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Comparative Study of Quality of Life Before and after Functional Endoscopic Sinus Surgery in Patients with Chronic Rhino Sinusitis with Nasal Polyposis

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Abstract
To compare the quality of life before and after functional endoscopic sinus surgery (FESS) in patients with chronic rhino sinusitis with nasal polyposis (CRSwNP). A total of 45 patients aged 15 years and above with chronic rhino sinusitis with nasal polyposis requiring primary bilateral functional endoscopic sinus surgery with or without septoplasty were included in this prospective, comparative study, conducted from May 2019-May 2020. Pre and postoperative Sinonasal Outcome Test (SNOT-16) score and Modified Lund-Kennedy (MLK) endoscopic scores were noted to assess and compare the quality of life of patients. Post-operative data was collected at three months of surgery. Descriptive statistics and inferential statistics (paired t-test) were used, considering $p<0.05$ statistically significant. There was a statistically significant improvement in both SNOT-16 score and Modified Lund-Kennedy score postoperatively ($p<0.05$). The statistical significant post-operative improvement was found in the individual symptoms of SNOT-16 also (p value 0.000 in all individual symptoms). FESS is an effective procedure in improving the Quality-of-Life outcome of patients with CRSwNP. Comparing SNOT-16 score and MLK endoscopic score, before and after FESS, the quality of life significantly improved at three months of FESS.

INTRODUCTION

The overall prevalence of symptom-based CRS in the population has been found to range from 5.5% to 28%[1]. The effect that CRSwNP has on a patient is not limited to the nasal symptoms. In fact, it can have several negative health consequences including poor sleep, increased bodily pain and an overall decrease in the quality of life. These disease-related effects can lead to work absences, reduced work performance and lost leisure household time[2,3].

There is a consensus that CRSwNP should initially be treated medically whilst the surgical procedure is reserved for those failing to respond to medical treatment for primary as well as recurrent sinonasal polyposis[4,5]. Functional Endoscopic Sinus Surgery (FESS) is the commonly practiced surgical options for CRSwNP.

There are various objective evaluation measures like endoscopic and CT scores to assess the effectiveness of FESS for CRSwNP. There could be improvement or deterioration seen objectively post FESS in a case of CRSwNP, but assessing the disease from a patient's perspective is critical in understanding the quality-of-life outcomes after FESS. Many studies such as Rhinosinusitis Disability Index (RSDI), Chronic Sinusitis Survey (CSS), Rhinitis QoL questionnaire, 16 stem Sino Nasal Outcome Test (SNOT-16), 22 stem Sino Nasal Outcome Test (SNOT-22) provide validated means to subjectively quantify patient's perception of disease burden in terms of symptoms before and after doing FESS[6].

The aim of the study was to compare the quality of life before and after FESS in patients with CRSwNP using Sino Nasal Outcome Test (SNOT-16) as subjective and MLK endoscopic scoring system as an objective tool.

MATERIALS AND METHODS

It was a prospective and comparative study. The study was conducted in the Department of ENT and Head and Neck Surgery, Tribhuvan University Teaching Hospital (TUTH), Maharajgunj Medical Campus, Institute of Medicine (IOM), Kathmandu, Nepal from May 2019-May 2020 after ethical clearance by Institutional Review Committee of IOM, Tribhuvan University (TU) with approval no. 421(6-11)e2/075/76. A total of 45 patients with CRSwNP of all gender, aged 15 years and above with failed medical therapy requiring primary bilateral functional endoscopic sinus surgery with or without septoplasty were included in the study after taking informed consent. However patients on anxiolytics, antidepressants patients needing revision surgery and lost to follow up were excluded from the study.

Nasal endoscopy was done using zero degree flexible nasal endoscope to diagnose and stage the extent of disease. Modified Lund-Kennedy endoscopic scoring was used to grade polyp, edema and discharge of the disease. Preoperative assessment using SNOT-16 questionnaire was done a day before the surgery. Patients' symptoms were rated on 16 different symptoms which were graded according to the severity from a score of 0 (nil), 1 (mild symptoms), 2 (moderate) and 3 (severe symptom).

Patients underwent bilateral FESS using microdebrider with or without septoplasty under general anesthesia. All patients received three weeks of oral steroids and a week of co-amoxyclav pre-operatively and post-operatively, a week course of co-amoxyclav whilst mometasone nasal spray and alkaline nasal douching were too continued. The follow ups were done after two weeks and three months post-operatively. The second week follow up was for debridement of crusts. On the third post-operative month, the SNOT-16 score for subjective assessment and Modified Lund-Kennedy endoscopic score for objective assessment were noted.

IBM Statistical Package for the Social Sciences software for Windows version 25.0 (IBM SPSS Corp. Armonk, NY, USA) was used for all statistical calculations. Descriptive statistics (mean, standard deviation, frequency and percentages) and inferential statistics (paired t-test) were used and $p<0.05$ was considered to be statistically significant.

RESULTS AND DISCUSSIONS

Initially, 47 patients who underwent bilateral functional endoscopic sinus surgery for chronic rhino sinusitis with nasal polyposis were enrolled. However, two patients were lost to follow up. So, a total of 45 patients consisting of 26 males and 19 females were eventually included.

Fig. 1: Correlation of pre-operative SNOT-16 score and pre-operative MLK score (n = 45)

Fig. 2: Correlation of post-operative SNOT-16 score and post-operative MLK score (n = 45)

Table 1: Comparison of pre-operative and post-operative mean SNOT-16 score post FESS (n=45).

	SNOT-16 Score Mean ± SD	Improvement	't' value	paired t-test p value	Inference
Pre-operative	0.94 ± 0.34	78.7%	11.53	0.000	Significant
Post-operative	0.20 ± 0.13				

Table 2: Comparison of mean pre-operative and post-operative SNOT-16 score of individual symptoms post FESS (n=45).

		Mean ± SD		
Symptoms	**SNOT-16 Symptoms**	**Pre-operative SNOT-16 score**	**Post-operative SNOT-16 score**	**paired t-test p value**
Rhinological symptoms	1. Need to blow nose	1.60 ± 0.91	0.38 ± 0.57	0.000
	2.Sneezing	1.44 ± 0.86	0.29 ± 0.50	0.000
	3. Runny nose	1.60 ± 0.75	0.40 ± 0.53	0.000
	4. Cough	0.73 ± 0.78	0.24 ± 0.57	0.000
	5. Postnasal discharge	0.64 ± 0.80	0.16 ± 0.36	0.000
	6. Thick nasal discharge	1.18 ± 0.80	0.31 ± 0.51	0.000
Ear symptoms & Facial pain	7. Ear fullness	0.84 ± 0.70	0.29 ± 0.58	0.000
	8. Headache	1.20 ± 0.86	0.51 ± 0.54	0.000
	9. Facial pain/pressure	0.87 ± 0.81	0.09 ± 0.28	0.000
Sleep Related symptoms	10. Wake up at night	0.82 ± 0.77	0.02 ± 0.14	0.000
	11. Lack of a good night's sleep	0.67 ± 0.87	0.09 ± 0.28	0.000
	12. Wake up tired	0.67 ± 0.73	0.11 ± 0.31	0.000
Psychological symptoms	13. Fatigue	0.73 ± 0.75	0.11 ± 0.31	0.000
	14. Reduced productivity	0.78 ± 0.70	0.13 ± 0.34	0.000
	15. Reduced concentration	0.67 ± 0.60	0.11 ± 0.31	0.000
	16.Frustrated/restless /irritable	0.62 ± 0.80	0.11 ± 0.31	0.000

Table 3: Status of individual SNOT-16 symptoms post FESS (n=45).

Symptoms	No. of cases with symptom (n)	Complete relief n(%)	Improvement n(%)	No change n(%)	Worse n(%)
Rhinological symptoms	1. Need to blow nose (42)	27 (60)	6(13.33)	12 (26.66)	0(0)
	2. Runny nose (42)	25(55.56)	11(24.44)	8(17.77)	1(2.22)
	3.Sneezing (40)	28(62.22)	8(17.77)	8(17.77)	1(2.22)
	4. Thick nasal discharge (37)	25(55.56)	7(15.55)	11(24.44)	2(4.44)
	5. Cough (24)	17(37.77)	3(6.66)	23(51.11)	2(4.44)
	6. Postnasal discharge (21)	16(35.5)	2(4.44)	25(55.5)	2(4.44)
Ear symptoms &Facial Pain	7. Headache (35)	15(33.33)	11(24.44)	17(37.77)	2(4.44)
	8. Ear fullness (30)	23(51.11)	3(6.66)	15(33.33)	4(8.88)
	9. Facial pain/pressure (28)	24(53.33)	3(6.66)	18(40)	0(0)
Sleep Related symptoms	10. Wake up at night (27)	26(57.77)	1(2.22)	18(40)	0(0)
	11. Wake up tired (24)	19(42.22)	3(6.6)	23(51.11)	0(0)
	12. Lack of a good night's sleep (19)	15(33.33)	3(6.66)	27(60)	0(0)
Psychological symptoms	13. Reduced productivity (28)	23(51.11)	1(2.2)	20(44.44)	1(2.2)
	14. Reduced concentration (27)	23(51.11)	1(2.2)	20(44.44)	1(2.2)
	15. Fatigue (25)	21(46.66)	2(4.44)	21(46.66)	1(2.2)
	16.Frustrated/restless/irritable (21)	16(35.55)	3(6.66)	26(57.77)	0(0)

The pre-operative and post-operative mean MLK score was 1.49 ± 0.34 and 0.35 ± 0.40 respectively and the difference was statistically significant (p value < 0.05).

Table 4: Comparison of pre-operative and post-operative mean MLK score post FESS (n=45).

	Mean MLK Score Mean ± S.D.	't' value	paired t-test	p value	Inference
Pre-operative	1.49 ± 0.34		15.770	0.000	Significant
Post-operative	0.35 ± 0.40				

The age ranged from 15 years-65 years with a mean of 37.51±13.58 years. There were 12 (26.7%) patients in the age group 15-30 years, 22 (48.9%) in 31-45 years, nine (20.1%) in 46-60 years and two (4.4%) in more than 60 years.

There were 21 (46.7%) patients of chronic rhino sinusitis with nasal polyposis, 16(35.5%) chronic rhino sinusitis with nasal polyposis with deviated nasal septum, five (11.1%) bilateral allergic fungal rhino sinusitis with deviated nasal septum and three (6.7%) bilateral allergic fungal rhino sinusitis.

On preoperative subjective assessment, the most common symptoms were need to blow nose and runny nose (93.3%), whilst the least common symptom was lack of good night sleep (42.2%).

Bilateral FESS was performed in 24 (53%) whilst 21 (47%) patients underwent bilateral FESS with septoplasty. Comparing the pre and post-operative SNOT-16 score, there was statistically significant improvement (p<0.05).

Similarly, statistically significant improvement was found in all individual symptoms included in SNOT-16 score also (p value 0.000).

The postoperative status of patients was divided into complete relief, improvement, no change and worse. Complete relief was considered when the patient preoperatively had mild/moderate/severe symptoms which changed to no symptoms postoperatively. Improvement was considered when severe improved to moderate, severe/moderate improved to mild postoperatively. Worse was considered when the patient preoperatively had no/mild/moderate symptoms which changed to severe, no /mild symptoms changed to moderate and no symptoms changed to mild symptoms. No change was considered when there were no changes in no/mild/moderate/severe symptoms postoperatively. In each individual symptoms majority of patients had complete relief. However non-rhinological symptoms like headache, lack of good night's sleep, wake up tired

and frustrated had no change postoperatively in majority of patients.

The pre-operative and post-operative mean MLK score was 1.49 ± 0.34 and 0.35 ± 0.40 respectively and the difference was statistically significant (p value < 0.05).

On correlating the MLK score and SNOT-16 score, they showed moderate positive correlation both pre-operatively (r = 0.279) and post-operatively (r = 0.476) indicating the patients symptom severity correlated with the objective endoscopic findings.

CRS is a common condition whose diagnosis is largely symptom-based with corroboration of diagnosis based on endoscopic and radiological findings. Functional endoscopic sinus surgery is done for CRS with nasal polyposis which have failed to respond to medical therapy. The goal of this surgery is to enlarge the sinus ostia to allow adequate ventilation and drainage of sinuses along with unobstructed route for topical medications. The clinician may obtain the desired objective outcome following surgery but it may not always reflect the equivalent symptomatic improvement as perceived by the patient. Hence, this study aimed to assess the effect of FESS in quality of life in patients with CRS with nasal polyposis. Simultaneously, change in objective assessment was also done and correlation between the objective findings (MLK endoscopic score) as noted by the clinician and symptomatology (SNOT-16 score) as noted by the patient has been sought.

Post-operative assessment was done at three months of FESS to avoid any likely confounding effect of pre-operative oral steroids on the quality of life and to allow the post-FESS sinus cavities to heal.

Patient-Reported Outcome Measures (PROMs) assess the aspects of care that result in a change in health status, productivity and overall well-being of the patient. Therefore treating only ENT-related symptoms is not a holistic approach of managing patients of CRS. To assess the quality of life of the patients with CRSwNP, SNOT-16 was used for this study. SNOT-16 has less number of questionnaires as compared to SNOT-20 or 22. It is derived from the Rhino sinusitis Outcome Measure (RSOM-31) omitting vague symptoms. It is a reliable, valid, responsive and sensitive tool for assessing the quality of life in a patient with CRSwNP. It also assesses the physical as well as the emotional impact of sinonasal pathology on quality of life. Moreover, it is less time consuming, as it takes <five minutes to fill the questionnaire[7,8]. Only health-related questionnaires are included in SNOT-16 tool[9]. The application of SNOT-16 as a QoL instrument in the evaluation of patients with CRSwNP enabled us to make valid, objective comparisons of the preoperative and postoperative status of these patients using the derived scores.

Our study showed significant improvement (p value 0.000) in postoperative SNOT-16 score after FESS in CRSwNP patients. Nikakhlagh *et al.* using the SNOT-20 tool showed significant improvement (p value 0.0000001) in the postoperative score[10]. A similar study by Sreedharan[11] and Aghdas[12] using SNOT-22 also showed significant improvement (p value 0.000) in postoperative scores after FESS.

In the present study, all items of the questionnaire were significantly improved after FESS which was consistent with the study by Aghdas[12]. In contrast to our study, Ling *et al.,* who used Rhino Sinusitis Task Force (RSTF) and SNOT-20 in their study, showed that improvement was observed only in postnasal drip, nasal obstruction and nasal congestion[13].

In this study, the most common symptom was a need to blow nose (93.3%) and runny nose (93.3%) followed by sneezing (89.9%), thick nasal discharge (82.2%), headache (77.7%), ear fullness (66.6%), runny nose (67.14%) and facial pain/pressure (62.2%). In the study done by Abdalla *et al.* using SNOT-22, nasal blockage (96.5%) was the most common symptom followed by an altered sense of taste/smell (90.3%), need to blow nose (79.8%) and runny nose (69.6%)[14]. Here in contrast to our study, the need to blow nose and runny nose were third and fourth most common symptoms. Variation in the most common symptoms were due to use of different SNOT tools. Lilly et al. found rhinorrhea (100%), stuffy nose (97.4%), sneezing (67.6%), anosmia (54.8%), headache (54.8%) as the common symptoms[15]. This study used self-made questionnaires that were not validated and do not include some symptoms of SNOT-16 which was the reason for variations in common symptoms.

In our study, the least common symptom was lack of good night's sleep (42.2%). In contrast study by Abdalla[14] using SNOT-22 found ear pain (17.1%) as the least common symptom. It could also be due to use of a different SNOT tool.

Overall the highest improvement in symptom was seen in wake up at night (97.56%), followed by reduced concentration (90.3%) and facial pain/pressure (89.6%) in our study. A similar result was seen in a study done by Abdalla *et al.* where overall highest improvement was seen in cough (75%), wake up at night (62%) and need to blow nose (51.7%)[14].

In our study, overall postoperative improvement in SNOT-16 score was 78.7% which was comparable to other studies Abdalla *et al.* showed 56%[14] Al badaai *et al*. showed 72%[16] and Mishra *et al.* showed 87.74%[17]. In our study, symptoms like headache, lack of good night's sleep, wake up tired and frustrated had no change postoperatively in majority of patients. These symptoms in majority were mild preoperatively to start with and they remained mild postoperatively also hence there was no change noted.

To record the endoscopic findings in a universally accepted format, Modified Lund-Kennedy endoscopic scoring system was used in our study as it is reliable and valid[18]. It is easy to use with the highest reliability among most scoring systems and is best to correlate with patient-reported outcome measures (PROMs).

In our study, the mean preoperative endoscopic score was 1.49±0.34 and the mean postoperative endoscopic score was 0.35±0.40 with statistical significant difference (p value 0.000). Similar to our study, Toros *et al.* showed a significant difference (p value 0.0001) after FESS with a mean preoperative and postoperative score of 9.12±3.31 and 4.16±3.35 respectively[19].

In our study, there was a moderate positive correlation between endoscopic scores and symptom scores at pre and postoperative assessment (pre-operative r = 0.279, post-operative r = 0.476). This affirms the objective improvement post FESS noted by the clinician correlated proportionately with symptomatic improvement experienced by the patient. A similar study by Toros *et al.* showed there was a positive correlation between endoscopic scores and symptom scores at pre and postoperative follow-up (pre-operative r = 0.479, post-operative r = 0.628)[19]. In contrast to our study, Kaplan *et al.* showed there was no correlation between endoscopic scores and preoperative (r^2 = 0.10) or postoperative (r^2 = 0.06) SNOT scores[20].

There were few limitations in study. Multiple surgeons with variation in their technique, operative skills and experience were involved which might have affected the surgical outcome. Inclusion of CRS and AFRS of various extents, with or without deviated nasal septum invited heterogeneity which could have affected the extent of surgery and subsequently the outcome. AFRS has a high chance of recurrence. Similarly, eosinophilic CRS shows a low response to surgery as compared to CRS. Additional surgery like septoplasty, use of oral steroids before surgery, and probable inconsistencies in postoperative care like proper douching and use of different medications by patients could also have influenced the quality of life of patients. We assessed the patients up until three months post-operatively. The outcome of FESS and subsequently the QoL can change over time which remains unexplored by this study.

CONCLUSIONS

FESS is an effective procedure in improving the Quality of Life outcome of patients with CRSwNP. Comparing SNOT-16 score and MLK endoscopic score, before and after FESS, the quality of life significantly improved at three months of FESS.

REFERENCES

1. Fokkens, W.J., V.J. Lund, C. Hopkins, P.W. Hellings and R. Kern et al., 2020. European position paper on rhinosinusitis and nasal polyps 2020. Rhinology journal, Vol. 29 .10.4193/rhin20.600.
2. Rudmik, L., T.L. Smith, R.J. Schlosser, P.H. Hwang, J.C. Mace and Z.M. Soler, 2014. Productivity costs in patients with refractory chronic rhinosinusitis. The Laryngoscope, 124: 2007-2012.
3. Bhattacharyya, N., 2005. Symptom and disease severity differences between nasal septal deviation and chronic rhinosinusitis. Otolaryngology–Head Neck Surg., 133: 173-177.
4. Mygind, N., J.V. Lund and R J. Jones, 2008. Nasal polyposis and surgical management of rhinosinusitis. In: Scott and Brown's Otorhinolaryngology, head and neck surgery, Gleeson, M., G.G. Browning and J.M. Burton, (Eds.)., Edward Arnold publishers, London, ISBN-14: 978-3642114113, pp: 1480-1481.
5. Garrel, R., Q. Gardiner, M. Khudjadze, P. Demoly, C. Vergnes and M. Makeieff, 2003. Endoscopic surgical treatment of sinonasal polyposis-medium term outcomes (mean follow-up of 5 years). Rhinol,. 41: 91-96.
6. Quintanilla-Dieck, L., J.R. Litvack, J.C. Mace and T.L. Smith, 2012. Comparison of disease-specific quality-of-life instruments in the assessment of chronic rhinosinusitis. Int. Forum Allergy and Rhinology, 2: 437-443.
7. Lehrer-C.E., S.F. Mariño, I. Alobid and J. Mullol, 2013. Quality of life measures in patients on rhinosinusitis trials. Clini Investig., 3: 251-263.
8. Mortuaire, G., S. Vandeville and D. Chevalier, 2010. Psychometric evaluation of the sinonasal outcome test-16 for quality of life in chronic rhinosinusitis with nasal polyps. Eur. Ann. Otorhinolaryngol., Head Neck Dis., 127: 91-96.
9. Anderson, E.R., M.P. Murphy and E.A. Weymuller, 1999. Student research award 1998: Clinimetric evaluation of the sinonasal outcome test-16. Otolaryngology–Head Neck Surg., 121: 702-707.
10. Nikakhlagh, S., A. Bakhshi and Z. Noroozi, 2015. Evaluation of quality of life of patients with chronic rhinosinusitis before and after endoscopic sinus surgery. Biome and Pharma Jour., 8: 73-77.
11. Sreedharan, S., J. Anne, D. Dosemane, V. Shenoy and P.M.Kamath,at al 2020. Predictors of Surgical Outcomes After Functional Endoscopic Sinus Surgery in Chronic Rhinosinusitis. Allergy., 1: 1-69.
12. Aghdas, M.M., N. Shahidi, D. Sheikhzadeh and M. Ebrahimzadeh, 2018. Quality of Life in patients with chronic rhinosinusitis with nasal polyposis before and after functional endoscopic sinus surgery: A study based on sino-nasal outcome

test. Advan in Biosci and Clini Medic., 1: 11-14.
13. Ling, F.T.K. and S.E. Kountakis, 2007. Important clinical symptoms in patients undergoing functional endoscopic sinus surgery for chronic rhinosinusitis. Laryngoscope., 117: 1090-1093.
14. Abdalla, S., H. Alreefy and C. Hopkins, 2012. Prevalence of sinonasal outcome test (SNOT-22) symptoms in patients undergoing surgery for chronic rhinosinusitis in the England and Wales National prospective audit. Clini otolaryng., 4: 276-282.
15. da Lilly-Tariah O.B., 2006. Pattern of clinical features of chronic simple rhino-sinusitus in Port Harcourt. Niger Jour of Clini Prac., 2: 142-146.
16. Badaai, Y.A. and M. Samaha, 2010. Outcome of endoscopic sinus surgery for chronic rhinosinusitis patients: A canadian experience. The J. Laryngo and amp., Otology., 124: 1095-1099.
17. Mishra, D.K., R. Bhatta and L.R. Verma, 2010. Quality of life after functional endoscopic sinus surgery. Nepal Jou of ENT Head and Neck Sur., 2: 6-8.
18. Zhang, L. and L.H. Zhang, 2017. Comparison of different endoscopic scoring systems in patients with chronic rhinosinusitis: Reliability, validity, responsiveness and correlation. Rhinol jou., 55: 363-368.
19. Toros, S.Z., S. Bölükbasi, B. Naiboglu, B. Er, C. Akkaynak, H. Noshari,at al 2007. Comparative outcomes of endoscopic sinus surgery in patients with chronic sinusitis and nasal polyps. Eur. Arch. Oto-Rhino-Laryng., 264: 1003-1008.
20. Kaplan, B.A. and S.E. Kountakis, 2004. Role of nasal endoscopy in patients undergoing endoscopic sinus surgery. Amer jour of rhinol., 3: 161-164