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Functional endoscopic sinus surgery in chronic rhinosinusitis and subjective assessment of its outcome

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Abstract
Rhinosinusitis is a significant health problem which results in large financial burden on society. The study evaluated the prevalence and severity of individual symptoms of chronic rhinosinusitis (CRS) and the impact of endoscopic sinus surgery (ESS) on the symptoms and medication used in patients with CRS. Patients with refractory CRS were assessed prospectively with ESS intervention. We studied the symptoms, change in medical therapy, complications of surgery and effect of other factors like smoking, polyposis and asthma on endoscopy and computed tomography scan scores. A total of 53 patients underwent ESS for CRS. In our study, nasal discharge was the more common symptom observed (41 patients) in the study group and the major clinical sign was hyperaemia of nasal mucosa (41 patients). Further, using FESS technique uncinectomy, anterior ethmoidectomy, posterior ethmoidectomy, maxillary ostia widening, polypectomy and septoplasty were carried out. Endoscopic sinus surgery results in significant improvement in the symptoms of patients with CRS along with a definitive decrease in antibiotic and antihistaminic requirement. We conclude that FESS is an effective treatment for CRS in those who fail to respond to medical treatment.

Keywords: chronic rhinosinusitis, functional endoscopic sinus surgery, stammberger, messerklinger

Introduction
Chronic rhinosinusitis (CRS) refers to a series of disorders characterized by the inflammation of the nasal mucosa and paranasal sinuses. Wide array of factors like environmental materials and host-related anatomic variations such as concha bullosa are involved in the etiology of CRS [1]. The major symptoms of CRS encompass the presence of facial pain or pressure, facial congestion, nasal obstruction, halitosis, headache, and hyposmia are essential for diagnosis. None of the symptoms of the disease-specific; thus, the sign-based diagnosis alone is not reliable and endoscopic surveillance and CT-scan procedures are required for the confirmation of diagnosis [2]. Although this is not life threatening, it impairs the quality of life of many patients. There are several therapeutic options including the application of antibiotics, corticosteroids, antihistamines, nasal lavage, decongestant, immunotherapy, and surgery [3]. FESS is a treatment of choice for those who have not responded to medical treatments [4, 18]. The surgical success rate indicates better quality of life. Several studies have shown that the inflammation degree, shown in CT-scan and/or endoscopic findings, is not correlated with the extent of symptoms experienced by the patient [5, 6].
The major complaints among the symptoms in patients with chronic rhinosinusitis are postnasal drip, and airway obstruction; in addition, constraints in the quality of life of the patients are mainly due to these two symptoms that are most often improvable by sinus surgery, enhancing the life quality in a long-term period [7]. Sinus surgery is a standard clinical treatment for chronic rhinosinusitis. This endoscopic process is based on the principles introduced by Messerklinger. It improves both the performance and permeability of pre-ethmoidal spaces with a precise and guided intervention, resulting in proper ventilation and drainage of facial sinuses [8]. Regarding that several studies suggest the improvement of patients who underwent FESS; this prospective study aims at investigating the role of FESS in the enhancement of the quality of life of the patients with rhinosinusitis. Several instruments have been designed to assess the quality of life, among which five point ranking scale, as a most valid questionnaire, has been used in this study.

Materials and Methods
This study was conducted in the department of Otorhinolaryngology, VIMS Hospital Bellary for a period of 24 months. A total of 53 cases of CRS, aged between 6-66 years were recruited from patients attending otorhinolaryngology department of the institute. The data were recorded as per proforma after taking written in-formed consent and prior permission from institutional ethical committee. Patients with history of previous nasal surgery, nasal malignancy, sinus due to granuloma and sinusitis due to cause where FESS is not indicated were excluded from the study.
The patients were clinically evaluated and followed up with endoscopic nasal examination and preoperative CT scans. Before surgery each patient completed a questionnaire, which catalogued symptoms of CRS. The patients graded the severity of the major symptoms (nasal obstruction, nasal discharge, loss of smell, nasal bleeding, headache, facial painand posterior nasal drip) before and after surgery.
The study population underwent FESS with a standard technique. The surgical procedures were performed along the guidelines described by Messerklinger and Stammberger with modifications from Wigand. The extent of surgery was determined by the severity of disease and extent of involvement of sinuses as per the preoperative CT scan and nasal endoscopy.
The patients were followed up postoperatively for 3 weeks, 3 months, 6 months and one year and the patients were given the questionnaire and their relief from the pre

operative symptoms were recorded.

Further, the quality of life (QOL) were also done using a five point ranking scales and they grades as no complaints (0), to mild (1), moderate (2), severe complaints (3) and intolerable complaints (4). Furthermore, the questions regarding symptoms and QOL were included and they were grades as marked (2), mild (1) and no improvements (0) depending upon the ranking scale.

Results

In the present study, 53 patients were recruited and out of these 26 (49%) were males and 27 (51%) were females and the mean age was found to be 27.34 years.

In our study history of previous treatment were as follows, 19 patients were under antibiotics, antihistamines and decongestant. Meanwhile, 29 patients had received topical steroid spray and 5 patients received systemic steroids. Regarding the previous history sinus surgical procedures 19 patients had undergone antral wash and 8 patients had polypectomy. Further, in our study the nasal discharge was the more common symptom observed (41 patients) in the study group and the major clinical sign was hyperaemia of nasal mucosa (41 patients).In our study, based on the CT scan examination of para nasal sinuses (PNS), 33 patients had unilateral ethmoid plus one dependent sinus.

In our study, using FESS technique the following surgical procedures were carried out in patients as follows, uncinectomy (44 cases), anterior ethmoidectomy (41 cases), posterior ethmoidectomy (4 cases), maxillary ostia widening (51 cases), polypectomy (31 cases) and septoplasty (16 cases) respectively.

Further, using FESS a total of 242 individual operative procedures were performed on 67 sides as follows, uncinectomies (49 sides), anterior ethmoidectomies (54 sides), maxillary ostia widening (59 sides), polypectomies (44 sides), septoplasties (16 sides), posterior ethmoidectomies (8 sides), frontal sinusotomies (4 sides) and sphenoidotomies (8 sides) respectively.

Regarding, complications no major events had occurred and only 8 patients elicited minor complications minor bleeding (3 cases), synechiae (4 cases) and crusting (one case) (Table 1). Post operatively, all the patients were followed regularly and the mean follow up period was 8.2 months. During this, the patients were administered with standardized questionnaire and their subjective improvement of the pre-operative symptoms was assessed. Based on this, 44 patients displayed marked improvement, whilst in 10 patients the symptoms were present and there is no marked improvement. Further, symptoms wise improvement nasal obstruction was effectively reduced in majority of the patients (32 cases), followed by headache (17 cases) and nasal discharge (16 cases).

Finally, after FESS the quality of life (QOL) of patients was improved in 39 patients, whilst in 14 patients QOL was not improved (Table 2).

Discussion

Chronic rhinosinusitis restricts the quality of life of millions of patients. The pathology is based on the chronic inflammation of mucosa of the paranasal sinuses with secretion, stasis and bacterial infection. The symptom manifestation of CRS is varied and for clinical evaluation includes major and minor criteria. The presence of two or more of major criteria or one major and two minor criteria in the history and examination over a 6-12 weeks' time interval is suggestive of CRS. Persistent changes seen on CT scan of the PNS resistant to medical therapy is also considered diagnostic of CRS. FESS was introduced in the 1960s by Professors Messerklinger and Wigand. It was popularized in Europe by Stammberger and subsequently in North America by Kennedy [9]. The health and normal function of the paranasal sinuses and their lining mucous membranes depends primarily on ventilation and drainage. ESS aims at maintaining physiological function and anatomical structure by restoring sinus drainage and ultimately improving sinus mucociliary function. Though ESS has been regarded as a standard carefor refractory CRS, its effectiveness has been questioned. The varied etiologies of CRS, especially allergic and fungal causes, and recurrences after surgery have doubted the impact of FESS. Out of the spectrum of symptoms of CRS, each patient usually has a few symptoms that are more problematic than the others. Before FESS the patient is interested in understanding the effectiveness of surgery on the specific symptoms that affect their quality of life. In our study, the impact of FESS on these common symptoms of CRS that cause impairment of daily routine of patients has been evaluated. Various studies have shown significant improvement of symptoms of CRS after ESS but the success rates of individual symptoms vary [11-12]. The symptom manifestation of CRS is varied and hence the subjective parameters used in the various studies as well as the definition of success are variable resulting in different success rates. In our study the subjective parameters of symptom improvement and objective evaluation of endoscopic scores have been considered for evaluating success. Therefore, we conclude that ESS is an effective treatment for CRS in patients who fail to respond to medical treatment.

Conclusions

Chronic Rhinosinusitis, one of the most common chronic disease, is a significant health problem which results in large financial burden on society. Functional Endoscopic Sinus Surgery results in significant improvement in the symptoms of patients with CRS along with a definitive decrease in antibiotic and antihistaminic requirement. We conclude that FESS is an effective treatment for CRS in those who fail to respond to medical treatment.

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