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Original Research Article

Effect of endoscopic sinus surgery on general health related quality of life domains in chronic rhino sinusitis patients

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ABSTRACT

Background: Chronic rhino sinusitis (CRS) is a common health problem affecting around 5-12% of the general population in a year. Treatment of CRS consist of medical and surgical management. Surgical management is considered when patient is not responding to maximal medical treatment or in case of complication. Sino nasal outcome test 22 (SNOT- 22) is considered as the most appropriate instrument in the evaluation of HRQOL impairment in CRS patients. This study evaluated general health related quality of life (QOL) domains of SNOT- 22 changes following endoscopic sinus surgery.
Methods: This study was conducted in 53 subjects who underwent endoscopic sinus surgery for chronic rhino sinusitis in Department of otorhinolaryngology, Government Medical College, Kottayam over a period of one year. Detailed history including SNOT-22 questionnaire enquired. Clinical, radiological and endoscopic examinations were performed. This patient followed up after 1 week, 1month and 3 months. SNOT-22 scores were recorded at each visit; data compiled and analysed with help of SPSS.
Results: The baseline SNOT-22 score for study population was 37.51. General health related quality of life domains was assessed separately. The score for psychological dysfunction and sleep dysfunction decreased from 10.72, 6.00 to 1.58 and 1.02 respectively at the end of 3 months.
Conclusions: Chronic rhinosinusitis patients reported significant improvement in psychosocial dysfunction and sleep related symptoms after endoscopic sinus surgery. Chronic rhino sinusitis patient with anxiety and depressive disorders need special attention to improve health related quality of life (HRQOL).

Keywords: CRS, HRQOL, Sleep dysfunction, Psychological dysfunction

INTRODUCTION

Chronic rhino sinusitis (CRS) is a common health problem causing frequent visits to primary care physicians and ear, nose, throat specialists. It affects around 5-12% of the general population in a year.[1] Chronic rhinosinusitis have two phenotypes; CRS with polyps (CRSwNP) and without polyps (CRSsNP). Treatment of CRS consist of medical and surgical management. Surgical management is considered when patient is not responding to maximal medical treatment or in case of complication.[2]

A number of health-related quality-of-life (HRQOL) evaluating instruments have been developed in past few decades. According to recent systematic reviews Sino-nasal outcome test 22 (SNOT- 22) is considered as the most appropriate instrument in the evaluation of HRQOL impairment in CRS patients.[3] SNOT-22 questionnaire scoring was analysed by dividing the questions into five domains.[4] These are sinus-specific symptom domains (rhino logic, extra rhino logic and ear/facial symptoms) and general health-related QOL domains (psychological and sleep dysfunction).[5] Our study evaluated general

health related QOL domains and changes following endoscopic sinus surgery.

METHODS

After getting approval from departmental scientific review committee, institutional review board and ethical committee the study was initiated in February 2018. Consenting patients satisfying the inclusion criteria were selected for the study. Details of the patients were enquired which includes age, gender, and duration of medical therapy. After a detailed history during preoperative period, patients were provided with the standard Sino Nasal Outcome Test (SNOT-22) questionnaire (Table 1) which was translated to Malayalam. It is a 22-symptom questionnaire.

Table 1: Sino nasal outcome test chart.

	No problem	Very mild	Mild/ slight	Moderate	severe	Problem bad as it can be	Most important item
Need to blow nose	0	1	2	3	4	5	[ ]
Sneezing	0	1	2	3	4	5	[ ]
Runny nose	0	1	2	3	4	5	[ ]
Nasal obstruction	0	1	2	3	4	5	[ ]
Loss of smell/taste	0	1	2	3	4	5	[ ]
Cough	0	1	2	3	4	5	[ ]
Post-nasal Discharge	0	1	2	3	4	5	[ ]
Thick nasal discharge	0	1	2	3	4	5	[ ]
Ear fullness	0	1	2	3	4	5	[ ]
Dizziness	0	1	2	3	4	5	[ ]
Ear pain	0	1	2	3	4	5	[ ]
Facial pain/pressure	0	1	2	3	4	5	[ ]
Difficulty in falling asleep	0	1	2	3	4	5	[ ]
Waking up at night	0	1	2	3	4	5	[ ]
Lack of good night sleep	0	1	2	3	4	5	[ ]
Waking up tired	0	1	2	3	4	5	[ ]
Fatigue	0	1	2	3	4	5	[ ]
Reduced productivity	0	1	2	3	4	5	[ ]
Reduced concentration	0	1	2	3	4	5	[ ]
Frustrated/restless/ Irritable	0	1	2	3	4	5	[ ]
Sad	0	1	2	3	4	5	[ ]
Embarrassed	0	1	2	3	4	5	[ ]
Total							
Grand total (all columns together)							
B. Please check off the most important items affecting your health in the last column (max of five items)							

Sino-nasal outcome test [snot-22] scores. A. Considering severity and frequency of your problem, please rate each item below on how ”bad” it is by circling the number that corresponds with how you feel using this scale. Grand total (all columns together); B. Please check off the most important items affecting your health in the last column (max of five items)

Table 2: General health related QOL domains.

Psychological dysfunction	**a)** Waking up tired **b)** Fatigue **c)** Reduced concentration **d)** Reduced productivity **e)** Frustrated/Restless/Irritable **f)** Sad **g)** Embarrassed	0-35
Sleep dysfunction	a) Difficulty in falling asleep b) Waking up at night c) Lack of good night sleep d) Waking up tired e) Fatigue	0-25

Scoring was conducted using Likert scale response according to which 0=" No problem", 1=" Very mild problem", 2=" Mild or slight problem", 3=" Moderate problem", 4=" Severe problem", and 5=" Problem as bad as it can be". Total score was then calculated and mean score of all patients were computed. After clinical examination routine pre-operative investigations like computed tomography (CT) scan para nasal sinus and diagnostic nasal endoscopy were done. CT scan findings were evaluated using Lund- Mackay CT score and endoscopy findings using Lund-Kennedy score.[6,7] Post procedure SNOT-22 questionnaire was given to patient during usual follow up consultations i.e. at the end of 1st week, 1st month and 3rd month. During analysis we evaluated general health related QOL4 domains separately (Table 2).

Data collected were coded and entered in Microsoft excel and analysed using Statistical package for the social sciences (SPSS) software. Qualitative variables were summarized using mean frequency and percentage, while quantitative variables were summarized using mean and standard deviation. Association between qualitative variable were tested using chi-square test. Association between quantitative variables were tested using independent and paired t test, significance level will be fixed at a $p< 0.05$.

RESULTS

The results of our study are presented in table 3-5. Mean age of study population was 42.55 with standard deviation (SD) of 12.8 years. Study population consisted of 64.2% males and 35.85% females. In the total population, 66% were chronic rhinosinusitis (CRSwNP) with polyposis and rest were chronic rhinosinusitis without polyposis (CRSsNP) (table 3).

Table 3: Baseline characteristics of subjects (n=53).

Characteristics	Number	N (%)
Males	34	64.2
Females	19	35.8
CRS with Polyp	35	66
CRS without polyp	18	34

Table 4: Preoperative scores.

Characteristics	Score (mean+/-SD)	
CT score	11.17 (4.702)	
Endoscopy score	7.85 (2.727)	
SNOT - 22 average score	37.51 (15.218)	
General health related QOL Domains		**Range**
Psychological	10.72 (7.050)	0-35
Sleep dysfunction	6 (5.519)	0-25

Preoperative CT (Lund and MacKay) score was 11.17 (SD 4.7) while nasal endoscopy (Lund and Kennedy) score was 7.85 (SD 2.7). Baseline SNOT-22 score for study population was 37.51 (SD 15.2). During analysis of scores of general health related quality of life domains, we observed serial decrease in scores in all the three follow ups. The score for psychological dysfunction and sleep dysfunction decreased from 10.72, 6.00 to 1.58 and 1.02 respectively. The subdomain scores were statistically significant ($p<0.001$) (table 4).

DISCUSSION

This study was conducted on 53 patients who were diagnosed to have chronic rhinosinusitis; of these patients 66% were CRSwNP and 34% CRSsNP. The demography of our study cohort showed CRSwNP were more common in males (77%) and CRSsNP is more in females (61%). This variation was found to be statistically significant ($p=0.006$). Vedantam8 et al also reported CRSwNP to be more common among males with a sex ratio of 2:1. The mean age of study population was 42.55 years. and maximum number of patients were found between 21-60 years of age. (86.8%). Similar age distribution was observed in other studies also.[9,10]

Preoperative Lund Kennedy endoscopy score and Lund Mackay CT score were 7.85 and 11.17 respectively. In our study baseline CT score for CRSsNP and CRSwNP were 9.44 and 12.06 respectively (table 5). In another study by Nair et al, there observed a significant difference in the mean Lund MacKay CT score between CRSsNP (8.7) and CRSwNP (14.2).[11] Higher value in endoscopy and CT score indicates worse disease severity.[12]

Table 5: Preoperative CT and Endoscopic scores for CRSwNP and CRSsNP.

	CRS with polyp	CRS without polyp	t value	P value
LKES	8.37 (2.462)	6.83 (2.995)	-2.00	0.05
CT score	12.06 (4.6)	9.44 (4.58)	-1.968	0.06

Preoperative SNOT 22 average score obtained in our study was 37.15 (15.218). The SNOT-22 can be categorized into 'mild' defined in the SNOT-22 score as 8-20, 'moderate' as more than 20-50 and 'severe' as more than 50.[13] According to multiple studies.[14,15] SNOT-22 scores are influenced by several demographic confounders and other factors like gender, smoking, asthma and mental illness including anxiety and depression.

Table 6: General health related QOL domains for CRSwNP in preoperative and postoperative period.

General HRQOL Domains	Baseline score	1 week	1 month	3 month	F test	df	P value
Psychological	11.69 (7.17)	5.29 (2.76)	2.37 (1.18)	1.66 (1.8)	74.83	1.188	<0.001
Sleep dysfunction	7.03 (5.52)	3.83 (2.28)	1.63 (2.05)	1.11 (1.8)	38.619	1.265	<0.001

Table 7: General health related QOL domains for CRSsNP in preoperative and postoperative period.

SNOT 22 score	Baseline score	1 week	1 month	3 month	F test	df	P value
Psychological	8.83 (6.5)	4.72 (2.95)	2.06 (2.53)	1.44 (2.43)	27.58	1.257	<0.001
Sleep dysfunction	4 (5.07)	2.39 (3.14)	1.17 (2.66)	0.83 (2.25)	11.17	1.33	<0.001

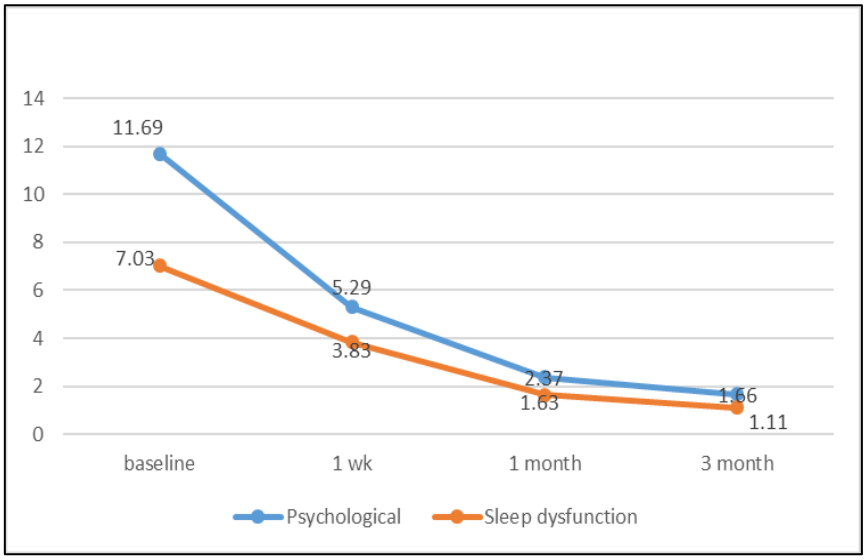

Figure 1: General health related QOL domains for CRSwNP in preoperative and postoperative period.

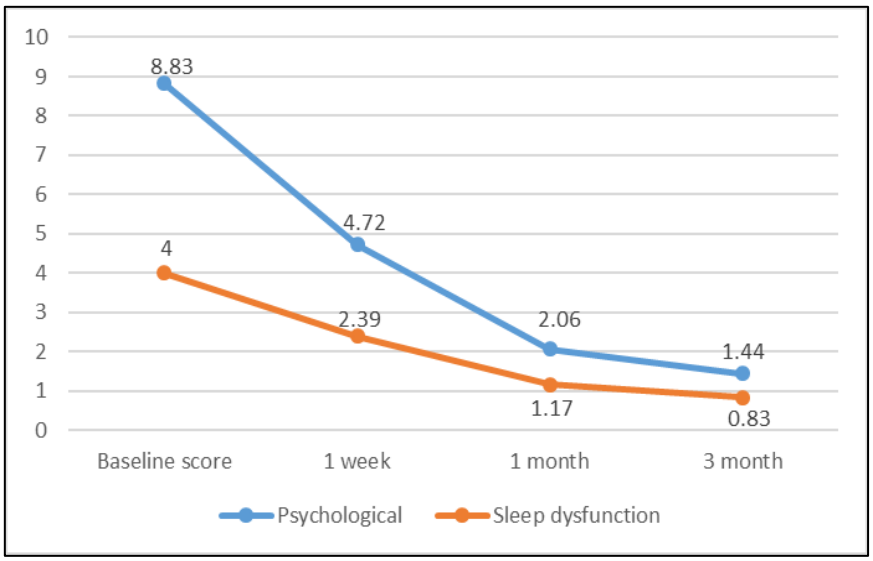

Figure 2: General health related QOL domains for CRSsNP in preoperative and postoperative period.

General HRQOL domains

Psychosocial dysfunction

Preoperative score for CRSwNP and CRSsNP were 11.69 and 8.83. It reduced to 2.37 and 2.06 respectively (table:6,7). Levy et al observed overall improvement in psychological domain i.e, score in the SNOT-22 decreased from 15.9 to 8.5 in CRSwNP, and 16.3 to 8.9 in CRSsNP.[16] In our observation difference in psychosocial symptoms was a bit higher when compared to the above study. The scores obtained in all the follow ups were significant statistically. We observed higher score for this domain in patients with nasal polyps preoperatively. The smallest change in a given outcome measure that can be detected by a patient as a perceptible change is called minimal clinically important difference (MCID).[1] In study of Chowdhury et al, average MCID for psychosocial dysfunction following ESS is 3.9.[17] Our study population has difference in score more than this value. One of the main cause of psychological dysfunction identified was coexisting anxiety and depressive disorder.[16,18] These groups showed worst postoperative score.

Sleep dysfunction

Sleep related problems in CRS have shown to cause a significant decrease in quality of life. Exact mechanisms underlying sleep disruption and poor sleep quality in CRS are unknown. According to various studies any condition resulting in nasal air passage obstruction causes sleep disruption.[19,20] Complete nasal obstruction can increase apneic episodes and transient hypoxia in healthy individuals which indicates that nasal obstruction causes sleep related problems.[21] In our observation most of the CRS patients from both phenotypes exhibit sleep disruption. Preoperative average score for sleep dysfunction domain was 7.03 and 4 in CRSwNP and CRSsNP respectively. These patients showed significant reduction in symptom related scores after ESS i.e. score reduced to 1.11 and 0.83 at the end of 3 months (table 6,7). El Rassi et al also noticed similar improvement sleep dysfunction postoperatively.[22] Another study reported that 90 percentage of the patients with chronic rhinosinusitis have improved sleep quality postoperatively.[23] The average minimal clinically important difference (MCID) for sleep dysfunction domain is 2.9.

CONCLUSION

The two phenotypes of CRS had different gender predominance. CRS with polyposis were seen commonly in male with more than 2/3 of total cases. Similarly, CRS without polyposis had a definite female predilection. Lund Mackay CT score and Lund Kennedy endoscopy score had definitive role in assessing extent of disease. Both scores were high in CRSwNP phenotype. Chronic rhinosinusitis patients with associated psychosocial dysfunction and sleep related symptoms have worse quality of life. These patients showed significant improvement after endoscopic sinus surgery. But associated anxiety and depressive disorders can reduce quality of life even after surgery. Therefore, these associated conditions have to be address separately during treatment of chronic rhinosinusitis.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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