



ASSESSMENT OF OUTCOME OF FUNCTIONAL ENDOSCOPIC SINUS SURGERY IN PATIENTS WITH CHRONIC SINUSITIS WITH OR WITHOUT SINONASAL POLYPOSIS

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ABSTRACT

Introduction:- Chronic rhinosinusitis is a multifactorial disease causing inflammation of sino-nasal mucosa. Functional endoscopic sinus surgery (FESS) causes less morbidity, complication and less recurrence rates. This study aims to assess various presenting symptoms, nasal endoscopic and Computed tomography (CT) findings, to compare relief of various symptoms & to confirm the effectiveness of FESS as standard modality of treatment. **Methodology:-** In this study we include 100 cases of chronic sinusitis with or without sinonasal polyposis age between 15 to 65 years attending otorhinolaryngology outpatient department which fulfil our inclusion criteria & undergoing Functional endoscopic sinus surgery. All the patients were pre- & post-operatively evaluated clinically using Rhinosinusitis symptom inventory score in to major & minor criteria, radiologically and endoscopically. **Results:-** The overall result reveal male to female ratio was 1:1.27. Preoperatively on CT scan and endoscopic examination most commonly involved sinus was maxillary sinus 99% & anterior ethmoid sinus (70%), most common anatomical variation was Deviated nasal septum/spur seen in (98%) & Concha bullosa in (82%). Most common symptoms observed was Nasal obstruction (93%), headache (81%) & Nasal discharge (72%). Post-operatively 91.66% of the patients were asymptomatic at the end of the 3 months with p value <0.0001 (statistically significant) and 8.33% of patients were still symptomatic at the end of 3 months. No major complication directly related to FESS occurred. **Conclusion:-** In conclusion FESS is minimally invasive, safe and effective procedure & has better impact in relieving symptoms of chronic rhinosinusitis, as it clears only the involved sinus pathology, establishing normal mucociliary drainage of the paranasal sinuses.

KEYWORDS

Chronic rhinosinusitis, Nasal endoscopy, Computed tomography, Functional endoscopic sinus surgery

INTRODUCTION

Chronic rhinosinusitis is a complex group of disorder occurs in all ages, both genders and all ethnic groups causing Loss of productivity and significant decrease in quality of life¹. Chronic rhinosinusitis is a multifactorial disease characterized by inflammation of the mucosa of the nose and paranasal sinuses. Factors contributing can be infection, allergy, physical obstructions caused by morphological/anatomical variations i.e. in the nasal cavity or paranasal sinuses. Anatomical variants of osteomeatal complex and deviated nasal septum/bony spur leading to impaired mucociliary outflow and contribute in pathogenesis of chronic rhinosinusitis¹.

Because of the heterogeneity Chronic rhinosinusitis is subdivided into three categories CRS with polyps (CRSsNP), CRS without polyps (CRSsNP), and allergic fungal RS.

The cardinal symptoms of CRS are nasal obstruction, nasal discharge, facial pressure or pain, hyposmia or anosmia and headache and diagnosis is mainly symptom based with persistence of patient's complaints for more than 12 weeks with or without nasal endoscopic and radiological confirmation and resistant to appropriate maximum medical therapy are surgical indications. According to "Task force on rhinosinusitis 1996" symptom complex has been divided in major and minor factor with two major or one major and two minor sinus symptoms were considered for diagnosis of CRS².

Nasal endoscopy has a clear role in the identification of sinonasal disease. It serves as an objective, diagnostic tool in the evaluation of nasal mucosa, sinonasal anatomy and nasal pathology. Finding of mucopus in the middle meatus is diagnostic of sinusitis. The Lund-Kennedy endoscopic scoring system is a widely accepted endoscopic scoring system which quantifies the pathologic states of the nose and paranasal sinuses³.

Computed tomography of the Paranasal sinuses is an important tool in making diagnosis of chronic rhinosinusitis. The Royal College of Radiologist Working Party⁴ said that plain radiographs have no place in the routine management of rhinosinusitis due to the low specificity and sensitivity compared to clinical and surgical findings.

When comparing the forms of imaging, CT scan is the investigation of choice as it provides detailed information about the ostial anatomy. It is indicated when maximal medical treatment has failed, complications

of rhinosinusitis or if malignancy was suspected. It is extremely useful in providing the "road map" prior to endoscopic sinus surgery⁵.

Most authors have shown that functional endoscopic sinus surgery (FESS) is an effective means of treating recalcitrant CRS. Most cases of chronic rhinosinusitis respond to medical treatment but if there is no improvement in symptoms, surgical intervention is advocated. With the recent advancements Functional Endoscopic Sinus Surgery was advocated using endoscope for better visualization and understanding of sinus pathology and restoration of mucociliary outflow tract obstruction^{6,7}.

There are many validated tools to evaluate the outcome of FESS. The evaluation of improvement in each major and minor symptom following FESS shows a significant role in understanding patients disease and treatment outcome.

The present study aimed to assess relief of various symptoms of CRS with or without sinonasal polyposis before and after FESS and to confirm the effectiveness of FESS in patients refractory to medical treatment.

MATERIAL AND METHODS

A total of 100 cases of CRS were included in the study. The inclusion criteria includes patients between 15 to 65 years of age, both male and female, symptoms of chronic rhinosinusitis with or without sinonasal polyposis for at least 12 weeks, failed maximum medical therapy and fulfil the criteria for chronic sinusitis clinically or by nasal endoscopy and confirmed by computed tomography of nose and paranasal sinuses.

All patients were clinically evaluated using **Rhinosinusitis symptom inventory symptom scores**⁸ i.e 0=absent, 1=very mild, 2=mild, 3=moderate, 4=severe, 5=very severe, followed by nasal endoscopy performed pre and post operatively at regular interval on follow up (at the end of 2nd week, 4th week, 2nd month and at the end of 3 months).

Exclusion criteria includes patients below 15 years of age, patients with acute sinusitis, malignancy of nose and paranasal sinuses, road traffic accident and post traumatic injury, previous nasal surgeries and Fungal sinusitis.

All the data will analysed through SPSS. 26.0 (Trial version) and all

applicable statistical test will be used for data analysis. P value <0.05 considered as significant.

RESULTS

In this study a total of 100 patients were subjected to FESS. 44% patients were males and 56% patients were females, male is to female ratio was 1:1.27 with Average age of 32.60 ± 12.09 years. The mean duration of symptoms was 2.41 ± 3.34 years.

Preoperatively, on CT scan sinusitis was most commonly seen in maxillary sinus (N=99, 99%) followed by anterior ethmoid sinus (N=70, 70%), posterior ethmoid sinus (N=63, 63%), frontal sinus (N=20, 20%) and sphenoid sinus (N=21, 21%). Anatomical variation most commonly seen on nasal endoscopy and CT scan was deviated nasal septum/ spur was seen in (N=98, 98%) followed by concha bullosa in (N=82, 82%), medialised uncinate process (N=73, 73%), enlarged bulla ethmoidalis medialised uncinate process (N=57, 57%), pneumatized uncinate process in (N=45, 45%), accessory ostia (N=41, 41%), paradoxical middle turbinate (N=37, 37%), enlarged agar nasi cell (N=28, 28%), hallar cells (N=22, 22%) and onodi cells (N=12, 12%).

In the present study, on Lund Kennedy staging 14 patients (14%) had nasal polyps, 32 patients (32%) had nasal mucosal edema and 83 patients (83%) had thick/thin nasal discharge.

Table 1: Pre operative symptom profile major criteria/symptoms (RSI)

Major Criteria	Absent (0)	Very Mild (1)	Mild (2)	Moderate (3)	Severe (4)	Very Severe (5)	%
Facial Pressure/ Pain	37	2	6	24	30	1	63
Nasal Obstruction	7	0	1	15	73	4	93
Post Nasal Drip	51	1	9	19	19	1	49
Nasal Discharge	28	4	9	34	24	1	72
Anosmia	91	2	1	6	0	0	9
Fever (Acute)	100	0	0	0	0	0	0

Table 2: Pre operative symptom profile minor criteria/symptoms (RSI)

Minor Criteria	Absent (0)	Very Mild (1)	Mild (2)	Moderate (3)	Severe (4)	Very Severe (5)	%
Headache	19	1	6	32	41	1	81
Fever (Non Acute)	100	0	0	0	0	0	0
Halitosis	97	0	2	1	0	0	3
Dental Pain	100	0	0	0	0	0	0
Cough	84	3	3	5	4	1	16
Earache	66	5	8	17	4	0	34
Ear Fullness	69	1	7	16	7	0	31



Figure 1: Pre operative symptom profile- Chart presentation

Preoperatively over all the commonest symptom was nasal obstruction (93%, N=93), followed by headache (81%, N=81). Other symptoms were Nasal discharge (72%, N=72), Facial pain/pressure (63%, N=63), Post nasal drip (49%, N=49), earache (34%, N=34), ear fullness (31%, N=31), cough (16%, N=16), anosmia (9%, N=9), and

halitosis (3%, N=3). All the patients in the study were subjected to FESS. Majority of the patients underwent uncinctomy and middle meatal antrostomy (99%, B/L=89, R=6, L=4), followed by anterior ethmoidectomy (70%, B/L=64, R=1 L=5), posterior ethmoidectomy (63%, B/L=61, R=1, L=1), sphenoidotomy (21%, B/L=18, R=2, L=1) and frontal recess surgery (20%, B/L=15, R=4, L=1).

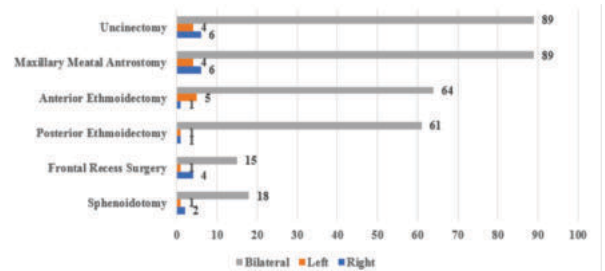


Figure 2: Multiple bar diagram representing distribution of patients according to various procedures done in FESS

Table 4: Overall patient satisfaction post-operatively at the end of 3 months

Symptoms	Pre Operative Score %	No. of patients Asymptomatic at the end of 3 months	Post operative Asymptomatic patients in %	No. of patients Symptomatic at the end of 3 months	Post operative Symptomatic patients in %
Facial Pressure/Pain	63	61/63	96.82	Very Mild-2	3.17
Nasal Obstruction	93	88/93	94.62	Very Mild-5	5.37
Post Nasal Drip	49	38/49	77.55	Very Mild-11	22.44
Nasal Discharge	72	68/72	94.44	Very Mild-4	5.55
Anosmia	9	9-Jul	77.44	Very Mild-2	22.22
Headache	81	79/81	97.53	Very Mild-2	2.46
Halitosis	3	3-Mar	100	Zero	0
Cough	16	16/16	100	Zero	0
Earache	34	31/34	91.17	Very Mild-3	8.82
Ear fullness	31	27/31	87.09	Very Mild-4	12.9
Average %			91.66		8.33

Post operatively, overall patient satisfaction was high. 91.66% of the patients were asymptomatic/ absent (0) scoring at the end of the 3 months with p value <0.0001 (statistically significant) and 8.33% of patients were still symptomatic at the end of 3 months which included facial pain (N=2, 3.17%), nasal obstruction (N=5, 5.37%), PND (N=11, 22.44%), nasal discharge (N=4, 5.55%), anosmia (N=2, 22.22%), headache (N=2, 2.46%), earache (N=3, 8.82%) and ear fullness (N=4, 12.90%). These patients had very mild (1) scores at the end of 3 months.

Post operatively, all the patients were subjected to DNE in the follow up period up to 3 months. At second week 61 patients had severe crusting, 17 patients had mild crusting at 4th week, and absent/no crusting at the end of 2nd and 3rd month.

In the present study no major complication has been encountered. The most common minor complication was synechiae (N=12) formation which was which were released during post operative during follow up, the next common complication was bleeding (N=3) managed successfully by nasal packing. Minor complications in the form of lamina papyracea breach (N=1) and periorbital swelling (N=1) was encountered, and was managed conservatively without any sequelae.

DISCUSSION

- In the present study age group selected was above 15 years to 65 years, 44% patients were males and 56% patients were females,

- male is to female ratio was 1:1.27 with Average age of 32.60±12.09 years. However in the present study age and sex does not carry any statistical significance as the p value is >0.05.
- Clinical evaluation of chronic rhinosinusitis using major and minor criteria as well as nasal endoscopy and CT scan are common methods for diagnosis and handling of the patients. In the present study nasal endoscopy and CT scan of nose & paranasal sinuses showed variety of anatomical variation and degree of sinus opacification which aid in management of sinusitis.
 - In the present study we used Rhinosinusitis symptom inventory score to analyse the outcome of FESS. Which in term showed significant improvement of symptoms 91.66% of our patients were symptom free i.e. zero/absent scoring ($P < 0.0001$) at the end of three months due to minimally invasive technique of FESS in addressing the pathology of the only chronic rhinosinusitis refractory to medical management and 8.33% of patients had very mild symptoms at the end of three months.
 - We achieved higher results than those of other studies mentioned 9,10,11,12, which have shown 70 to 85 % post operative improvement after FESS, as the patients in the present study had no systemic abnormalities like asthma, cystic fibrosis and immune deficiencies were not included.
 - Nasal endoscopic suction and clearance of nasal cavity was done regularly at each follow up and healing of cavity was seen after 4-6 weeks of surgery. Hence these major and minor symptoms of CRS showed statistically significant improvement in symptom score ($P < 0.0001$) at the end of 2nd month and 3rd month due to thorough clearance of the disease, achieving good mucociliary pathway which led to proper drainage and ventilation of paranasal sinuses.
 - In the present study, 8.33% patients remained symptomatic at end of 3 months as these patients developed upper respiratory tract infections in the follow up period, were allergic to environmental dust & pollution, personal habits like smoking which effect the nasal mucociliary drainage function of the sinuses and delay the healing capacity of the sinuses thereby altering their symptom scores in the follow up period of only 3 months, so these patients may require longer period of follow-up and advice regarding modification of these post operative factors which may help in improving the symptom scoring later.
 - In the present study the no major complication occurred and few minor complication like synechiae, bleeding, breach of lamina papyracea & periorbital swelling occurred which were managed conservatively without any sequelae.
 - So, FESS is a safe and effective procedure when performed by experienced surgeons. In an inexperienced hand, complications can occur.

CONCLUSION

- In conclusion chronic rhinosinusitis is the most frequently encountered disease seen in all age groups irrespective of sex. It is mainly diagnosed on the basis of symptomatology along with diagnostic nasal endoscopy and computed tomography of PNS giving the pathology of involved sinuses.
- FESS performed in our patients resulted in significant improvement as assessed by Rhinosinusitis Symptom Inventory Score and suggest that FESS is minimally invasive, safe and effective procedure & has better impact in relieving symptoms of CRS, as it clears only the involved sinus pathology, establishing normal mucociliary drainage of the paranasal sinuses.
- Post-operative regular follow up with nasal endoscopic suction & cleaning and RSI scores helps in monitoring both symptomatic improvement and disease activity in patients with chronic rhinosinusitis.

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