



RESEARCH ARTICLE

A STUDY FOR EVALUATION OF CLINICAL OUTCOME OF ENDOSCOPIC SINUS SURGERY IN PATIENTS OF CHRONIC RHINOSINUSITIS

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ABSTRACT

Chronic rhinosinusitis (CRS) is an inflammatory condition of nasal and paranasal mucosa. It has both medical and surgical modalities of treatment. The evaluation of clinical profile of a patient can be done both subjectively using SNOT 20 scoring and objectively using Lund and Mackey endoscopic scoring and NCCT for imaging for assessment of efficacy of the treatment modality. The most effective modality of treatment of CRS has always been a debate amongst surgeons both in respect to modality as well as timing and type of surgical intervention. In our study we have evaluated the subjective and objective outcomes of FESS in patients with CRS, refractory to medical treatment or with recurrence of disease. In right hands FESS is associated with very low complication rate. There is a marked improvement in the clinical profile as well as the quality of life of patients of CRS following FESS.

INTRODUCTION

Chronic rhino sinusitis (CRS) is a very common disease seen in routine ENT practice. These patients can visit many speciality clinics before reaching the otolaryngologist, for example primary care physicians, physicians, paediatricians and pulmonologists. But dealing with the disease as ENT surgeon gives it a better face. Not only its Symptoms affects the general health, vitality and social functioning but also leads to decreased productivity and hence brings down the quality of life. The effect on quality of life by CRS is comparable to that seen in patients with coronary heart disease. The treatment of CRS has always been a debate between medical and surgical and also in respect to the extent and kind of surgery. CRS is one of the common ailments for which antibiotics and steroids are frequently prescribed. Medical management is the modality of choice for CRS, though in most cases repeated courses are required with variable responses. However if no improvement is achieved surgical treatment is considered, and Functional endoscopic surgery is the choice of surgery as well as definitive modality of treatment for this disease in most centers. Although the surgical techniques of FESS have been described in great details, not much has been appeared about its results. In this study we aim to evaluate to clinical profile of the patients of chronic rhinosinusitis preoperatively and postoperatively using subjective and objective tools and compare outcomes. This study shall be an effort to add to literature the results of FESS in terms of subjective and objective outcomes.

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MATERIALS AND METHODS

Study site: Out patient department of otolaryngology in tertiary care center.

Study population: Patients with clinical features and investigations suggesting Chronic Rhinosinusitis meeting the inclusion-exclusion criteria.

Study design: Following ethical committee approval a “prospective study” was conducted in patients with chronic rhinosinusitis.

Sample size: 30 patients.

Sampling technique- Random selection of patient.

Justification of sample size

Keeping in mind the given duration of the study, the topic being a surgical related the sample size will be 30 subjects, with the aim to complete the study within stipulated time.

Time frame to address the study: Study duration is 1 year from October 2014 to September 2015.

Inclusion Criteria

- All cases of CRS irrespective of etiology, symptomatic for at least 12 weeks.

- Patients who did not respond to medical treatment of 12 weeks.
- Patient’s age group between 18-60 years.

Exclusion Criteria

- Patients with more than grade I deviated nasal septum.
- Previous H/O nasal surgery.
- Mass other than polyp in nasal cavity.
- Unfit for surgical procedure
- Patients below 18 years or above 60 years of age.

MATERIALS AND METHODS

An evaluation of all patients visiting the out patient department with features of chronic rhinosinusitis between 18 to 60 years of age of both genders was done over a period of 1 year. Patient with at least two major or one major and two minor symptoms as per TASK FORCE CRITERIA was considered. A written informed consent was taken so as to undergo this study. Clinical profile was documented using SNOT 20 prior to the surgery. Thorough clinical examination of ear, nose, throat and neck was done.

Diagnostic Nasal Endoscopy -- was done under topical anaesthesia On the basis of LUND MACKAY ENDOSCOPIC SCORING SYSTEM all these patients were given a pre operative scoring depending upon presence of discharge, edema and polyps.

Ncct Pns: was done preoperatively to assess the extent of disease, condition of Osteomeatal complex, opacification of sinus and to rule out any anatomical variations. As the diagnosis and extent of disease was ascertained, patients were made to undergo a pre anaesthetic evaluation and subsequently taken up for FESS under general anaesthesia. In the post operative follow up period patients were made to fill up the SNOT-20 questionnaire. They will be evaluated by nasal endoscopy on the basis of scoring system used preoperatively and this time also considering presence of scarring and crusting. All the preoperative and postoperative scores at three months obtained from SNOT questionnaire and endoscopic scoring system were recorded and tabulated.

Statistical method

Student’s paired T-test will be applied for comparison of nominal data. P value of < 0.05 will considered as statistically significant. The analysis of data will be performed using software Microsoft excel and MINITAB 1513.

Observation and Results

In our study, total of thirty patients participated with a range of age from 22 to 58 years and average age being 36.87. Their gender distribution was 21 males verses 9 females. The average duration of symptoms was 4 years and 4 months with a range of 8 months to 20 years. All of these patients were given adequate medical management before considering for surgery. The medical management included antibiotics, local decongestants and topical steroids. Pre operatively patients were subjected to the standardised SNOT-20 which varied from 49 to 87 and mean value of 69.03. Following this they underwent a complete ENT evaluation including a nasal

endoscopy. In our study, 70% of the patients had nasal polyposis, 40% had mucous in the nasal cavity, 30% had edema and 20% had mild deviation of the nasal septum. They were scored on the basis of Lund Mackay Endoscopic scoring system pre operatively. One week prior to their respective surgeries, patients underwent NCCT Nose and PNS to evaluate the involvement of various sinuses and the Osteomeatal complex. The NCCT was evaluated by both radiologist as well as the otolaryngologist. Opacification of various sinuses, Ostiomeatal complex was noted as well as the anatomical landmarks were taken into account. All the 30 patients underwent FESS under general anaesthesia and were followed up periodically and evaluated post-operatively at interval of 1, 3 and 6 months. Average duration of hospital stay for these patients was 4 days, range being 3 to 7 days. There was no major complication noted. Similar scores were recorded at the end of 6 months and compared with the pre operative scores so as to assess the surgical outcome. The SNOT score post operatively for the patients participating in this study varied from 27 to 48 and mean value being 36.30. In accordance to the subjective scoring of the patients it was seen that patients had significant improvement in all the 20 questions. The endoscopic findings were scored on the basis of Lund MacKay Endoscopic Scoring system and recorded in the patient file. The scores varied from a range of 42.85 to 85.71 with a mean of 62.61. This score was calculated taking in consideration the maximum denominator and percentage was calculated. Post-operatively the patients were evaluated at end of 6 months and endoscopic findings were scored in accordance with Lund Mackay scoring system taking in account the scarring and crusting as well. These scores varied from 13.63 to 36.36 with a mean value of 27.12. The finding of nasal endoscopy examination can be tabulated as below:

Table 1. Finding of nasal endoscopy

Findings	No of patients	Percentage
Polyps	3	10
Discharge	5	16.66
Edema	4	13.33
Scarring	4	13.33
Crusting	3	10

The male female ratio is 21:9. We compared the mean ages between males and females for the record. The difference in the mean age (Mean Age (F) =33.78, Mean Age (M) =38.19) is statistically not significant (T= -1.26, P value= 0.224).

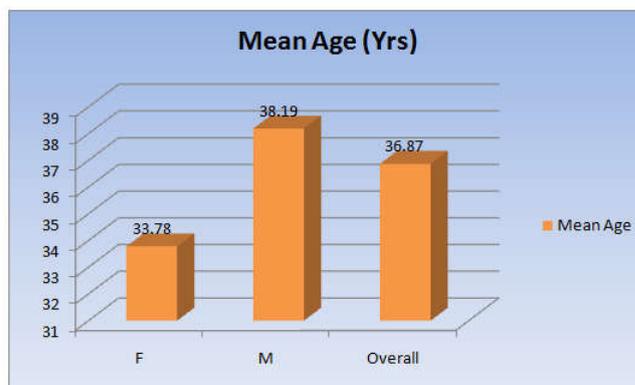


Figure1. Mean ages of males and Females

The Pre FESS and Post FESS Endoscopic scores have been converted to percentage based on the corresponding respective maximum score in order to bring them on a common scale. We

compared mean Pre FESS and Post FESS Endoscopic scores. The mean Pre FESS Endoscopic score of 62.62% is significantly higher compared to mean Post FESS Endoscopic score of 12.42% (T=29.16, P=0.0001).

Histogram of Differences: Pre & Post Endo

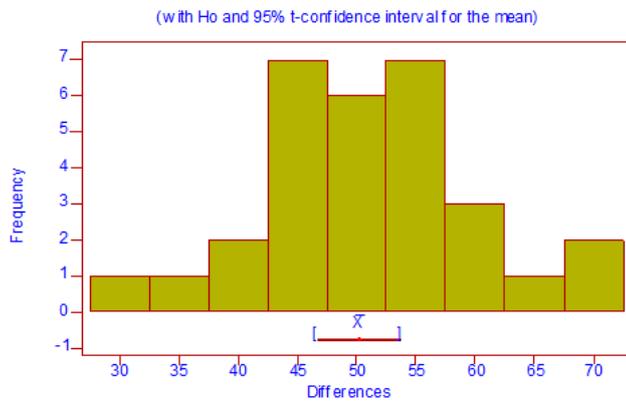


Figure 2. Pre & Post FESS Endoscopic scores

We tested the significance of difference in the mean scores, Pre and Post FESS for SNOT score and Endoscopic scores. For the comparison Student’s Paired T – test has been used. Mean SNOT scores have been compared. Mean Pre FESS SNOT score of 69.03 is significantly higher than that of Post FESS SNOT score of 36.30 (T=27.07, P=0.0001). All the comparisons in various subjective and objective criteria showed marked improvement in the clinical profile of the patients.

Histogram of Differences-Pre & Post SNOT

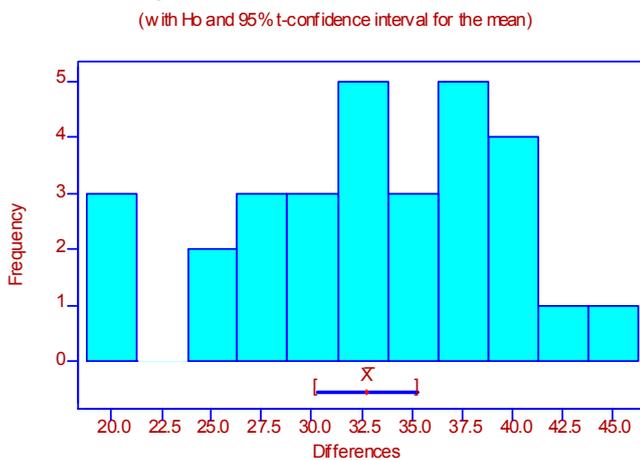


Figure 3. Pre & Post FESS SNOT score

Table 2. Descriptive Statistics: Pre FESS SNOT, Post FESS SNOT, Pre FESS Endoscopic Score (%), Post FESS Endoscopic Score (%)

Variable	N	Mean	Median	St Dev	SE Mean
Pre Op SNOT	30	69.03	68.50	10.22	1.87
Post Op SNOT	30	36.300	36.00	5.279	0.964
Pre Op Endo (%)	30	62.62	60.71	10.56	1.93
Post Op Endo (%)	30	12.424	13.636	3.362	0.614

Variable	Minimum	Maximum	Q1	Q3
Pre Op SNOT	49.00	87.00	61.75	77.25
Post Op SNOT	27.000	48.000	32.750	40.000
Pre Op Endo (%)	42.86	85.71	57.14	71.43
Post Op Endo (%)	9.091	18.182	57.14	71.43

DISCUSSION

With better understanding of the anatomy of lateral nasal wall and improvement in the surgical technique the use of FESS has become popular. Messerklinger and Wigand introduced FESS in 1960’s. It was further popularised in Europe by Stammberger and in North America by Kennedy. FESS has been accepted as a minimally invasive technique for treatment of Chronic Rhinosinusitis resistant to medical therapy. It restores sinus drainage, improves mucocilliary clearance and the sinus function is reverted to normal. Although the surgical techniques of FESS have been described in great details, not much has been appeared about its results. An analysis by *Steven et al* (1999) of 100 consecutive patients undergoing FESS over 23 months duration with average follow up time of 5 months had average of 39 yr (range 6-83yr), 50 males and 50 females. Of these 59 patients had recurrent sinusitis, 4 had polyps only and 37 had both. A total of 89 patients had undergone sinus surgery previously. After FESS, 14 patients had minor complications, most common being synechiae between middle turbinate and septum in 6 patients. 83 patients had significant improvement after FESS while 6 had one episode of sinusitis postoperatively. The results of this series suggest that FESS is an efficacious improvement in treatment of sinusitis. In another study done by *Howard L Levine* (1990), 250 patients who underwent FESS (42 unilateral, 208 bilateral, total of 458 procedures) for nasal polyposis and chronic sinusitis were evaluated. 21 had concomitant resection of concha bullosa and 41 had Septoplasty. Nasal drainage and facial pain were among the most common symptoms. 8.3% developed minor complications and 0.7% developed major complications. 221 patients were available for long term follow up at 12 to 42 months with series success rate of 89.7% for sinonasal polyposis and 80.2% for relief of chronic sinusitis.

Brain L Mathew et al (1991) studied pre operative complaints, clinical findings, CT extent of disease and surgical outcomes, retrospectively in 155 patients, with a median follow up of 12 months. Nasal obstruction was the commonest symptom (n=146.96%) followed by postnasal drip (n=143.92%) and facial pain or headache (n=139.90%). Indications for FESS were persistence of symptoms despite aggressive medical therapy and radiologic evidence of a significant sinus abnormality. Haemorrhage occurred postoperatively in 2 patients (1.3%) and 17 patients (12.7%) required additional endoscopic surgery. Overall, 140 patients (91%) believed that surgery was beneficial. Patients with facial pain preoperatively showed maximum relief. Total opacification of maxillary sinus was not a predictor of outcome, but opacification of sphenoid sinus correlated with poor outcome. *Nayak et al* (1991) studied a group of 78 patients (30 unilateral disease and 48 bilateral disease) between 12 to 57 yr with chronic sinusitis over a period of 16 months with various nasal complaints, the commonest being nasal discharge (27 unilateral, 34 bilateral) followed by headache (26 unilateral, 33 bilateral) and nasal obstruction. The range of duration of symptoms was from 3 months to 30 yrs. 75 patients underwent FESS under Local anaesthesia. On follow up, it was observed that 47 patients had total relief, 12 had partial relief and 7 had no relief at all. 12 patients were lost to follow up and 6 had recurrence and were taken for a second procedure. No complication was reported. *Nasser A Fageeh et al* did a retrospective study of 129 patients between July 1991- Dec 1993 with CRS refractory to medical treatment. All these patients underwent FESS. The commonest

complaint was nasal obstruction (76%) followed by headache (74.4%), anosmia (56.5%) and facial pressure/ pain. Postoperatively patients were followed up for at least six months. Patients with complaints of nasal obstruction had most significant improvement (60%). The least improvement was noticed in patients of anosmia (40%). All these patients were assessed pre and post operatively according to the severity of their symptoms by allotting grades. Majority of these patients were operated under general anaesthesia. Minor complications like mild to moderate nasal bleeding, synechiae and facial swelling were noted in few patients. One major complication in the form of internal carotid artery rupture was observed. This was managed successfully with immediate packing, fluid replacement and blood transfusion. Patient did not have any neurological sequel. Two patients developed orbital hematoma however no loss of vision was encountered. The complications were comparable with other studies. There were 85.1% of the patients who had a favourable opinion of the procedure and would recommend it to others with similar problems. It was concluded in this study that preoperative CT imaging is essential for the diagnosis and operative planning of sinus disease. It is also an excellent intraoperative guide.

Jacobsen J and Svendstrup F (2000) conducted a prospective study on 237 consecutive patients from 1989 to 1999 to study the effect of FESS in patients suffering from chronic sinusitis and /or nasal polyposis. Nasal obstruction was the most frequent symptom (61%) followed by purulent nasal discharge, anosmia, frontal pain, headache and facial pain. Duration of symptoms averaged 9.3 years. All patients underwent surgery in general anaesthesia. 86% of patients were operated bilaterally. In 72% the posterior ethmoids were opened and in 54% the sphenoid was opened. The maxillary ostium was enlarged in 82% of the patients and the frontal recess opened in 51% of cases. No serious complications were registered. At the end of one year of follow up, 45% were totally satisfied with the results and were symptom free and 44% more definitely feeling better. To determine the effectiveness of FESS for CRS a non randomized prospective clinical study was done by *Bhattacharyya A* (2004). 100 patients with CRS refractory to medical treatment were included in this study with a mean follow up of 19 months. Before surgery, the mean major symptoms score ranged from 2.5 to 3.5 on the Likert scale, and minor symptoms score ranged from 0.8 to 2.8. After surgery, statistically significant decrease in the major and minor symptoms was noted ($P < 0.001$ for all). The largest effective sizes were noted for the decrease in facial pressure, congestion, nasal obstruction, rhinorrhoea and headache. It was concluded in this study that FESS provides significant symptom relief for the nasal and facial symptoms associated with CRS. Although patients will still require topical nasal steroids for management of their CRS, but a decrease in the antibiotic requirements after FESS is expected.

Although much has been reported on the short term outcomes of FESS, little has been reported with regard to its long term impact on chronic sinusitis. *Senior B A et al* (1998) study shows a long term follow up (average 7.8 yr) of 72 patients. Of the patients responding to the question about overall symptoms, 91.6% (n=66) reported improvement after surgery. There was a tendency towards continued subjective improvement in symptom score with longer follow up, but the changes were not significant statistically. 13 patients (18%) required subsequent surgical procedures. The study demonstrated that tremendous subjective results following

FESS could be maintained in long term with suitable post operative management. The study also validated the concept that patients in whom the cavity can be normalized following surgery are unlikely to require further surgery. *Roth Y et al* (1995) presented a retrospective analysis data on 100 patients of rhinosinusitis who underwent FESS. High rate of good results (79%) and a low rate of complications (17%), all minor were noted. All the data was satisfactorily comparable to those reported from other centres. A review of FESS literature, including 10 large series with a total of 1,713 patients, by *Terris M H and Davidson T M* (1999) shows a 91% improvement rate. Subjectively 63% of patients reported very good result, 28% a good result and 9% an unsatisfactory result. 12% of the patients required revision surgery. Major complications occurred in 1.6% of the patients. Chronic rhinosinusitis is known to restrict quality of life of millions of involved patients. 279 such patients were included in a study done by *Damm M et al* (2002) to assess the impact of FESS on symptoms and quality of life. Quality of life was restricted by CRS in 94% of all the patients preoperatively and ranked as severe or intolerable in 74%. Leading symptoms of CRS were nasal obstruction in 92% and postnasal drip in 87%. Further, patients reported dry upper respiratory tract symptoms in 68%, hyposmia in 66%, headache in 64% and asthmatic complaints in 34%. After a mean post operative follow up of 31.7 months, an improvement of quality of life was achieved in 85%, no change in 12% and deterioration in 3%. The ranking of restricted quality of life improved from severe to mild ($p < 0.01$). Mainly responsible elements for this improvement were post operative decrease of nasal obstruction (84%), headache (82%) and post nasal drip (74%). Hence it was concluded that symptoms improved in excellent fashion by FESS in majority of the patients, achieving better quality of life in the long term. *Hoffmann et al* (1993) conducted an outcome based longitudinal study of sinus symptoms prevalence among 31 patients treated with FESS for CRS. Patients completed structured data collection forms to quantify the prevalence of commonly experienced sinus related symptoms during an eight week period both before surgery and six months after undergoing FESS. Significant decrease in nasal symptoms prevalence (post surgery verses pre surgery) was noted for headache, nasal drainage, sinus infection, nasal blockage and breathing difficulties. In addition, the fraction of subjects who rated their current health as superior compared to one year previously increased from 27% pre surgery to 58% six months after sinus surgery. These findings aid in quantifying the magnitude of improvement experienced by sinus surgery patients and provide further evidence that endoscopic sinus surgery represents an effective treatment for chronic sinusitis. *Iro H et al* (2004) assessed in a retrospective study, the medium term clinical outcome of FESS in 208 patients with CRS with a mean follow up of 3.1 years. A questionnaire focusing on nasal obstruction, rhinorrhoea, nasal dryness/crusting, sneezing, headache, smell, numbness in cheeks and lips, aural fullness, epiphora and sore throat was used. In addition, subjective influence of sinus surgery on asthma, bronchitis and allergic disease was evaluated. Overall success was reported by 92% of all patients. 41% of all patients with complete ethmoidectomy and 32% of all patients with pan sinus surgery described complete resolution of complaints. No difference in clinical success rates was noted when comparing primary surgery or revision. A positive effect was also reported for asthma, bronchitis and allergic disease. It was concluded in the study that there was improvement for nasal symptoms and

coexisting complaints after FESS. The value of FESS is underlined for treatment of patients with CRS.

Conclusion

Chronic rhinosinusitis is a common disease seen globally with the incidence on the rise. It is a significant health problem, resulting into considerable medical care cost and severe impact on the quality of life. It is an inflammatory process involving the mucous membrane of nose and sinuses. CRS is multifactorial in aetiology and the major factor being impairment of mucocilliary function. Other important factors are bacterial infection, allergy, mucosal edema and physical obstruction caused by anatomical variations. A significant role is played by origin of pathology in the ostiomeatal complex. Opinion regarding treatment of CRS has always been a debate, both in respect of medical and surgical management as well as the choice and extent of surgery. In the past, CRS used to be treated by repeated antral puncture and wash out resulting in transient improvement of symptoms. Present trends in the management include a combination of medical and surgical treatment, with antibiotics and anti allergic drugs in the initial stages. When associated with polyposis, appropriate course of topical or oral steroids do help the patients. In cases where signs and symptoms do not resolve after adequate medical treatment, endoscopic sinus surgery is considered. FESS has been found to be quite effective and treatment of choice in medical refractory cases. The symptom profile of the patient improves significantly after undergoing FESS as this surgery reduces the disease by clearing the ostiomeatal complex, restoration of mucocilliary function, improving ventilation of the sinuses and clearing the pathway for better drug delivery. It is proven beyond doubt that FESS is a definitive treatment modality in patients of chronic rhinosinusitis who have minimal or no response to medical treatment with a significant improvement in their symptoms as well as the quality of life and very little complication rate.

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