Research Article

Evaluation of role of functional endoscopic sinus surgery in patients of sinonasal diseases & nasal polyposis

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Abstract

Introduction: Functional Endoscopic Sinus Surgery has opened up a new horizon in the management of chronic sinonasal (allergic & non allergic) diseases & nasal polyposis. Functional Endoscopic sinus surgery (FESS) is now a days a common and excellent method for the treatment of most of the diseases in the area of nose and paranasal sinuses, like chronic rhinosinusitis with and without nasal polyposis. **Materials and Method:** In this study we have selected 80 patients of chronic sinonasal (allergic & non allergic) diseases & nasal polyposis attending the department of otorhinolaryngology. All the patients were pre-operatively evaluated clinically, radiologically as well as endoscopically. Diagnostic nasal endoscopy revealed various pathological abnormalities in the middle meatus and anterior ethmoid region. Even after complete pre-operative evaluation, initially patients were managed medically according to their symptoms and were observed for 6 weeks. All 80 patients underwent for functional endoscopic sinus surgery, using the Messerklinger's approach. **Result:** The overall result reveal that 85.49% patients considered themselves asymptomatic or improved following surgery. No major complication directly related to FESS occurred in this series. The important finding were, osteomeatal complex obstruction seen in 88.75%, polyp in nose in 46.25% of cases. Radiological evaluation done by coronal section (axial & sagital if needed) CT scanning revealed the maxillary sinus most common site of mucosal involvement 76.25%% followed by anterior ethmoid sinus in 53.75% cases. Frontal and sphenoid sinuses were involved in 26.25% and 15% cases respectively. **Conclusion:** FESS is highly effective in controlling symptoms of chronic sinonasal diseases with or without polyposis.

Keywords: Sinusitis, Antrochoanal Polyp, Ethmoidal Polyp, Maxillary Antrum, Functional Endoscopic Sinus Surgery (FESS).

Introduction

Chronic rhinosinusitis (CRS) affects approximately millions of individuals every year. It is characterized by inflammation of nose and paranasal sinuses, thus becoming one of the most common disorders of the upper airway. It can be classified according to Brazilian guidelines [1] on rhinosinusitis in acute (lasting 4 weeks), sub acute (duration between 4 and 12 weeks) and chronic (lasting longer than 12 weeks) [2]. Approximately 25% to 30% of patients suffering from CRS also manifest nasal polyposis. Various studies have shown that 80% of polyp arise from middle meatal mucosa, uncinate process and infundibulum[3,4]. Multiple factors including infection, allergy, trauma, chemicals, metabolic disease and psychogenic factor have all been implicated as possible etiology of nasal polyposis [5]. Functional endoscopic sinus surgery (FESS) has become an increasingly popular treatment for chronic sinus diseases. Advances in technology with the development of small fiberoptic endoscopes and computerized tomography (CT) scanning of the paransal sinuses have allowed a more direct and accurate study of sinus disease that was impossible previously [6]. It began since the early 1970 & last 35 years that it has achieved world wide popularity.

Messerklinger established and reiterated the importance of the sinus ventilation and pattern of mucocilliary

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clearance. He pioneered the study of endoscopic anatomy and pathophysiology of the paranasal sinuses, publishing his experience with ESS in 1978[2]. He also highlighted the role of the ostiomeatal complex (OMC) in the pathophysiology of rhinosinusitis and directed attention to it during surgery [7]. The term FESS was coined by Kennedy [8].

FESS confers the advantage of being minimally invasive and allows for sinus air cells and sinus ostia to be opened under direct visualization. The primary goal of FESS is to return the mucociliary drainage of the sinuses to normal function.

CT of the paranasal sinuses has become a roadmap for FESS. It has been imperative in the understanding of regional anatomical variation and has been integral in the guidance of surgical procedures. Improvement in both FESS techniques and CT technology has concurrently expanded the indications for sinus surgery [9]. The present study focuses on the assessment of the efficacy, safety and benefits of Functional endoscopic sinus surgery in cases of chronic rhinosinusitis, allergic and non allergic nasal polyposis in terms of morbidity, mortality and recurrence of disease.

Material & Methods

This prospective & retrospective study was conducted at MGM Medical College & M Y Hospital, Indore Madhya Pradesh, from august 2010 to September 2013. All the patients were pre-operatively evaluated clinically, radiologically as well as endoscopically. All 80 patients underwent for functional endoscopic sinus surgery.

Criteria for Patient Selection

The study included those patients who were clinically diagnosed as having chronic rhinosinusitis with or without nasal polyposis. To support a clinical diagnosis of chronic rhinosinusitis, in accordance with the American Academy of Otolaryngology and Head and Neck Surgery (AAO-HNS) criteria, at least two major or one major and two minor symptoms are required [9]. We excluded patients with recurrent polyp, and those who underwent re-operation.

American Academy of Otolaryngology and Head and Neck Surgery criteria for chronic rhinosinusitis [9]

Major criteria	**Minor criteria**
Purulence in nasal cavity	Headache
Facial pain, pressure, congestion, fullness	Fever (all nonacute)
Nasal obstruction. blockage, discharge, purulence	Halitosis
Fever (acute rhinosisinusitis only)	Fatigue
Hyposmia/anosmia	Dental pain
	Cough
	Ear pain and fullness

History: All the patients in the study group were subjected to detailed history of wide spectrum of presenting symptoms viz. facial pain, headache, nasal discharge (whether it was watery, mucoid, purulent or blood mixed), nasal obstruction (its duration, whether it is continuous or intermittent and whether it is associated with any external nasal deformity) and nasal mass . The presence of allergic symptoms such as itchy eye, watery eye, itchy nose, seasonal variation, asthma and aspirin sensitivity were noted.

Clinical Evaluation: All patients were subjected to thorough ENT examination with special emphasis on

anterior and posterior rhinoscopy & elicit sinus tenderness.

Nasal Endoscopy: Patients were further evaluated clinically by subjecting them to diagnostic nasal endoscopy using rigid endoscopes 0 and 30 degree angulations, to view the anatomical variation and polypoidal changes at osteomeatal complex area.

Radiological Assessment and CT Scan PNS (Coronal Section): X-ray of the parasnasal sinuses Water's view and sometimes lateral view including nasopharynx were done when clinically polyps extended in the nasaopharynx, for initial screening. CT PNS (coronal & axial) provides the surgeon with a Road Map and acts as a guide to the surgeon in planning the operative procedure and in assessing the prognosis and success of surgery.

Surgery

Preoperative Patients Counselling: The patients included in the present study were explained in details about alternative modes of treatment, nature of surgery, outcomes of surgery including benefits as well as possible complications of surgery. written informed consent was obtained from each patient prior to FESS. They were also detailed with the need for regular post operative follow up to monitor healing and avoid post operative complications.

Equipments:

Instruments specific for FESS

1. Sickle knife for uncinectomy
2. Weil Blakesely straight and up turned forceps, Lucs forceps, were used for resection of polypoidal diseased mucosa from nasal cavities and sinuses.
3. Reverse cutting Ostium forceps was used for widening of the maxillary sinus.
4. Straight and curved suction tips for suction. The curved suction tip was used to help identifying the natural maxillary ostium and for the removal of secretions or collections from antrum after enlargement of the ostium.

Operative Technique: After detailed nasal endoscopy and CT scan study, patients underwent Functional Endoscopic Sinus Surgery. The patient was placed in supine position with head elevated to 30 degree and slightly turned to right. The 'Messerklinger Technique' of FESS was followed in all the patients, this is an anterior to posterior approach. It was performed under General anaesthesia, the surgical procedure consist of septoplasty, polypectomy uncinectomy, anterior ethmoidectomy, middle meatal antrostomy, posterior ethmoidectomy, partial middle turbinectomy.

Result

The study group consisted of 80 patients with chronic sinonasal diseases & nasal polyposis, in which conservative management had failed. The patients who were symptomatic even after medical treatment were operated upon by FESS approach and Messerklinger (1978) technique was used in all cases, according to need and minimal surgery was done in order to preserve the normal physiology and anatomy of sinus as much as possible. In this study we found ranged from 7 to 65 years. All information about the cases was compiled and relevant data were analyzed and shown in tabulated form.

Table1: Common presenting complaints (n=80)

Symptoms	No of patients	Percentage
Nasal Discharge	77	96.25%
Nasal Obstruction	71	88.75%
Headache	36	45%
Sneezing	40	50%
Nasal Mass/Polyp	37	46.25%
Epistaxis	07	8.75%
EAR (Discharge/Heaviness)	13	16.25%
Post Nasal Drip	42	52.50%

In the present study the chief presenting symptoms were nasal discharge followed by nasal obstruction. Headache, sneezing & nasal polyp were other common findings.

Table 2: Nasal Endoscopic Findings

Findings	Total Cases		Unilateral		Bilateral	
	No	%	No	%	No	%
DNS -Right -Left	51	62.50	12 39	23.52 76.75	-	-
Middle Turbinate Hypertrophy	23	28.75	17	73.91	6	26.1
Inferior Turbinate Hypertrophy	44	55	29	65.90	15	34.1
Polyp In Nasal Cavity/Middle Meatus	37	46.25	13	35.13	24	64.8
-Ethmoidal	25	67.56	6	24	19	76
-Antrochoanal	12	32.43	12	100	-	-
Mpd In Middle Meatus	33	41.25	21	63.63	12	36.36
Enlarged Agger Nasi	05	6.25	03	60	02	40
Paradoxically Curved Mt	08	10	6	75	2	25
Edematous/Polypoidal Up	09	11.25	7	77.77	2	22.22

The diagnostic nasal endoscopy revealed various pathological abnormalities in the middle meatus and anterior ethmoid region. The important finding were, obstruction in osteomeatal complex area, deviated nasal septum, inferior turbinate hypertrophy, polypoidal mass in nasal cavity.

Radiological evaluation done by coronal section (axial & saggital if needed) CT scanning, revealed the maxillary sinus most common site of mucosal involvement 76.25%% followed by anterior ethmoid sinus in 53.75% cases. Frontal and sphenoid sinuses were involved in 26.25% and 15% cases respectively

Out of 80 patients the most common anatomical variation associated were septal deviation 62.5%, Concha Bullosa is pnuematization of middle turbinate 47.5% cases, paradoxically middle turbinate 28.7% cases. Agger nasi cells 21.25% and haller cells in 13.7% cases on CT.

Mucosal abnormalities ranged from minimal mucosal thickening to total sinus opacification. Most frequently noted in the maxillary sinus 76.25% cases.

No major per-operative complication occurred in this, however, 2 patients presented post-operative echymosis, one patient presented diplopia and blurring in vision, one patient presented with headache, one with orbital subcut emphysema, and 2 patients were with post operative synechie formation.

Fig1: Endoscopic View Showing Polypoidal Mass In Middle Meatus

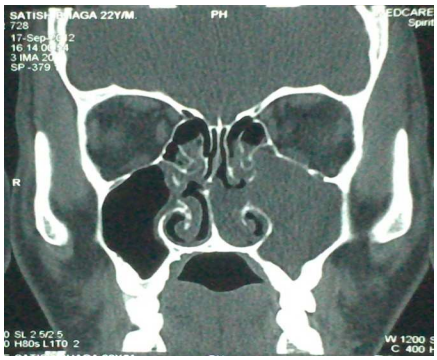

Fig 2: CT Scan PNS Coronal Section Showing Polypoidal Mass

Overall success rate

The results of endoscopic sinus surgery in the patients of chronic sinonasal diseases, allergic or non allergic, with or without nasal polyposis were evaluated in 80 patients who responded to the different questions asked regarding their subjective improvement in their follow-up.

- Patients were completely satisfied with the result(CS) of surgery-CS
- Patients was generally satisfied with their result (GS) after surgery-GS
- Patients did not have improvement after surgery-NI

Table-3: Post-Operative Subjective Improvement

S. No.	Symptoms	TOTAL No.	CS	%	GS	%	NI	%	TOTAL
1.	Nasal Discharge	77	32	41.5	43	55.84	02	2.59	97.39%
2.	Nasal Obstruction	71	34	47.8	35	49.29	02	2.81	97.17%
3.	Headache	36	15	41.6	16	47.22	05	13.8	88.88%
4.	Sneezing	40	14	35	18	45	08	20	80%
5.	Nasal Mass/Polyp	37	28	75	07	18.91	02	5.4	93.91%
6.	Epistaxis	12	06	50	03	25	03	25	75%
7.	EAR Discharge/Heaviness	13	04	30.7	07	53.84	02	15.3	84.6%
8.	Post Nasal Drip	42	19	42.8	21	50	02	4.7	70.5%
9.	Mouth Breathing	10	07	70	03	30	-	-	100%
	Total	**338**	**159**	**48.3**	**153**	**41.67**	**26**	**9.95**	**85.49**

Chi= 41.8, P= 0.0004, Highly Significant

A. Patients were completely satisfied with the result (CS) of surgery in 48.51% cases. Out of 80 patients under study.
B. 41.67% Patients was generally satisfied with their result (GS) after surgery
C. 9.95% Patients did not have improvement after surgery (NI).

The overall satisfactory rate can be calculated just by adding the 1st and 2nd points mentioned above which comes as 85.49%.

Discussion

Functional Endoscopic Sinus Surgery (FESS) is the gold standard for treatment of chronic rhinosinusitis(CRS), with or without nasal polyposis & allergic fungal sinusitis refractory to optimal medical treatment.[1] The concept of FESS is the removal of tissue obstructing the Osteometal Complex (OMC) and the facilitation of drainage and ventilation while conserving the normal non-obstructing anatomy and mucous membrane, which is essential for mucosal regeneration. Use of microdebriders further improved to remove the pathologic tissue while preserving normal mucosa, and with the combination of suction with powered dissection has revolutionized endoscopic sinus surgery [8]. FESS, like all minimally invasive surgery, is designed to combine an excellent outcome with minimal patient discomfort.

The use of the endoscope as a functional tool was pioneered by Messerklinger in1985, and has been popularised as the surgical treatment of choice for uncomplicated chronic inflammatory sinus disease. Much of the available literature concerns the theory, technique and complications of FESS. Both retrospective and prospective outcome analysis have been published with variable experimental designs, results and conclusions. The criteria used for success and failure, patient selection and the precise means and length of follow up are highly variable [10].

In our study found that the most common symptoms was nasal discharge 96.25% and next were nasal obstruction 88.75%, post nasal discharge 52.50%, followed by sneezing 50%, nasal mass 46.25%, headache 45%, ear problem 16.25% and epistaxis 8.75%,which is in agreement with the literature[11][12].

The rigid fiberoptic nasal telescope provides superb intra-operative visualization of the OMC, allowing the

surgery to be focused precisely on the key areas [8]. Nasal endoscopy provides excellent visualization of polyps, especially of small polyps in the middle meatus. It also shows nasal polyps originating from contact areas in middle meatus and nasal anatomic abnormalities [5]. It was done in each and every cases preoperatively, Similar result were noted in other study **[**13].

CT Scan Paranasal sinuses have become mandatory for all patients undergoing functional endoscopic sinus Surgery. It depicts the anatomical complexities of osteomeatal complex in much simpler way and acts as a Roadmap for endoscopic sinus surgery [14]. The most common anatomical variation associated were septal deviation (62.5%) followed by concha bullosa and paradoxically middle turbinate these finding supported by other studies [14][15].

Mucosal abnormalities ranged from minimal mucosal thickening to total sinus opacification. It was most frequently noted in the maxillary sinus. Findings supported by other study [16].

Stankiewicz [17] suggested that the complication rate decreases with increasing experience, reporting a rate of 29 percent in the first 90 cases which he performed compared with only 2.2 percent in the subsequent 90. Post-operative care after FESS is at least as critical as the successful outcome as in the initial surgical procedure. The 1st postoperative followed up is 7 day after surgery and then subsequent visits, every week for one month, fortnightly for one month and after that followed up was carried out on monthly basis. Until, the operative side heal completely. In our study, No major per-operative complication occurred in this, however, 2 patients presented post-operative echymosis, one patient presented diplopia and blurring in vision, one patient presented with headache, one with orbital sub acute emphysema, three patients with headache and 2 patients were with post operative synechie formation.

The outcome of FESS, similarly, can be evaluated by objective and subjective methods. In clinical practice, the welfare of the patient seems to be reliable in isolation, but the objective assessment can also be accomplished through additional tests. Stammberger [1], in a study including 500 patients with subjective improvement rate of 91% found that the improvement in objective evaluations were below the status of well-being of the patient. In our study, we evaluated the profile of essentially subjective improvement 85.49%.

FESS is safe and effective method of treatment in cases of chronic sinonasal diseases with or without polyposis. Its provide an efficient and safe method for treating sinonasal disease and it has proven to be a better therapeutic means over a conventional method [18]. We found an improvement of 85.49% in patients. This study is similar with the another study [1][5][10][12][18][19].

Conclusion

Functional Endoscopic Sinus Surgery (FESS) is targeted endoscopic intervention, introduce in 1978, with goals virtually identical to those originally reported. FESS strictly upholds Messerklinger functional concept so that the surgeon performs a very minimal initial intervention. By this study we finally conclude that FESS is a safe and effective method of treatment in cases of chronic sinonasal disease with or without polyposis in all age group of patients. Though the procedure has a few disadvantages, its manifold advantages certainly outweighs them to make it a better option in the treatment of sinonasal diseases.

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