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Quality of life after functional endoscopic sinus surgery in patients with chronic rhinosinusitis

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Abstract

Background and objective: Chronic Rhinosinusitis characterized by inflammation of the mucosa of the nose and paranasal sinuses. The degree of sinonasal inflammation as measured by CT- scan or endoscopy fails to correlate with the extent of symptoms experienced by the individual patient. This study aimed to evaluate the effect of functional endoscopic sinus surgery in improving symptoms profile and quality of life for patients complaining of chronic rhinosinusitis.

Methods: A prospective clinical study extended from January 2013- January 2015 & included 30 patients above 18 years old of chronic rhinosinusitis without polyp who were treated by functional endoscopic sinus surgery. The data were collected and interpreted using Sinonasal Assessment questionnaire -11 (SNAQ-11).

Results: A total of 30 patients were included in the study; 18 patients were males (60%), and 12 patients were females (40%). Most of the patients (40%) were among the age group 25-34 years. The result shows no significant association between age and mean difference in SNAQ-11 score. The main preoperative complaint of our patients was the nasal obstruction (100% of patients), followed by nasal congestion (93.3%), and least complaint was sneezing (20%) and earache (20%). There was a statistically significant association between the patient's symptoms and SNAQ-11 score with a significant reduction in the total SNAQ-11 score after surgery.

Conclusion: Functional endoscopic sinus surgery performed for chronic rhinosinusitis cases has been associated with significant improvement in the quality of life after 12 months follow up & the best outcome was for nasal obstruction

Keywords: Chronic Rhinosinusitis; Functional Endoscopic Sinus Surgery (FESS); Quality of Life; Sinonasal Assessment Questionnaire -11

Introduction

Chronic Rhinosinusitis (CRS) is a group of disorders characterized by inflammation of the mucosa of the nose and paranasal sinuses and symptoms lasts more than 12 weeks.[1] The hallmark of CRS is inflammation of the mucosal linings, in the practice setting, the focus is on those patients in whom this inflammation leads to symptoms.[1,2] Therefore, for improving symptoms, therapies used for treatment of CRS are aimed at the inflammation and the inciting factors causing that inflammation.[2] Clinicians have traditionally focused on objective findings in order to assess response after a given treatment and numerous studies have shown that the degree of sinonasal inflammation as measured by CT- scan or endoscopy fails to correlate with the extent of symptoms experienced by the individual patient. A patient may, therefore, have debilitating symptoms with only minimal mucosal thickening or vice versa.[3] One immeasurable result of any disease such as rhinosinusitis is the impact on quality of life (QoL). Recent efforts to evaluate the impact of disease on QoL and the outcome of the disease have clarified the importance of such impacts.[1] QoL is

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a unique personal experience that reflects not only health status, but other factors in a patient's life which can only be described by each individual patient,[4] or it may be defined as the difference between expectations and experience.[5] When we consider the QoL impact from the rhinosinusitis-related symptoms and the associated emotional and functional impairments, it can be assumed that rhinosinusitis has a dramatic impact on patients' lives. This, in turn, will affect their sense of well-being, which can ultimately affect work productivity and life satisfaction.[1] Overall the symptoms of CRS are not life threatening, but they are associated with a dramatic reduction in QoL.[6] It is of great importance for the ENT surgeons to be able to demonstrate and evaluate the clinical effectiveness of functional endoscopic sinus surgery (FESS). For that purpose, a lot of "outcome measures" are used: Visual Analogue Score (VAS), Sino Nasal outcome Test (SNOT-20), Sino Nasal Assessment Questionnaire (SNAQ-11), Quebec French-Rhinosinusitis Outcome Measure (QF-ROM) and many others developed in different ENT departments.[7-9] The SNAQ -11 was validated in the year 2000.[10] It covers all main symptoms of CRS. It differs from the commonly used SNOT-20 measures as the latter contains no reference for nasal obstruction and headache that are common sinonasal symptoms.[8] In this study, we aimed to explore the effect of FESS, which is the most widely used surgical treatment for CRS, in improving symptoms profile and QoL for patients suffering from CRS, and explore the main symptoms relieved by FESS depending on patients' satisfaction.

Methods

This is a prospective study has been conducted at Otolaryngology Department of Rizgary Teaching Hospital-Erbil city/Iraq, for the period from January 2013 to January 2015 and performed on 30 patients with clinical presentation, endoscopy examination and CT-scan changes of chronic rhinosinusitis (CRS) without a polyp. The diagnostic criteria of CRS were according to EPOS 2012 (European position paper on rhinosinusitis 2012).[8] The inclusion criteria included age > 18 and patient with CRS without polyp with the failure of medical treatment to resolve the condition for more than 12 weeks. The exclusion criteria included previous endoscopic sinus surgery, sinonasal tumors, congenital anomalies (primary ciliary dyskinesia, cystic fibrosis, craniofacial anomalies), immune deficiency, nasal polyposis (excluded because it needs more follow up time to evaluate the effect of the surgery on patient), and patients who refused to be enrolled in the study. A full ENT history was done for all the patients with a focus on detailed sinonasal symptoms, including nasal obstruction, nasal discharge, facial pain, and all other symptoms mentioned in our questionnaire. Then, detailed ENT examination done, including an endoscopic examination of the nose. CT-scan imaging was done for all patients to aid our diagnosis and as a roadmap for surgery. All surgeries were performed under general anesthesia with orotracheal intubation and hypotensive technique. The extent of surgical procedure was according to the severity and extent of the disease depending on clinical, endoscopic, radiological and intraoperative findings. The performed operation includes; uncinectomy, middle meatal antrostomy, anterior and posterior ethmoidectomy, or opening of the sphenoid sinus. No one of our patients had diseased frontal sinus. All surgeries performed uneventfully, and no major postoperative complications were seen apart from mild nasal bleeding which managed conservatively. During postoperative care, patients were given systemic (oral) antibiotic (amoxicillin 500 mg/ clavulanic acid 125 mg, three times daily for one week), frequent isotonic normal saline nasal douching, and topical nasal steroid (mometasone 50 mcg twice

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daily, started one week after surgery). All patients were regularly reviewed following surgery to perform endoscopic nasal cleansing, removal of crusts and release adhesions. The data were collected using the Sinonasal Assessment Questionnaire - 11 (SNAQ-11). This questionnaire contains 11 questions covering most of the symptoms of sinonasal diseases. Every patient asked to answer the questionnaire two times, first, preoperatively and second, 12 months after surgery. The severity of the symptoms evaluated by a score ranging from (0-5), with 0 = no problem, 1 = very mild problem, 2 = mild to slight problem, 3 = moderate problem, 4 = severe problem, and 5 = problem as bad as it can be. The first two items (nasal obstruction and nasal congestion) were multiplied by 3, and the 3rd item (facial pain) was multiplied by 2 (because of the significance of these three symptoms), so the total score is ranged from 0 to 80. The sum of the numeric scores of all questions in pre and post-operative forms were collected for comparison and a percentage of change in score obtained.

Ethical considerations:

Verbal consent was taken from each patient after explaining the procedure and the purpose of the study.

Data Entry and Statistical Analysis:

Data were analyzed using the statistical package for the social sciences (version 19). The Kruskal Wallis test was used to compare ranks of the difference in QoL scores between the age groups. The Mann -Whitney test was used to compare ranks of the difference in QoL scores between the genders. The Wilcoxon signed ranks test was used to compare ranks of QoL before and after FESS. McNemar test was used to compare proportions of symptoms before and after the FESS. A *P* value of ≤0.05 was considered statistically significant.

Results

Gender distribution.

A total of 30 patients were enrolled in this prospective study, 18 patients were male (60%), and 12 patients were female (40%) as shown in Figure 1. There was no statistically significant association between gender and mean difference of SNAQ-11 score (Table1).

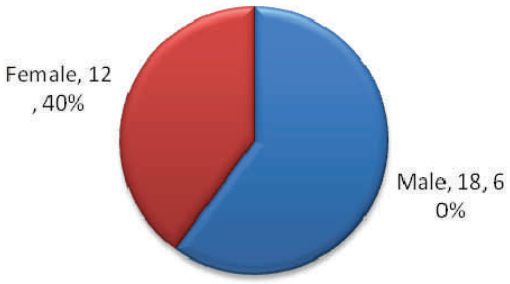

Figure: Distribution of patients by gender.

Table 1: Gender and SNAQ-11 score.

Gender	N=30	Pre-op. mean SNAQ score	Post-op. mean SNAQ score	Mean Difference	*P* value*
Male	18	38.278	12.056	26.22	0.318
Female	12	35.667	11	24.66	

*By Mann Whitney test

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Age Distribution

The age of patients was between 19-52 years. Figure 2 shows that most of the patients (40%) were among the age group 25-34 years, followed by age group 35-44 years (30%). The result shows non-significant statistical association between age groups and mean difference in SNAQ-11 score, with *P* = 0.775 as shown in Table 2.

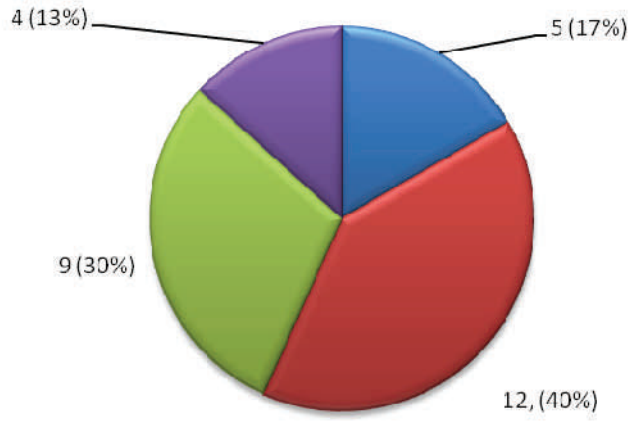

Figure 2: Age groups distribution of patients.

Table 2: Age groups and SNAQ-11 score.

Age groups	N=30	Pre-op. mean SNAQ score	Post-op. mean SNAQ score	Mean difference	*P* value*
< 25	5	42.4	16	26.40	
25-34	12	39.75	12.08	27.66	0.775
35-44	9	37.78	11.22	26.55	
45+	4	29.5	5.75	23.75	

*By Kruskal Wallis test

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Symptoms Distribution

The main preoperative complaint of our patients was nasal obstruction (100%) patients, followed by nasal congestion (93.3%), facial pain (90%), anterior nasal discharge (86.7%), and least complaint was sneezing (20%) and earache (20%) as shown in Table 3. There was a statistically significant association between the patient's symptoms and SNAQ-11 score except for cough as shown in Table 4.

Table 3: Prevalence of symptoms before & after surgery (FESS).

Symptoms	Pre-operative prevalence %	Postoperative prevalence %	*P* value*
Nasal obstruction	100	56.7	NA
Nasal congestion	93	50	<0.001
Facial pain	90	43.3	<0.001
Runny nose	86	56.7	0.004
Postnasal discharge	70	40	0.004
Sneezing	20	13.3	0.50
Cough	30	20	0.25
Reduced smell	80	53.3	0.008
Headache	76	50	0.008
Earache/Ear fullness	20	13.3	0.50
Sleep disturbance / fatigue	70	46.7	0.016

By McNemar test*

Table 4: Association between patients SNAQ score and symptoms.

Symptoms	Pre-op. mean score (± SD)	Post-op. mean score (± SD)	Mean difference	*P* value*
Nasal obstruction†	10.90 (± 3.199)	3.40 (± 3.997)	7.5	<0.001
Nasal congestion†	8.80 (±4.012)	2.60 (± 3.318)	6.2	<0.001
Facial pain†	5.13 (± 2.446)	1.33 (± 1.845)	3.8	<0.001
Runny nose	2.87 (± 1.502)	0.93 (± 1.015)	1.94	<0.001
Post nasal discharge	2.27 (± 1.78)	0.63 (± 0.89)	1.64	<0.001
Sneezing	0.37 (± 0.809)	0.17 (± 0.461)	0.20	0.034
Cough	0.50 (± 0.861)	0.27 (± 0.583)	0.23	0.066
Reduced smell	2.30 (± 1.299)	0.80 (± 0.887)	1.5	<0.001
Headache	2.37 (± 1.671)	0.77 (± 0.898)	1.6	<0.001
Earache/Ear fullness	0.40 (± 0.855)	0.13 (± 0.346)	0.27	0.023
Sleep disturbance/fatigue	1.60 (± 1.404)	0.60 (± 0.724)	1.00	<0.001

*By Wilcoxon signed ranks test
†These variables (nasal obstruction & nasal congestion) were multiplied by 3.
†This variable (facial pain) was multiplied by 2

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There was a statistically significant reduction in the total SNAQ-11 score before and after surgery (FESS) as shown in Table 5.

Discussion

This study has been conducted in the Otolaryngology Department and performed on 30 patients aged 19-52 years. The duration of follow up in our study was 12 months, while the follow-up period in other studies that conducted in Delhi (India, 2006) USA (2010), China (2008) and Karnataka (India, 2002) were; 9, 36, 12, 24 and 31 months, respectively.[11-15] Our study shows that most of the patients (40%) were among the age group 25-34 years, followed by age group 35-44 years (30%). This age distribution is comparable to study done in the USA in 2010 who found (30%) of patients belong to age group 21-30, and (27%) belongs to age group 31-40.[12] This age group distribution may be due to that young age patients are more concerned and interested in their health and therefore in their QoL. There was no statistically significant difference in score between age groups (P = 0.775). Most of our patients were male (60%); this gender distribution may be due to the cultural and social specificity of our community that female patients may be neglected or may be due to the small number of patients included in our study. This gender distribution was similar to the study conducted in Brazil in 2012 in which most patients were male 60.5%,[16] but it differs from study conducted in Boston (USA) in 2004 who found a female to male ratio was 2:1.[17] According to our results, there was no statistically significant difference in SNAQ-11 score of male and female patients (P = 0.318), which is similar to study conducted in Brazil 2012 (P = 0.484).[16] In our study, most common symptoms were the nasal obstruction (100%), facial pain (90%), nasal congestion (93%), nasal discharge (86%), and reduced smell (80%). In Brazil study done in 2006 which concluded the most common presenting symptoms were the nasal obstruction (94%), postnasal discharge (86%), and reduced smell (63%). In another study, the presenting symptoms were the nasal obstruction (92%), postnasal discharge (87%), and reduced smell (66%).[15] While other study conducted in India at 2010, it concluded that the most common symptoms were postnasal discharge (95%), headache (91%), nasal discharge (90%), and nasal obstruction (86%).[11] These differences in presenting symptoms are probably due to environmental, racial, and social variations between different communities. In our study, the greatest reduction in score was in nasal obstruction from the pre-operative score (10.9) to post-operative score (3.4), nasal congestion (from 8.8 to 2.6) and facial pain (from 5.1 to 1.3). This is a suspected outcome of FESS, as one of the aims in this type of surgery is to relieve the obstructed osteomeatal area and removal of hypertrophied mucosa resulting in better ventilation and drainage for the diseased sinuses. The least change in the score was in sneezing (from 0.37 to 0.17),

Table 5: Association between SNAQ score change and operative status.

	SNAQ-11_scores Before FESS	SNAQ-11 scores After FESS	Difference	*P* value*
Mean	37.2333	11.6333	25.6000	
Std. Deviation	10.60151	8.05791	6.11725	<0.001*
Minimum	21.00	2.00	14.00	
Maximum	59.00	30.00	43.00	

*By Wilcoxon signed ranks test

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and cough (from 0.50 to 0.27), as these symptoms are more related to allergy and gastroesophageal disorders than mechanical obstruction, and suspected to respond better to medical treatment later on, especially after surgical clearance of the obstructed region in the nasal cavity permitting better environment for local medications to reach previously unreachable mucosa. These findings are comparable with study conducted in India in 2010, which found significant change in nasal obstruction, post-nasal discharge, headache, facial pain, and nasal discharge.[11] Another study conducted in USA in 2004 also found statistically significant change in facial pressure, nasal congestion, nasal obstruction, and hyposmia.[17] Another study by Fahmy in 2002 found a higher change in nasal obstruction and facial pain scores, with lower change in cough and ear symptoms.[8] Functional endoscopic sinus surgery had a positive association with chronic rhinosinusitis (CRS) patients' QoL as seen in the statistically significant difference observed in QoL scores (SNAQ-11) before (37.23) and after (11.63) surgery (P = 0.001). This finding similar to study performed by Bezzera TFP. et al. (2012),[16] Ling et al. (2007),[19] Netkovski J. et al. (2006),[20] and Bhattacharrya N. et al. (2004).[17]

Conclusion

Functional endoscopic sinus surgery performed in patients with chronic rhinosinusitis has been associated with statistically significant improvement in the QoL after twelve months follow up. The best outcome of Functional endoscopic sinus surgery in our study was for nasal obstruction, nasal congestion, facial pain, and nasal discharge, and the least changes in score were for sneezing and cough. Further studies are recommended on the correlation between subjective and objective outcomes of functional endoscopic sinus surgery and to follow up a larger number of patients for a longer period.

Competing interests

The authors declare that they have no competing interests.

References

1. Benniger MS. Rhinosinusitis. In: Gleeson M, Browning GG, Burton MJ, et al. Scott-Brown's otorhinolaryngology, Head and Neck Surgery. 7th ed. London: Hodder Arnold; 2008. P. 1439–48.
2. Palmer JN, Kennedy DW. Concepts of Endoscopic Sinus Surgery: Causes of Failure. In: Flint PW, Haughey BH, Lund VJ. Cummings Otolaryngology Head & Neck Surgery. 5th ed. Philadelphia: Mosby Elsevier; 2010. P. 759–74.
3. Solar ZM, Smith TL. Quality of Life Outcomes after Functional Endoscopic Sinus Surgery. Otolaryngol Clin North Am 2010; 43(3):605–12.
4. Piccirillo JF, Merritt MG JR, Richards ML. Psychometric and clinimetric validity of the 20-item Sino-Nasal Outcome Test (SNOT-20). Otolaryngol Head Neck Surg 2002; 126:41–7.
5. Calman KC. Quality of life in cancer patients- an hypothesis. J Med Ethics 1984; 10(3):124–7.
6. Van Oene CM, Van Reij EJ, Sprangers MA, Fokkens WJ. Quality- assessment of disease-specific quality of life questionnaires for rhinitis and rhinosinusitis: a systematic review. Allergy 2007; 62(12):1359v70.
7. Lund VJ, Scadding GK. Objective assessment of endoscopic sinus surgery in the management of chronic rhinosinusitis: an update. J Laryngol Otol 1994; 108:749–53.
8. Fahmy FF, McCombe A, Mckiernan DC. Sino nasal assessment questionnaire, a patient focused rhinosinusitis specific outcome measure. Rhinology 2002; 40:195–7.
9. Durr GD, Desrosiers M. Evidence-based endoscopic sinus surgery. J Otolaryngol 2003; 32:101–6.
10. Fahmy F, McCombe A, Hicklin L. Outcome Measures for endoscopic sinus surgery. Proceedings of the 4th European Congress of Oto -Rhino-Laryngology, Head and Neck Surgery, Monduzzi Editore, Milano 2000; 1:397–02.
11. Nair S, Bhadauria RS, Sharma S. Impact of Endoscopic Sinus Surgery on Symptom Manifestation of Chronic Rhinosinusitis. MJAFI 2010; 66:415.
12. Mishra DK, Bhatta R, Verma LR. Quality of life after functional endoscopic sinus surgery. Nepal Jor of Otol Head & Neck Surg 2010; 2(1):6–8.
13. Mace JC, Michael YL, Carlson NE, Litvack JR, Smith TL. Correlations between endoscopy score and quality of life changes after sinus surgery. Arch Otolaryngol Head Neck Surg 2010; 136:340–6.
14. Li Y, Zhang GH, Liu X. Clinical prognostic factors of chronic rhinosinusitis after endoscopic sinus

https://doi.org/10.15218/zjms.2018.023

surgery. ORL J Otorhinolaryngol Relat Spec 2008; 70:113–7.
15. Damm M, Quante G, Jungehuelsing M, Stennert E. Impact of functional Endoscopy Sinus Surgery on Symptoms and Quality of Life in Chronic Rhinosinusitis. Laryngoscope 2002; 112:310–5.
16. Bezerra TFP, Piccirillo JF, Fornazieri MA, Pilan RR, Pinna Fd, Padua FG, et al. Assessment of quality of life after endoscopic sinus surgery for chronic rhinosinusitis. Braz J Otorhinolaryngol 2012; 78:96-102.
17. Bhattacharyya N. Symptom outcomes after endoscopic sinus surgery for chronic rhinosinusitis. Arch Otolaryngol Head Neck Surg 2004; 130(3):329–33.
18. Bunzen DL, Campos A, Leão FS, Morais A, Sperandio F, Caldas Neto S. Efficacy of functional endoscopic sinus surgery for symptoms in chronic rhinosinusitis with or without polyposis. Rev Bras Otorrinolaringol 2006; 72(2):242-6.
19. Ling FT, Kountakis SE. Important clinical symptoms in patients undergoing functional endoscopic sinus surgery for chronic rhinosinusitis. Laryngoscope 2007; 117(6):1090–3.
20. Netkovski J, Sirgovska B. The impact of functional endoscopic sinus surgery on symptoms in chronic rhinosinusitis. Prilozi 2006; 27(2):167–74.