis (41,7%). The results of pathological findings were denoted in table 4:

Table 4: Results of pathological findings

| Authors | N | sinusitis | polyp | cyst | tumor | mucocoele | Papilloma | Others |
|---------------------|-----|-----------|-------|------|-------|-----------|-----------|--------|
| HADAR T [8] 2002 | 38 | 22 (57%) | 4 | 5 | 1 | 3 | 1 | 2 |
| KIEFF DA [11] 2002 | 20 | 15 (75%) | | | | 03 | | 2 |
| LAWSON [12] 1997 | 132 | 80 (61%) | | | 39 | | | 13 |
| MARTIN TJ [13] 2002 | 29 | 11 (38%) | | | 07 | 05 | | 6 |
| SETHI DS [18] 1999 | 21 | 08 (38%) | 03 | 01 | 02 | 04 | 02 | 1 |
| WANG ZM [19] 2002 | 122 | 31 (25%) | 01 | 47 | 08 | | 04 | 31 |
| PHANVANDUNG-2002 | 12 | 05 (42%) | 04 | 00 | 00 | 00 | 01 | 2 |

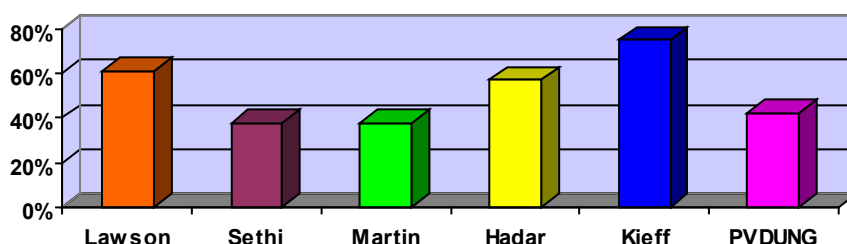


Fig 4: Sinusitis rates of authors

In our series, there were 5 pieces that had been done bacteriological findings, the results were: 3 pieces with Staphylococcus coagulase (-) + Propionibacterium acnes, 1 piece with Staphylococcus aureus and 1 piece with Stenotrophomonas maltophilia. My result is different with Brook's results (Department of Pediatrics, Georgetown University School of Medicine, Washington, DC, USA, Nov-2002): in 7 chronic infected sphenoid sinuses, the aerobic bacteria were found were Klebsiella pneumonia, Escherichia coli and Pseudomonas aeruginosa, anaerobic bacteria included Peptostreptococcus, Prevotella and Fusobacterium.

5. CONCLUSION

Isolated sphenoid sinusitis is a rare disease

(12 cases in 8 years). The diagnosis was made on the base of computered tomography and nasal endoscopy. The history and clinical examination contribute little to establishing the correct diagnosis. Headache is the most common symptom (75%).

The approach to the sphenoid sinus in cases of isolated sphenoid sinus disease can through the area of the natural ostium. Endoscopic sphenoidotomy and sphenoidectomy are the effective and safe direct surgical techniques for isolated sphenoid sinus diseases. They are associated with minimal blood loss, reduced operating time and short post-operative hospitalisation. There were no operative complications in the series. Surgery results are very good.

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