



IMPACT OF FUNCTIONAL ENDOSCOPIC SINUS SURGERY ON SYMPTOM MANIFESTATION OF CHRONIC RHINOSINUSITIS USING SNOT -22

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ABSTRACT

Introduction: Rhinosinusitis has been defined by the American Academy of Otorhinolaryngology as “An inflammation of the mucosa of nose and paranasal sinuses”. While chronicity is defined by duration of disease for 12 weeks or longer. **Material and Methods:** Fifty patients of either sex aged 15 to 60 years suffering from CRS were included in the study on the basis of predetermined clinical criteria. They were subjected to complete general physical and ENT examination. The assessment of patients was done by anterior rhinoscopy, x ray nose and PNS. Detailed Nasal Endoscopy and Computed Tomography (CT) of paranasal sinuses was done in all the patients. Following evaluation, patients underwent Functional Endoscopic Sinus Surgery. The patients were called for 3 follow up visits at 4th, 8th and 12th week. **Result:** At 12 weeks follow up, improvement for nasal obstruction was present in 100% patients, 93.47% patients for nasal discharge and 95.23% improved for post nasal discharge. There was 100% improvement for symptoms of facial fullness, hyposmia and headache. The total percentage of improvement in the SNOT-22 SCORE study was found to be 86.5%. The maximum improvement was found for the nasal obstruction and least improvement for sneezing. **Conclusion:** This study helped in finding the impact of functional endoscopic sinus surgery on symptoms of chronic rhinosinusitis. Patient-based outcome measures, such as the SNOT-22, are helpful tools for quantifying changes in symptoms and can be used to predict objective extent of post-operative improvement.

KEYWORDS

Chronic Rhinosinusitis, Functional Endoscopic Sinus Surgery, Sinonasal outcome test 22,

INTRODUCTION

Rhinosinusitis has been defined by the American Academy of Otorhinolaryngology as “An inflammation of the mucosa of nose and paranasal sinuses”.¹ While the disease is described as being chronic when it persists for 12 weeks or longer. The chronic sinusitis is almost always accompanied by concurrent nasal airway inflammation and is often preceded by rhinitis symptoms; thus the term chronic rhinosinusitis (CRS) has evolved to more accurately describe this condition.²

CRS may manifest with nasal polyps, without nasal polyps or as allergic fungal rhinosinusitis. Patient with rhinosinusitis clinically presents with two or more symptoms of blockage/congestion; anterior nasal discharge, posterior nasal discharge, facial pain/pressure and reduction/loss of sense of smell.³ The sinus ventilation and clearance depends upon ostial patency. The small orifice, increased mucus production and ciliary dysfunction leads to inadequate drainage, stasis of secretions and exacerbation of mucosal inflammation. This vicious cycle can be difficult to break and if the condition persists, it can lead to chronic rhinosinusitis.⁴

The goal of medical therapy for chronic rhinosinusitis (CRS) is to reduce mucosal oedema, promote sinus drainage and eradicate any infections. The development of FESS made it possible to diagnose more accurately and treat these inflammatory and infective conditions of the nose and paranasal sinuses refractory to non-invasive therapy. The principles of endoscopic sinus surgery are the restoration of disturbed ventilation or drainage, removal of relevant foci of a disease, preservation of the normal or only slightly altered mucosa and the most possible protection of anatomical landmarks.⁵ Assessment of outcome following FESS includes both endoscopic evaluation and quality of life (QOL) assessment. QOL can be assessed by various tools specific for sinonasal diseases like chronic sinusitis survey (CSS), respiratory symptom disability index (RSDI), respiratory symptom index (RSI) and sinonasal outcome test (SNOT-22).⁶ Of these, the SNOT-22 is one of the most widely used tools for measuring the QOL in patients with CRS. The test consists of 22 questions which can be divided into four subdomains (nasal, extra nasal, sleep and psychological).⁷ The aim of

present study is to elicit preoperative and postoperative symptoms and to analyse the effectiveness of surgery in the relative improvement of individual CRS symptom obtained through a symptom-based rhinosinusitis outcome measure, the Sino-Nasal Outcome Test-22 (SNOT-22).

MATERIALS AND METHODS

This study is a cross sectional study conducted at Government Medical College, Amritsar. An approval from Institutional Ethics Committee, Government Medical College, Amritsar was obtained and an informed consent was taken from all the patients included in the study. The study was conducted on 50 patients of either sex aged between 15-60 years having chronic rhinosinusitis diagnosed by a health professional according to the following diagnostic criteria:

Major criteria including stuffy or blocked nose, the postnasal drip, lack of smell, rhinorrhea, feeling of fullness in the face and minor criteria including headache, weakness, toothache, cough, ear pain or a feeling of pressure in the ears. Two major criteria or one Major criteria and two minor criteria if fulfilled, the patient was diagnosed as having chronic rhinosinusitis. Endoscopic and radiological evidence of sinusitis and failed medical treatment were also the inclusion criteria for the study. All the patients having complicated sinusitis, osteomyelitis, aggressive fungal infections, immune suppression, previous sinus surgery and sinonasal malignancy were excluded from the study. X-ray nose and PNS was done in all the selected cases. Preoperatively the patients were evaluated for the severity of the major symptoms. The patient's symptoms were graded on a scale of 0 to 3 (0: No symptoms, 1: mild symptoms causing little or no discomfort, 2: moderate symptoms that are interfering in daily activities but not affecting sleep and 3: severe symptoms affecting daily activities and sleep). The presence of other symptoms, such as sneezing, acute/chronic/serous otitis media and headache were also noted in full details. After a detailed nasal endoscopy and CT-scan study, patients underwent the “Messerklinger technique” of Functional Endoscopic Sinus Surgery under general anaesthesia. Three Follow up visits were planned at 4 weeks, 8 weeks, 12 weeks postoperatively. Patients were asked whether these symptoms had improved, remained the same or had become worse after surgery and to give an overall impression of surgical success in the same terms.

Postoperatively, each symptom was reassessed and graded as success or failure (-1: worse, 0: no change, +1: improved). Endoscopic examination was performed postoperatively at 12th week follow up. We used endoscopic staging proposed by Lund-Kennedy to assess the following parameters: nasal mucosal edema (0: absent, 1: minimal, 2: gross), presence of secretion (0: absent, 1: thin, 2: purulent) and presence of polyps (0: absent, 1: present in meatus, 2: present in nasal cavity but not obstructing airway, 3: present in nasal cavity with obstruction of airway). This assessment was performed with the total points corresponding to the sum of values obtained on both sides ranging from 0-14. At 12 weeks postoperative follow up visit, CT scan was planned for patients reporting no improvement or worsening of symptoms. This was to be evaluated as per Lund-Mackay score. All the patients were evaluated by SNOT-22 prior to and following surgical intervention. Each patient completed the SNOT-22 during hospital visit by answering all questions based on a 0–5 scale, where 0 defines no problems with the given symptom and 5 defines maximal problems.⁹ The postoperative SNOT 22 questionnaire was completed 12 weeks after the surgery.

Analysis of Data

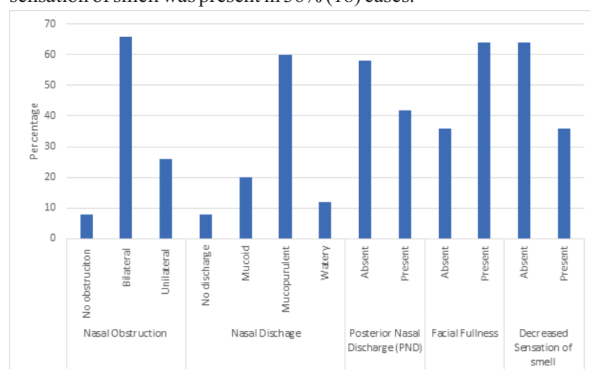
Data was analysed by using paired „t test. The p-value was determined finally to evaluate the levels of significance. The p-value of >0.05 was considered non-significant; p- value of 0.01 to 0.05 as significant and <0.01 as highly significant

RESULTS

Demographic Profile:

A total of 50 patients were included in the study out of which 23 cases (46%) were female and 27 cases (54%) were male, the cases being selected at random. The mean age of our study population was 35.10±13.99 years. Out of 50 patients, 36% (18) cases had allergic symptoms.

Clinical Findings In our study, nasal obstruction was the most common complaint in 92% (46) cases with this being bilateral in 66% patients. 92% (46) cases presented with complaint of nasal discharge out of which 60% (30) cases presented with mucopurulent discharge. Posterior nasal discharge was present in 42% (21) cases. Facial fullness/ heaviness was present in 64% (32) cases. Decreased sensation of smell was present in 36% (18) cases.



Graph 1: Major Presenting Symptoms

HRCT Findings

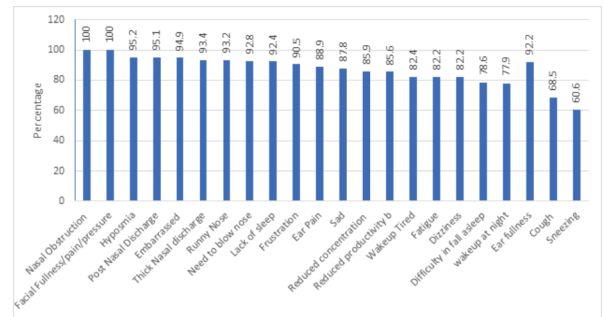
Regarding the HRCT findings for the paranasal sinuses -the Lund Mackay Radiological scoring was followed. The majority (74% on right side and 66% on left side) of patients showed complete opacification of maxillary sinus followed by opacification of anterior ethmoids, posterior ethmoids, frontal and sphenoid sinus. Osteomeatal complex was completely obstructed among 82% of patients on right side and 74% patients on left side. The mean Lund Mackay scores were between 12-24 as most of the patients had stage 3 nasal polyposis.

Endoscopic Findings

Endoscopy grading of polyposis was done on the basis of Lund Kennedy Endoscopy Scale (LKES). Most patients presented with Grade 3 polyposis (polyp completely obstructing the nose), Grade 2 (gross) oedema and Grade 2 (purulent) discharge. Postoperatively endoscopy done at 12 weeks showed no polyposis, mild odema and no discharge in almost all the patients. There was great degree of improvement in Lund Kennedy Endoscopy Score. Clinical findings had a highly significant correlation with endoscopic findings.

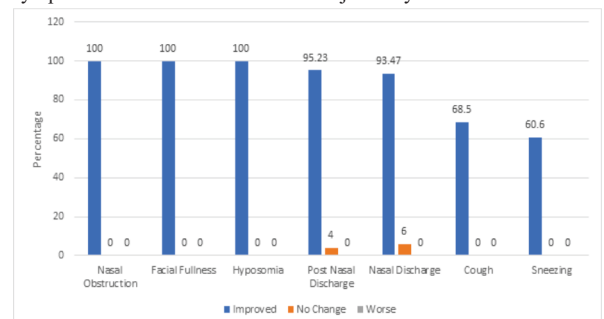
SNOT-22 Score:

The total percentage of improvement in the SNOT-22 Score Study was found to be 86.5%. The maximum improvement was found in the nasal obstruction and least improvement in sneezing.



Graph 2: Improvement in Each Item in SNOT – 22

At 12 weeks follow up in our study, Improvement in nasal obstruction was present in 100% patients, 93.47% in case of nasal discharge, 95.23% in case of post nasal discharge. There was 100% improvement in patients presenting with facial fullness, hyposmia and headache. No patient showed worsening of symptoms postoperatively. P value for all the above symptoms on both sides at 12 week was <0.01 showing a highly significant correlation between preoperative and postoperative symptoms on both sides as assessed subjectively.



Graph 3: Final Outcome at 12 Weeks

DISCUSSION

FESS has a significant impact on quality of life when offered to the patients suffering from chronic rhinosinusitis. This was evident both by endoscopic assessment by LKES as well as by QOL assessment by SNOT-22 scores. Our study showed that FESS produced a significant reduction in all four domains of the SNOT-22 scores. The demography of our study cohort showed that CRS was more common in the middle-aged group with a male predominance. In the study by Pokharel M et al for the outcomes of FESS in patients with chronic rhinosinusitis, 30% cases were in age group of 21-30 years, 24% were in age group of 31-40 years and 30% were more than 40 years of age. The age of patients ranged from 17 to 55 years (mean age 31.87 years) out of which 32 patients (36.8%) were male and 55 (63.2%) were female¹⁰. The literature reveals inconsistencies in differences between age groups. The possible explanation for variability is that prevalence and patterns of CRS might vary by region and population possibly due to environmental differences and development of health care facilities.

On comparing the symptoms, in our study, nasal obstruction was the most common complaint in 92% patients. Same number (92%) of cases presented with nasal discharge. Post nasal discharge was present in 42% cases. Facial fullness/ heaviness was present in 64%. Decreased sensation of smell was present in 36% cases. Our study correlates well with studies by Zoiagi R et al¹¹ and Amodu EJ et al¹² showing almost similar findings related to nasal obstruction, nasal discharge and facial pain. In another study done in 2013 by Pokharel M et al, nasal obstruction was reported in 85.1% cases, post nasal discharge in 27.6% cases, nasal discharge in 25% cases and facial pain in 2.3% cases. The study shows discrepancy which can be explained based on multiple factors (anatomical, pathological etc.) being responsible for symptom manifestations.

Regarding the endoscopy findings in our study, there was great degree of improvement in Lund Kennedy Endoscopy Score postoperatively. In a study done by Srivastava, et al the most common pathological

abnormality detected by nasal endoscopy was inferior turbinate hypertrophy (55% cases -65.9% unilateral and 34.1% bilateral). Polyp at osteomeatal complex area was seen in 46.25% cases (35.13% unilateral and 64.8% bilateral). The next most frequent finding was mucopurulent discharge (41.25%- 63.63% unilateral and 36.36% bilateral)¹³.

Our study showed that FESS produced a significant reduction in all four domains of the SNOT-22 scores. Quality of life and psychology related symptoms showed less improvement because of multiple factors such as the chronic nature of the disease, undiagnosed underlying psychological and sleep disorders.¹⁴ The SNOT symptoms having highest scores showed highest improvement value. This corresponds with previous studies which have cited the relatively greater improvement among more severely affected patients. It is important to note that even the patients with low preoperative symptom scores did experience improvement, although the magnitude of the improvement was less.^{15,16} Sneezing and cough exhibited less improvement in total SNOT-22 scores. Sneezing has significant association with allergic rhinitis which could not be significantly improved after FESS and cases who has habit of using betel nut chewing were found to have poor improvement in postoperative scores. Less improvement in total SNOT-22 scores for cough may be related to an underlying diagnosis of asthma/allergy and therefore, not amenable to improvement through FESS.^{17,18} An alternative explanation may be that cough can be a surrogate marker of laryngopharyngeal reflux (LPR) in this subgroup of population.

Nasal endoscopy score and imaging were not used to quantify the improvement of chronic rhinosinusitis in our study because chronic rhinosinusitis is a symptom-based condition and symptom-free patients usually do not require additional treatment even when they have minor alterations in endoscopic examination or mucosal thickenings in CT scan of paranasal sinuses.

SUMMARY AND CONCLUSION

In the present study of 50 cases, subjective observation showed significant improvement in presenting symptoms post-operatively and objective observation & corrected very well. Our study proves the objective scales of Lund Mackey (radiological) and Lund Kennedy (endoscopic) being excellent tools towards measurement of patient morbidity. Improvement was seen in almost all the symptoms post operatively with no worsening of symptoms. The objective assessment also concluded that FESS is a highly successful treatment for chronic sinus disease ($p < 0.01$). FESS has proven to be a better surgical therapeutic technique over the conventional methods. The success rates are encouraging but because of the nature and chronicity of the disease, longer follow-up may be necessary to assess the long term surgical effectiveness of the procedure. Patient-based outcome measures, such as the SNOT-22 are helpful tools for quantifying morbidity and can be used to predict extent of post-operative improvement.

Declarations

Compliance with Ethical Standards : YES

Disclosure of potential conflicts of interest: No.

Research involving human participants and/or animals: Yes Informed consent: Yes

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