Evaluation of quality of life after Functional Endoscopic Sinus Surgery (FESS) in chronic rhinosinusitis patients in Menoufia Governorate

Original Article

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ABSTRACT

Background: Chronic rhinosinusitis has a great impact on the quality of life. Functional endoscopic sinus surgery is the treatment of choice for chronic rhinosinusitis refractory to medical treatment as it allows restoring ventilation and mucociliary clearance. Sino- Nasal Outcome Test 22 questionnaire has been used for evaluating changes in symptoms and predicting the extent of postoperative outcome.

Objective: The aim of the study was to evaluate how functional endoscopic sinus surgery affects the outcome in patients' symptom profile and quality of life.

Patients and Methods: 60 patients indicated for functional endoscopic sinus surgery from March 2017 till December 2018. This prospective study was carried out at the Otorhinolaryngology Department at El-Menoufia University Hospital. For all patients, the Sino-Nasal Outcome Test–22 was completed before and three months after Functional Endoscopic sinus surgery.

Results: 60 patients were enrolled in this study (34 Males and 26 Females) aged from 25 to 40 years old with a mean age of 32.9 ± 5.3. The results of the statistical analysis showed that functional endoscopic sinus surgery reduced the Sino-Nasal Outcome Test–22 questionnaire score with a statistically high significant result ($P \leq 0.001$).

Conclusion: Functional endoscopic sinus surgery statistical significant improvements in disease-specific quality of life for patients with chronic rhinosinusitis.

Key Words: Chronic rhinosinusitis, endoscopic sinus surgery, quality of life, SNOT-22

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INTRODUCTION

Functional endoscopic sinus surgery (FESS) is the most commonly used surgical technique to treat medically unresponsive chronic sinusitis and other serious conditions of the nasal sinuses that result in impaired sinus drainage with an improvement in symptoms of up to 90 percent may be expected as it removes obstructing tissues, allowing the sinuses to drain more naturally. This decrease the severity, frequency, and duration of infections[1].

In order to evaluate the success rate of FESS, an assortment of variable outcome measures exist. One of the principal results of the evaluation is quality of life. The evaluation of patients' health-related quality of life shows a significant role in understanding patients' disease and treatment outcomes. They show how every patient feels about his symptoms, help to personalize the disease with better understand the patients' condition and his expectations with regard to treatment outcomes, and allows the physician to understand how a disease intervenes in everyday life of the patient, and thus improves patient/doctor relationship and treatment outcome[2].

There are many validated tools to evaluate the effect of nasal/sinus complaints upon QoL. Tools used to evaluate the quality of life are either general (generic) health questionnaires for evaluating general conditions or disease-specific questionnaires focused on symptoms of disease[3].

PATIENTS AND METHODS

This is a prospective Cohort clinical trial study carried out from March 2017 to December 2018 at the Otorhinolaryngology (ORL) Department in Menoufia University Hospital after the approval of the ethical committee of the hospital. All patients signed informed consent; the consent form was developed according to the

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stander of Quality Improvement System in the Ministry of Health in Egypt.

Our 60 patients included in our study had chronic rhinosinusitis (CRS) with or without nasal polyps that had not improved after three months of drug therapy and referred to FESS, patients aged from 25 years old to 40 years old, good overall health status and no systemic or localized diseases that might compromise the patient's health.

Exclusion criteria were patients who had previous endoscopic sinus surgery and patients with Psychic illness.

A full history was taken from all patients. General examination was done, followed by head and neck examination, a full nasal and nasopharyngeal examination that completed in the office. Anterior rhinoscopy using a headlight or mirror plus nasal speculum performed prior to any attempts of nasal decongestion. Any evidence of mucopurulent discharge, nasal polyps, enlarged turbinates, nasal septal deviation, or diseased mucosa was noted.

Using rigid naso-endoscopy, decongestion, and anesthesia with a sprayed mixture of 4% lidocaine with phenylephrine to facilitate the examination. Computed topography was done for all patients preoperatively. Routine pre-operative investigations: (Complete Blood Counts, Echocardiography, bleeding profile, liver function, kidney function) were done for all patients. All patients fulfilled the Sinonasal Outcome Test22 (SNOT22) at the day before the operation.

The surgical procedures were performed along with the guidelines described by Messerklinger and Stammberger[4]. The extent of surgery was determined by the severity of disease and the extent of involvement of sinuses as preoperative CT scan and nasal endoscopy. It consisted of uncinectomy, middle meatal antrostomy, anterior ethmoidectomy, posterior ethmoidectomy, sphenoidotomy, frontal sinus procedures, with or without septoplasty and inferior turbinate reduction. Patients underwent functional endoscopic sinus surgery under general anesthesia using rigid naso-endoscopy (zero, 30 and 70-degree 17cm 4mm endoscopy Karl Storz, Germany) and endoscopic equipment with standard instrumentation. Navigation-assisted surgery was not available in our department.

During postoperative care, all 60 cases were hospitalized for 48 hours then were discharged after removal of anterior nasal packing with routine precautions of prophylactic systemic antibiotics (amoxicillin-clavulanic acid 1 gm/ 12 h) orally for 14 days, analgesics (acetaminophen(paracetamol)500 mg / 6h maximum 4gm) orally for 10 days, topical steroids, budesonide spray 64 mcg on each nostril every 12h started 15 days after surgery and continued if necessary . Patients also used alkaline nasal douche solution 20 ml on each nostril every 6 hours started just after removal of anterior nasal packing until the surgical wound was completely healed and no crust was seen in the nasal cavity under endoscopic examination. Follow-up visits were done weekly for the first month then every month. In each visit nasal suctioning was done, crusts were removed and nasal cavity re-examined using rigid nasoendoscopic examination to exclude complications as nasal adhesions. All patients fulfilled the SNOT22 after 3 months postoperatively.

Statistical analysis

Data were collected, tabulated, statistically analyzed using a personal computer with Statistical Package of Social Science (SPSS) version 22 and Epi Info 2000 programs, where the following statistics were applied. Two types of statistics were done: Descriptive statistics e.g. Number (No), percentage (%), mean ($\bar{X}$) and standard deviation (SD), and Analytic statistics: Mann-Whitney test and Wilcoxon test. (*P-value* > 0.05 to be statistically insignificant, *P-value* ≤ 0.05 to be statistically significant and *P-value* ≤ 0.001 to be highly statistically significant)

RESULTS

A total of 60 patients included in this study aged from 25 to 40 years old with a mean age of 32.9±5.3. As shown in (Table 1), there were 34 males and 26 females included in our study. Study participants were asked to complete the SNOT-22 that were compared preoperatively and 3 months postoperatively. The 22-items of the SNOT-22 were categorized into 5 symptom domain scores: rhinologic symptoms domain; extranasal rhinologic symptoms domain; ear/facial symptoms domain; psychological dysfunction domain; and sleep dysfunction domain.

Table 1: Demographics data and diagnosis of studied patients (No.=60)

	Studied patients (No.=60)	
Age (Years) Mean ± SD	32.9±5.3	
	No	%
Gender		
Male	34	56.7
Female	26	43.3
Diagnosis		
CRSwNP	42	70
CRSsNP	18	30

CRSwNP=Chronic Rhinosinusitis with nasal polyps
CRSsNp=Chronic Rhinosinusitis without nasal polyps

Regarding domain of SNOT -22 questionnaire comparison between cases pre and postoperative results, there was a significant high difference in all domains of SNOT22 questionnaire pre and postoperative results (rhinologic symptoms domain, extranasal rhinologic symptoms domain, ear/facial symptoms domain, psychological dysfunction domain and sleep dysfunction domain). (Table 2)

Table 2: Comparison between cases pre and post-operative results as regard domain of SNOT -22 questionnaire

Domains of SNOT questionnaire	Pre-operative	Post-operative	W	*P*
	Mean ± SD	Mean ± SD		
Rhinologic Symptoms Domain	19±4.9	5.1 ± 3.3	6.74	<0.001
Extra-Nasal Rhinologic Symptoms Domain.	5± 1.9	1.16± 1.16	6.7	<0.001
Ear/Facial Symptoms Domain.	8.40 ± 4.37	1.88±2.77	6.5	<0.001
Psychological Dysfunction Domain	14.91± 7.53	2.38± 4.46	6.3	<0.001
Sleep Dysfunction Domain	8.25± 3.49	1.11± 2.76	6.42	<0.001

W=Wilcoxon Signed Ranks Test
P value: NS= Non-significant (*P-value* > 0.05), S = significant (*P -value* ≤ 0.05 HS= highly significant *(P-value* ≤ 0.001).

Regarding the mean scores of SNOT -22 questionnaire domains comparison between males and females patients postoperatively, there was no significant difference between males and females outcome. (Table 3)

Table 3: Comparison between males and females patients post-operative outcome regarding the mean scores of SNOT -22 questionnaire domains

Domains of SNOT questionnaire	Male No.=34	Female No.=26	Maan-whiteny test	*P*
	Mean ± SD	Mean ± SD		
Rhinologic Symptoms Domain	5.11 ± 3.01	5.23 ± 3.86	0.105	0.916
Extra-Nasal Rhinologic Symptoms Domain.	1.14 ± 1.28	1.19 ± 1.01	0.54	0.57
Ear/Facial Symptoms Domain.	1.94 ± 42.60	1.80 ± 3.03	0.30	0.76
Psychological Dysfunction Domain	2.23 ± 3.64	2.57 ± 5.4	0.124	0.90
Sleep Dysfunction Domain	1.17 ± 2.72	1.03 ± 2.8	0.46	0.64

W=Wilcoxon Signed Ranks Test
P value: NS= Non-significant (*P-value* > 0.05), S = significant (*P -value* ≤ 0.05 HS= highly significant (*P-value* ≤ 0.001).

According to diagnosis as regarding the mean scores of SNOT -22 questionnaire domains comparison between patients' postoperative results, there was a significant difference between CRSsNP and CRSwNP in rhinologic Symptoms and extra-nasal rhinologic Symptoms postoperatively, where a decrease of the score in CRSwNP more than CRSsNP indicated better improvement but no difference in other domains results. (Table 4)

Table 4: Comparison between patients post-operative results according diagnosis regarding the mean scores of SNOT -22 questionnaire domains

Domains of SNOT questionnaire	CRSsNP No.=42	CRSwNP No.=18	Maan-whiteny test	*P*
	Mean ± SD	Mean ± SD		
Rhinologic Symptoms Domain	6.19 ± 3.40	2.77 ± 1.69	4.16	0.001
Extra-Nasal Rhinologic Symptoms Domain.	1.38 ± 1.22	0.66 ± 0.84	2.23	0.02
Ear/Facial Symptoms Domain.	2.21 ± 3.14	1.11 ± 1.40	1.01	0.31
Psychological Dysfunction Domain	2.85 ± 5.11	1.27 ± 2.1	1.08	0.27
Sleep Dysfunction Domain	1.30 ± 3.15	0.66 ± 1.4	0.50	0.61

W=Wilcoxon Signed Ranks Test
P value: NS= Non-significant (*P-value* > 0.05), S = significant (*P -value* ≤ 0.05 HS= highly significant (*P-value* ≤ 0.001).

DISCUSSION

Clinical evaluation of chronic rhinosinusitis using major and minor criteria as well as endoscopy and CT-scan are common methods for the diagnosis and handling of the patients. Several studies have shown that the inflammatory degree shown in endoscopic findings and CT-scan are not directly related to the extent of the symptoms experienced by the patient. In that, although endoscopy and CT-scan show slight changes, the patients may have a serious complaint. On the other hand, sometimes the changes are, although large, the patients do not have many complaints. Due to uncertainties in diagnostic criteria and the lack of association between the imaging and symptoms of the disease, the quality of life Inventory is today the strongest evidence for evaluating the response to treatment[5].

In the study, we used SNOT-22 which is a specific questionnaire to analyze the quality of life in sinonasal diseases adapted and validated in several languages and is gaining popularity in other rhinological conditions and procedures[6].

SNOT-22 stems from the SNOT-20. The scoring has been simplified by removing the importance rating and adding two items: nasal blockage and loss of sense of taste and smell. It evaluates nasal, paranasal and psychological symptoms and those associated with sleep. It has 22 questions graded from 0 to 5; 0 meaning no problems and 5 is the worst possible problem. The total sum of the questionnaire score110 numerically indicates the effect of the disease in the QoL of the individual[7].

Regarding the mean scores of SNOT-22 questionnaire domains comparison between males and females patients' postoperative results. In our study, there was no significant difference in improvement in the questionnaire score between males and females, the result of our study was in agreement with a randomized controlled trial study in Iran by Amalia *et al*. and a prospective cohort study in the United States by Adappa *et al*.[8,9]. Also, another retrospective cohort study in the United States by Lal *et al*. and a prospective study in Brazil by Bezerra *et al*.[10,11] showed agreement with our results in this comparison.

Otherwise, a prospective study in Nova Scotians Canada by Macdonald *et al*.[12], studied 26 patients that followed for 3 and 12months postoperatively and concluded greater improvement in the quality of life was reported within males and those below 50 years, after FESS.

Regarding the impact of sinus surgery on sleep outcomes, in our study FESS improved sleep outcomes. Symptoms of excessive sleepiness and daytime fatigue are frequent complaints of patients with CRS. Because the effects of CRS are not only local but also systemic and that furthermore, FESS improves systemic cytokines levels by decreasing disease burden, it makes sense that FESS correspondingly improve sleep outcomes.

Result of our study was in agreement with a study in Canada done by Rotenberg *et al*.[13], and another prospective multisite cohort study in the United States with a population-based sample of 405 adults by Alt *et al*.,[14] concluded that patients with CRS have a high prevalence of sleep dysfunction that significantly improved following FESS.

Regarding pre and postoperative improvement as regard domain of SNOT -22 questionnaire, our study showed that all items of the questionnaire were highly significantly improved. Functional endoscopic sinus surgery is a minimally invasive technique used to restore sinus ventilation and normal function. It is the treatment of choice for CRS patients not responding to drug therapy

as it removes obstructing tissues, allowing the sinuses to drain more naturally.

The result of our study was in agreement with a prospective cohort study performed in Morrocco by Laababsi *et al*.,[15] showed that FESS improves all domains of QoL. In a prospective cohort study in Finland by Alakärppä *et al*.,[16] showed also improvement in SNOT-22 score after both septoplasty and endoscopic sinus surgery. In a retrospective analysis of prospectively collected patient data at the University of Virginia in the United States by Kennedy *et al*.,[17] showed that with optimal surgical intervention (and postoperative medical management), FESS is an extremely effective treatment of CRS. Patient-based outcome measures, such as the SNOT-22, are helpful tools for quantifying changes in symptoms and, can be used to evaluate the extent of postoperative improvement. In a prospective cohort study in England and Wales by Hopkins *et al*.,[18] evaluate the effect of surgical treatment of CRS (with or without nasal polyp) on QoL using SNOT-22, 3128 patients with CRS were evaluated, confirmed significant improvement in the SNOT-22 score at 3, 12, and 36 months after surgery.

Regarding patients' postoperative improvement according to diagnosis, our study showed greater SNOT-22 improvement in those with polyps more than without polyps. Our results were in agreement with a prospective study in Brazil by Kosugi *et al*, a prospective study in Iran by Saedi *et al*, and another retrospective study in the United States by Zhang *et al*[19,20,21].

Our results were in disagreement with study in Brazil by Mascarenhas *et al*.,[22] that comprised of 38 patients with no difference in SNOT-22 improvement between polyp and non-polyp patients.

Many studies have shown the impact of functional endoscopic sinus surgery on QoL using disease-specific questionnaires, but to this date, there had been no studies of this sort done in El- Menoufia University hospital.

CONCLUSION

The outcome of chronic rhinosinusitis has significantly improved after functional endoscopic sinus surgery with better results regarding patients' local nasal, extranasal, psychological, ear/facial, and sleep dysfunction manifestations.

CONFLICT OF INTERESTS

There are no conflicts of interest

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