FUNCTIONAL ENDOSCOPIC SINUS SURGERY- A NEWER SURGICAL CONCEPT IN THE MANAGEMENT OF CHRONIC SINUSITIS

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ABSTRACT : *Two hundred and ten patients suffering from chronic hyperplastic rhinosinusitis refractory to medical treatment were subjected to Functional Endoscopic Sinus Surgery using the classical Messerklinger technique(MT FESS). Of these, 147 (70%) had complete relief of symptoms, 39 (18.5%) had partial relief of symptoms and 15(7.17%) had no/poor relief of symptoms in the follow-up period varying from 6-33 months (Mean 18.3 months). Nine (4.2%) patients were lost to follow-up. The merits and demerits of Functional Endoscopic Sinus Surgery are discussed.*

INTRODUCTION

Functional Endoscopic Sinus Surgery (FESS) has now become a standard treatment for chronic hyperplastic rhinosinusitis. Although some of the ideas have been present since the turn of the century, yet the surgical technique per se was developed only about a decade and half back in Europe and later on popularized in United States. The technological advances made with the development of small fibreoptic endoscopes and computerized tomography (CT) scanning of the paranasal sinuses have now allowed a more direct and accurate study of sinus diseases than in the past. Work by Messerklinger[1] and others [2-4] led to the following concept of inflammatory sinus disease:

1. Most infection of the paranasal sinuses is rhinogenic in origin. Infection spreads from the ethmoid sinuses to infect the larger maxillary and frontal sinuses secondarily.

2. Obstruction of the major drainage pathways located in the osteomeatal complex is the root cause for chronic sinusitis, non-resolving acute sinusitis or chronic recurrent sinusitis. The osteomeatal complex consists of the drainage pathways for the frontal sinus, anterior ethmoid sinus and maxillary sinus. Since this area is very narrow and obstruction will interfere with the drainage and ventilation mechanism, and cause involvement of the larger sinuses.

3. Previously it was thought that chronic sinus disease produced irreversible changes in the paranasal sinus mucosa. But it is now demonstrated that by opening the stenotic ostia and re-establishing the ventilation of the sinuses, the so-called irreversible mucosal changes revert back to normal without ever touching them.

Based on these principles coupled with the technological development of endoscopes, functional endoscopic sinus surgery revolutionized the management of chronic inflammatory sinus diseases. In this paper we present our experience with 210 patients of chronic hyperplastic rhinosinusitis treated by functional endoscopic sinus surgery.

MATERIAL AND METHODS

Between May 1993 and December 1995, a total of 210 patients of chronic hyperplastic sinusitis were investigated and subjected to functional endoscopic sinus surgery(FESS). All the patients after a detailed history and thorough clinical examination were subjected to a standard protocol of investigation, which included complete haemogram, X-ray PNS and computerized tomography (wherever required). A diagnostic nasal endoscopy was performed on all these patients under local anaesthesia. After history and investigations, all the patients were operated under local anaesthesia by the classical Messerklinger's technique FESS.

A meticulous follow-up was done to evaluate the results with regard to relief of symptoms. The response to treatment was graded as under:

- Complete Relief : 90% -100% betterment
- Partial Relief : 50% -90% betterment
- Poor : <50% betterment

OBSERVATIONS

Out of the 210 patients, 122 were males and 88 were females. The age of the patients varied from 7-66 years with majority of the age group of 31-40 (0-10, n=6, 11-20; n=42; 21-30, n=48 ; 41-50, n=30 ; 51-60; n=15 and p61-70;

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n=3). The commonest symptoms were nasal discharge (147) and obstruction (183). The other symptoms were Post nasal drip (86), Sneezing(48), Crusting(15), Hyposomia/anosmia (7) and Eustachian tube block(9). The duration of symptoms varied from 6 months –25 years (6 months-2 years: n=66, 2-5 years ; n=39, 5-10 years ; n=48, 10-15 years ; n =39 and 15-25 years : n=18). All the patients included in the study had taken some form of medication without any relief of symptoms and 39 patients had undergone previous surgical procedures without any satisfactory relief of symptoms. Table-1 shows the detailed clinical finding revealed by anterior rhinoscopy.

Table –1

Ethmoidal Polyp	::	27
Antrochoanal Polyp	::	39
Nasal Discharge	::	75
Hypertrophied Inferior Turbinate	::	21
Hypertrophied Middle Turbinate	::	36
Congested Mucus Membrane	::	12
Frontal Sinus Tenderness	::	9
Maxillary Sinus Tenderness	::	6
Ethmoidal Scarring	::	9

Plain X-rays of the paranasal sinuses were done in all the cases to look for abnormality and the detailed findings are depicted in Fig - 1. A diagnostic nasal endoscopy was carried out in all the cases to assess the extent of the disease and only those cases where the exact extent could not be assessed were subjected to computerized tomography. The computerized tomographic findings in 120 patients revealed the involvement of anterior ethmoid in all the cases. The other findings included involvement of posterior ethmoids in 27 cases, maxillary sinus in 102 cases, frontal sinus in 36 cases and sphenoid sinus in 8 cases, besides the involvement of anterior ethmoid sinus. Functional endoscopic sinus surgery was performed unilaterally in 93 patients and bilaterally in 117 patients (Table –2).

The endoscopic surgery findings are depicted in Fig.2.

Except for injury to lamina papyracae in two patients, we did not encounter any major orbital or intracranial complication. However there were minor complications like bleeding in 12 patients which was controlled by anterior nasal packing and 18 patients had postoperative synechia between the middle turbinate and lateral wall of the nose. This was treated by excision. Meatal/ antrostomy closure was seen in six patients.

All the patients were meticulously followed up for relief of symptoms and the follow-up period varied from 9-33 months

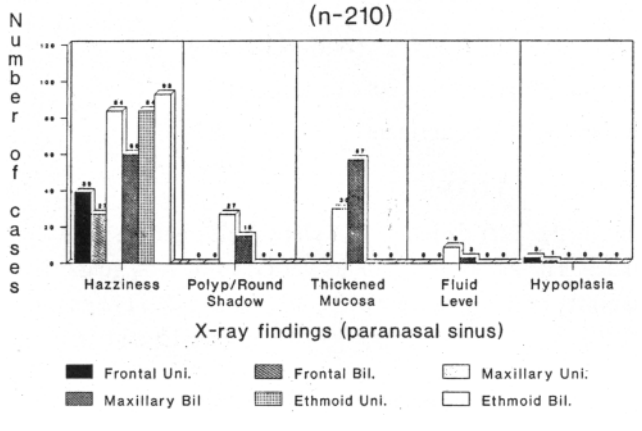

Figure-1

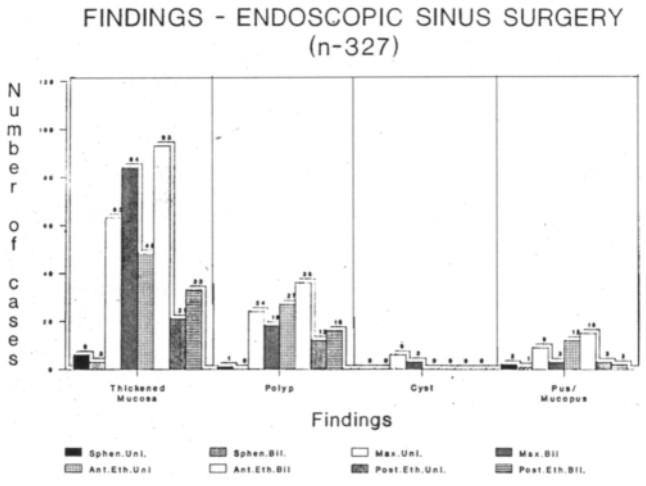

Figure-2

Table – 2

Endoscopic Sinus Surgical Procedures Performed (n = 327)		
¨ Uncinectomy + Middle Meatal Antrostomy (MMA)	::	72
¨ Anterior Ethmoidectomy + MMA	::	84
¨ Total Ethmoidectomy + MMA	::	36
¨ Polypectomy + Uncinectomy + MMA	::	24
¨ Polypectomy + Anterior Ethmoidectomy + MMA	::	57
¨ Polypectomy + Total Ethmoidectomy + MMA	::	36
¨ Polypectomy + Total Ethmoidectomy + Sphenoidotomy + MMA	::	12
¨ Total Ethmoidectomy + Sphenoidotomy + Sphenoidectomy + MMA	::	3

with the majority of cases being followed up for more than one year, (0-6 ; n=17, 7-12 : n=39, 13-18 : n=63, 19-24 : n=66 and 25-30 : n=27 and >30 : n=3). The mean follow-up was 18.3 months.

Out of the 210 patients, 147 (70%) had complete relief of symptoms, 39 (16.5%) had partial relief, 15(7.1%) had poor/ no relief. Nine (4.2%) were lost to follow-up. Of the 39 patients who had fair or good response, 14 showed recurrence of polyps during the routine follow-up which were removed at the same sitting in the OPD, though these patients never complained of any symptoms.

DISCUSSION

Chronic sinusitis is one of the most common diseases seen in the otolaryngological practice. Till a decade and a half back, nasal obstruction has been implicated as a contributing factor for persistent and/recurrent sinus infections and the principle of surgery was to remove the obstructions and diseased mucosa radically and create a large opening near the maxillary sinus floor i.e. intranasal inferior meatal antrostomy to facilitate free drainage. The popular operation performed was septal surgical correction with and without Caldwell-Lucas operation/ intranasal antrostomy. But these procedures rarely produced desired long term cure with the result that the patient of inflammatory sinus disease always felt that there is no cure to their problem. Messerklinger[1] and later on other workers[2,3,4] have shown convincingly that the keystone to the pathogenesis and persistence of chronic maxillary and frontal sinuses infection is the osteomeatal complex and the focal point is the anterior ethmoidal air cells.

It has been convincingly shown by both experimental and fluoroscopic studies that the mucociliary movement of the paranasal sinuses follows a definite pathway and is always towards the natural ostium of the sinus[2-4]. The opening of the larger sinuses namely the maxillary and frontal in the middle meatus are surrounded by ethmoidal recess and the ethmoidal infundibulum. This anatomical arrangement makes the maxillary and frontal sinus prone to persistent infection due to obstruction of their ostia in the middle meatus as a result of disease in the anterior ethmoidal complex.

Several factors responsible for making the anterior ethmoids more prone to disease are :

1. The mucosa of the cleft and fissures in the anterior ethmoid complex are very close to each other. In the healthy state, the mucociliary beat from opposing mucosal surfaces transmit the mucus. However, if there is inflammation, then these mucosal surfaces come in contact with each other resulting in defective drainage, stasis, oedema and blockage of the ostia of the larger sinus.

2. The anterior end of the middle turbinate is prone to oedema and hypertrophy as it bears the brunt of the air current and thereby the various pollutants that one is exposed to everyday.

3. Certain anatomical factors described by Messerklinger like paradoxical middle turbinate, conchabullosa, enlarged bulla ethmoidalis and laterally bent uncinate process also play a role in the blockage of osteomeatal complex thereby leading to infection in these areas.

Functional endoscopic sinus surgery aims at clearing the disease from the anterior ethmoidal complex and re-establish ventilation and drainage of the dependent maxillary and

frontal sinuses through their natural ostia without touching these sinuses. The principle of FESS is to remove only the diseased mucosa leaving the normal mucosa and structures untouched.

Complete relief of symptoms was seen in 147 patients (70%) and partial response was seen in 39 (18.5%) patients, which is consistent with those of other studies[5-9].

There are various advantages seen with FESS.

1. Endoscopes, due to improved illumination and depth of field perception are a great diagnostic tool by which one can accurately diagnose various pathologies leading to recurrent sinus infections.

2. Due to deflected angle of view, one can recognize and precisely and atraumatically remove disease from various clefts and recesses without the need for wide exposure and external approach.

3. The procedure is usually performed under local anaesthesia and does not require any nasal packing.

4. Hospitalization is minimal; hence it is economical.

However, functional endoscopic sinus surgery is not a " cure all" technique or 'cure all bullet' for each and every sinus pathology. It cannot be used in extensive and invasive fungal disease with bony erosion or intercranial extension. Any associated allergy has to be dealt with separately. Conventional surgical techniques still have their role, particularly in irreversible sinusitis with intracranial spread or bony wall erosion or a motile ciliary syndrome. FESS, however, is an important tool in the armamentarium of a rhinologist dealing with sinus diseases.

REFERENCES

1. Messerklinger, W. Endoscopy of the Nose, Baltimore Urban and Schwarzeberg, 1978.
2. Wigand, E.M. Endoscopic surgery of the paranasal sinuses and anterior skull base. New York Thieme Medical Publishers Inc. 1990.
3. Stammberger, H. Endoscopic Endonasal Surgery-Concepts in treatment of recurring rhinosinusitis Part I. Anatomic and pathophysiologic consideration. Otolaryngol. Head Neck Surg. 1986, 94 :143.
4. Kennedy, D.W., Zinreich S. J. Rosenbaum A.E. Johns, N.E. Functional Endoscopic Sinus Surgery : Theory and Diagnostic Evaluation. Arch. Otolaryngol 1985, 111 : 576-582.
5. Rice, D.H., Endoscopic Sinus Surgery. Results at 2 Year follow-up. Otolaryngol. Head Neck Surg. 1989, 101 : 476-479.
6. Schaefer, S.D., Manning S., Lanny G.C. Endoscopic Paranasal sinus Surgery : Indications and Considrations, Laryngoscope 1989, 99: 1-5.
7. Mathews, B.L., Smith, L.E., Jones, R., Miller, C., Brookschmid, J.K. Endoscopic Sinus Surgery : Out-come in 155 cases/ Otolaryngol. Head Neck Surg. 1991; 104: 244-246.
8. Levine, H.L. Functional Endoscopic Sinus Surgery Evaluation, Surgery Evaluation, Surgery and Follow-up of 250 patients. Laryngoscope, 1990, 100 : 79-84.
9. Rice D.H. Schaefer, S.D. Endoscopic Paranasal Sinus Surgery, New York, Raven Press 1988.