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Original Research Article

Quality of life: pre-and post-functional endoscopic sinus surgery in chronic rhinosinusitis

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ABSTRACT

Background: Chronic sinusitis (CRS) includes all inflammatory diseases of the nose and paranasal sinuses with a minimum duration of 12 weeks. Physical examination (anterior rhinoscopy, endoscopy) and/or radiography, ideally from sinus computed tomography, can provide objective proof of the same. After failure of conservative treatment, functional endoscopic sinus surgery (FESS) is the preferred modality for chronic rhinosinusitis that has been frequently used over the past years.
Methods: The present prospective study aimed to assess the quality of life (QOL), the nasal endoscopy scores- before and after FESS in 60 patients aged more than 18 years suffering from chronic rhinosinusitis. QOL was assessed using SNOT-20 questionnaire and endoscopy was quantified using Lund-Kennedy sinonasal endoscopy scoring system.
Results: QOL scores were significantly higher ($p<0.001$) before surgery (41.28±15.30) than after FESS (6.83±5.96) indicating improvement in QOL. Lund-Kennedy endoscopy scores of patients suffering from chronic rhinosinusitis before and after surgery was also significantly reduced ($p<0.001$).
Conclusions: This study concludes that there is significant improvement in the QOL and reduction in the severity of symptoms in patients suffering from chronic rhinosinusitis after FESS.

Keywords: Chronic rhinosinusitis, FESS, QOL, SNOT-20, Lund- Kennedy endoscopy scores

INTRODUCTION

Chronic rhinosinusitis (CRS) is defined by clinical presentation of at least two of the four cardinal symptoms-namely, facial pain or pressure, hyposmia or anosmia, nasal discharge, and nasal obstruction-which is present for at least 12 weeks in a row. The diagnosis is supported by objective findings of clinical examination, by anterior rhinoscopy and/or diagnostic nasal endoscopy, and computed tomography of paranasal sinuses.[1] Its estimated prevalence is 1-20% in different parts of the world.[2] Few studies suggest that CRS is more widespread than arthritis and hypertension, with impacts on the QOL, even in comparison to chronic debilitating diseases such as diabetes mellitus and congestive heart failure.

CRS symptoms may range from minor to major. The major symptoms are nasal obstruction, a feeling of facial pressure, rhinorrhea and hyposmia; and the minor symptoms are: headache, toothache, halitosis, fatigue, dry cough, fever and earache.[3] In cases that are refractory to medical management, FESS is the preferred and commonly applied treatment of CRS in the past years.[4] The main point of endoscopic sinus surgery (ESS) is to clear blockage and ensure patency of the osteomeatal complex (OMC)-the common drainage site of the frontal, maxillary, and anterior ethmoid sinuses.[5]

It is hard to measure health and life quality issues. According to the World Health Organization, it encompasses physical, social and mental well-being. Nowadays, it has become very important to assess the QOL in clinical interventions. QOL is the unique personal experience that reflects not only one's health status, but also other factors and circumstances pertaining to the patient's life that only he/she can describe.[6] QOL measures validly and reliably connected to CRS are crucial in the reassessment of CRS treatment outcomes.

The nasal obstructive symptoms evaluation questionnaire is one of the questionnaires that evaluates QOL in rhinologic surgeries, but it is brief and only pertains to the nasal symptoms of the patient. The SNOT-20 was demonstrated to be a valid disease-specific health-related QOL measure for patients with rhinosinusitis. It is a modified version of the 31-item rhinosinusitis outcome measure (RSOM-31), from which 11 redundant parameters were excluded.[6]

But QOL is a subjective entity, i.e., it depends on the particular individual's personal perception. A large number of studies with variable follow-up have focused on the patients' subjective appraisal of results, but objective tests have not been performed. Among the objective methods, sinonasal endoscopy is used to investigate the mucosa before and after therapeutic intervention and is often used to direct ongoing therapy for CRS.[7] The Lund-Kennedy sinus endoscopy scoring system, has been the tool of choice to endoscopically evaluate outcomes of interventions in non-neoplastic sinonasal disease prospectively over time in research and clinical practice.[8]

Relationships between health-related QOL (HRQOL) and the objective measures of chronic rhinosinusitis (CRS) remain elusive for patients choosing for endoscopic sinus surgery (ESS). There is evidence that a patient's subjective symptomatic experience correlates with improved HRQOL following sinus surgery.[5]

The aim of our current study is to assess whether there is improvement in QOL and endoscopy score after FESS in patients suffering from chronic rhinosinusitis.

Objectives of our study included to assess the age and sex distribution of chronic rhinosinusitis, to assess the QOL in patients suffering from chronic rhinosinusitis before and after FESS using SNOT-20 questionnaire, to compare the improvement in the Lund-Kennedy endoscopy scores of patients suffering from chronic rhinosinusitis before and after FESS and to know the relationship between QOL and endoscopy scores in the same patients.

METHODS

The present study was conducted to assess the QOL and Lund-Kennedy endoscopy scores before and after undergoing FESS in patients suffering from CRS.

Study design

Prospective and comparative study design were used.

Study population

Individuals ≥18 years old suffering from CRS who were to undergo FESS, fitting the inclusion and exclusion criteria as mentioned below.

Study period

Study conducted from February to July, 2014.

Sample size

The 60 (considering 95% confidence interval, considering 10% patients who may be lost to follow-up).

Inclusion criteria

Individuals of both sexes ≥18 years old consenting to participate in the study, individuals visiting the OPD of department of otorhinolaryngology, and diagnosed to have chronic rhinosinusitis refractory to medical management and individuals suffering from different categories of CRS (with /without nasal polyps, with fungal allergy) were included in study.

Exclusion criteria

Children (<18 years), pregnant/lactating women and patients who had undergone FESS prior to the study excluded.

A detailed history and thorough clinical examination were documented for every patient and they were subjected to diagnostic nasal endoscopic evaluation. The findings during endoscopy were documented. The criteria for FESS was CRS lasting >12 weeks and refractory to the medical therapy and was based on the endoscopic examination. Informed consents were obtained from all patients.

Self-structured questionnaire was classified into following categories:

Case details

It included name, age, gender, place, education, occupation, date of admission, chief complaints, history of present illness, past medical and surgical history, personal history, family history and treatment history.

Examination

Thorough general physical examination and local examination was performed.

Endoscopy

Observations like polyps, discharge, edema, scarring, and crusting were documented.

Endoscopy was quantified using Lund-Kennedy (score range, 0-2) scoring system (Table 1).

Table 1: Lund-Kennedy (score range, 0-2) scoring system.

Scoring system	
Polyp	0=absence of polyp; 1=polyp in middle meatus only, 2=beyond middle meatus
Edema	0=absent, 1=mild; 2=severe
Discharge	0=no discharge; 1=clear, thin discharge; 2=thick, purulent discharge
Scarring	0=absent; 1=mild; 2=severe
Crusting	0=absent; 1=mild; 2=severe

Adapted from Lund VJ, Kennedy DW. Quantification for staging sinusitis. In: Kennedy DW, editor, international conference on Sinus disease: Terminology, Staging, Therapy. Ann. Otol Rhinol Laryngol. 1995;104(167):17-21.

QOL was assessed using SNOT-20 questionnaire.[8] Specific instruments to assess QOL connected to RS have been developed given the need to better evaluate morbidity, disease progress, and therapy impact.

Patients were operated upon using the Messerklinger's approach with routine antibiotic coverage. This approach prioritizes both the function and the permeability of pre-ethmoidal spaces, in a precise and guided intervention on the lateral wall of the nose, thus bringing about good ventilation and drainage for the paranasal sinuses.[3] Post-operative follow up was done after 6 weeks. Endoscopic evaluation was repeated and patients were asked to answer the SNOT-20 questionnaire again.

The QOL scores obtained from SNOT-20 questionnaire are totalled and the mean value is calculated. Likewise, the Lund-Kennedy endoscopy scores are summated and the mean value is calculated. The values obtained before FESS and after FESS are compared. Later the relationship between QOL and endoscopic scores are calculated, both pre-and post-FESS.

Statistical analysis

Descriptive statistical analysis has been carried out in present study. Results on continuous measurements are presented on mean ± SD (Min-Max). Paired 't' test used to find significance of QOL scores and Lund-Kennedy endoscopic scores before and after FESS. Relationship between QOL and Lund-Kennedy endoscopic scores analysed using Spearman's correlation test.

The statistical software SPSS 16.0 was used for the analysis of the data and Microsoft word, PowerPoint and excel have been used to generate graphs, tables etc.

RESULTS

In this study we have selected 60 individuals ≥18 years old suffering from different categories of CRS (with /without nasal polyps, with fungal allergy) who are to undergo FESS. Out of these, 38 were male patients (63.33%) with the average age of 36.34±14.37 and 22 were female patients (36.7%) with the average age of 32.91±11.43 (Figure 1).

The QOL scores before and after FESS were significantly higher ($p<0.001$) before FESS (41.28±15.30) than after FESS (6.83±5.96) indicating improvement in the QOL after the procedure (Table 2).

Major endoscopy findings were polyps (0.87±0.85), oedema (1.08±0.74) and nasal discharge (1.3±0.61). Post FESS, mean values ± SD were reduced to 0.08±0.27, 0.15±0.36 and 0.12±0.32, respectively (Table 3). The comparison of mean of Lund-Kennedy scores for the endoscopic findings before and after FESS is graphically represented in Figure 2. This shows a significant reduction in each of the symptoms (<0.01).

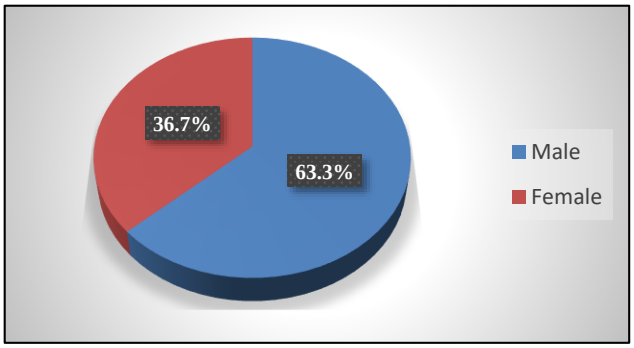

Figure 1: Sex distribution of the patients.

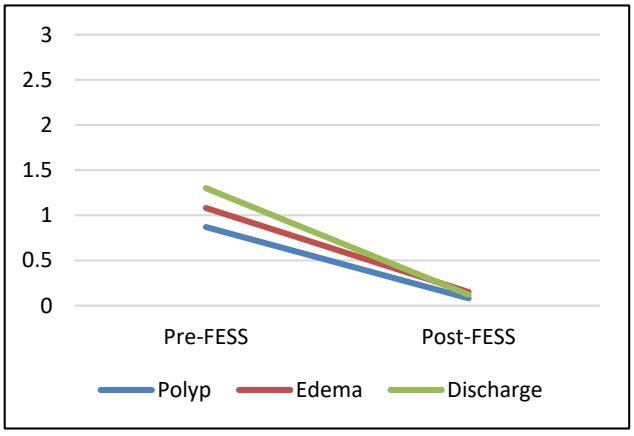

Figure 2: Comparison of mean of Lund-Kennedy scores for endoscopic findings before and after FESS.

The relationship between QOL scores and Lund-Kennedy endoscopy scores post-FESS were analysed using Spearman's correlation test. SNOT-20 scores and Lund-Kennedy endoscopy scores before FESS (41.28±15.30

and 3.25±1.54) show a positive correlation (r=0.242) and the scores after FESS (6.83±5.96 and 6.83±5.96) show a negative correlation (r=-0.192). No statistical significance was observed (p>0.05) (Table 4).

Table 2: Quality of life in patients suffering from CRS before and after FESS using the SNOT 20 questionnaire.

Before FESS (Mean ± SD)	After FESS (Mean ± SD)	T value	P value
41.28±15.30	6.83±5.96	18.28	<0.001

Table 3: Lund Kennedy endoscopy scores of patients suffering from CRS before and after FESS.

Features	Before FESS (Mean± SD)	After FESS (Mean± SD)	T value	P value
Polyp	0.87±0.85	0.08±0.27	7.17	<0.01
Edema	1.08±0.74	0.15±0.36	10.18	<0.01
Discharge	1.30±0.61	0.12±0.32	14.08	<0.01

Table 4: Relationship between QOL and endoscopy scores in the same patients before and after FESS.

Variables	Mean ± SD	T value	P value
Pre-FESS SNOT 20 score	41.28±15.30	0.242	0.06
Pre-FESS Lund Kennedy endoscopy score	3.25±1.54		
Post-FESS SNOT 20 score	6.83±5.96	-0.192	0.14
Post-FESS Lund Kennedy endoscopy score	6.83±5.96		

DISCUSSION

Chronic rhinosinusitis (CRS) is one of the common health problems that leads to frequent visit to primary health care and Otorhinolaryngologists. It contributes to significant amount of health care expenditure due to direct cost arising from hospital visit as well as indirect cost related to missed days at work, and a general loss of productivity due to decreased QOL.[9]

The present prospective study aimed to assess the QOL and the nasal endoscopy scores before and after FESS in 60 patients aged >18 years suffering from chronic rhinosinusitis. In accordance with the results obtained, both these parameters showed statistically significant improvement post-surgery indicating the impact of FESS in patient's QOL (subjective) and clinical picture which was evaluated by endoscopic evaluation (objective).

QOL before and after FESS

Health or QOL is not easy to measure. According to the world health organization, health is a multidimensional concept that encompasses physical, social, and mental states of being.[11] The QOL is assessed using the SNOT-20 questionnaire which contains 20 parameters, and each one is scored from 0-5. The score is then summed and the total score obtained before and after FESS were compared. There was statistically significant reduction in scores post-operatively (Table 2), indicating improvement in the QOL of the patients after FESS.

In a study done by Bezarra et al a statistically significant reduction of SNOT-20 scores was seen pre- and post-operatively on SNOT-20 [1.75 (IQR=2.05) vs. 0.90 (IQR=1.65), (p<0.01, Wilcoxon signed-rank test)] as similar to our study.[6]

According to a study by Netkovski et al, symptom parameter wise- nasal obstruction was postoperatively improved in 87% (0.61±1.2), post nasal discharge in 74.3% (0.89±0.95), anterior nasal discharge in 70.5% (1.1±1.3), headache in 59.4% (0.72±1.1) and hyposmia in 58.7% (0.51±0.91) of the patients.[4] All preoperative versus postoperative sinusitis manifestations were significantly improved i.e., reached statistical significance following surgery (p<0.05).

Such various other studies pointed to a similar conclusion that indicated betterment of patient's QOL, which was graded in terms of the severity of the symptoms, post FESS compared to pre-surgery.

Lund-Kennedy endoscopy scores before and after FESS

All patients were subjected to diagnostic nasal endoscopic evaluation before and after FESS for objective quantification using the Lund-Kennedy scoring system. The characteristics taken into consideration were the presence of polyps, mucosal oedema and discharge. There was a statistically significant reduction in the endoscopic scores post-FESS (Table 3, Figure 2), which indirectly revealed that the patients experienced significant symptomatic improvement after FESS. In a study conducted by Mace et al, patients experienced a statistically significant mean reduction in inflammatory disease characteristics of the sinonasal mucosa as measured by endoscopy (p<0.001) and improvement in all disease-specific HRQOL domains (all p<0.001) approximately 1 year after surgery.[7] The 86.66% of the patients in the study done by Shivakumar et al were symptom free with great relief at the end of 6 month follow-up (p<0.001), requiring no medical treatment after the initial postoperative period.[11] According to Mishra et al, the overall success rate after surgery on patient's own evaluation was found to be 94%, which is significant (p<0.05).[9]

Relationship between QOL and endoscopy scores before and after FESS

Although there was a positive correlation between the QOL scores and Lund-Kennedy endoscopic scores before FESS and a negative correlation after FESS, it was not statistically significant ($p>0.05$). Very few previous studies have addressed consistent correlations between measures of endoscopic examination and survey responses in patients undergoing sinus surgery.

Toros et al reported significant correlations between endoscopy scores and total patient-reported symptoms (on a visual analog scale, 0-10) preoperatively ($r=0.48$; $p<0.001$) and 12 months postoperatively ($r=0.63$; $p<0.001$) in 86 patients with and without polyps.[12] Likewise, Giger et al reported that the percentage of subjective symptom improvement correlated significantly ($r=-0.60$; $p<0.001$) with postoperative endoscopy findings in the ethmoidal cavities of 77 patients with CRS who did not have nasal polyposis.[13] Although the studies are similar, the clinical outcomes measured that showed improvements in HRQOL were subjective-such as changes in nasal obstruction, improved ventilation and olfaction, and reduced facial pressure, and were assessed in smaller populations with varied regard for nasal polyposis. Besides these "subjective" measurements, the discussion of the best, most meaningful tools for treatment outcome control also includes "objective" methods like CT, endoscopic scores etc., which reveal important information regarding the process of the mucosal disease. But they are usually not correlated or, are insufficiently correlated, with patients' complaints.[4]

The results of our study show that there is a statistically significant improvement in the QOL and the severity of symptoms are considerably decreased after undergoing FESS. But the correlation between the SNOT-20 scores and endoscopy scores was not statistically significant. Although the subjective and objective improvements haven't shown significant correlation, there was considerable patient satisfaction towards the outcomes of the surgery, which was the main aim of the procedure. The restriction of QOL in patient with chronic rhinosinusitis is intense and mainly caused by these key symptoms which can be improved by FESS. Bunzen et al believe that the purely subjective symptoms, described by the patients, should guide the medical treatment, as far as for complementary tests to be ordered-CT scan is the foremost, therapeutic to be used. Any study dedicated to measure the efficacy of nasal endoscopic surgery for various pathologies should be based on symptoms. The patients' complaints and how much the disease is limiting their daily activities should be the focus of such analysis.[3]

FESS has a number of advantages- it is very accurate in diagnosis, inaccessible areas of the nose and paranasal sinuses are easy to access, helpful in restoring normal physiology and avoidance of radical surgery.[9] One cause of different results in the literature concerning symptom correlations by endoscopic findings is that different investigators have used heterogeneous populations for the study. The second reason for the differences may be due to different methods of symptom assessment in these patients (SNOT-20 vs other QOL questionnaires). The third factor is the different method of evaluating and scoring endoscopic observations (Lund-Kennedy vs other sinonasal endoscopic systems).

The limitations of this study are as follows: Small sample size (60), shorter period of follow-up (6 weeks).

Despite these factors, our investigation adds to the limited amount of literature regarding the associations between sinonasal endoscopy score and postoperative improvements in HRQOL outcomes.

CONCLUSION

This study concludes that there is significant improvement in the QOL and reduction in the severity of symptoms in patients suffering from chronic rhinosinusitis after FESS. Results also indicated that there was no statistically significant correlation between improvement in QOL and endoscopic scores before and after FESS.

Chronic rhinosinusitis adversely affects the health, social life and economic condition of the patient, either directly or indirectly. These findings underscore the significant impact of this disease on patient QOL, as well as costs of care to patients and society. The traditional approach has been to treat with an antibiotic once or twice, and then send them to a surgeon. FESS has been the preferred mode of treatment in recent times. Our study offers a new insight and enhances the existing literature on the subjective and objective improvements in these patients after FESS, so that individuals suffering from CRS can undergo FESS and reduce their health-care spending in the long-run and increase their productivity, thereby positively affecting economy.

Further studies examining the impact on QOL and endoscopic scores over longer periods of time are needed to assess the long term effects of FESS in chronic rhinosinusitis.

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