

## QUALITY OF LIFE OUTCOMES AFTER FUNCTIONAL ENDOSCOPIC SINUS SURGERY

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### ABSTRACT

**Background:** Quality of life (QoL) is defined as those aspects of an individual's subjective experience that relate both directly and indirectly to health, disease, disability and impairment. **Objective:** To assess quality of life outcomes after functional endoscopic sinus surgery (FESS) for chronic rhinosinusitis with polyps and assess the relationship between disease severity and quality of life outcomes. **Methodology:** A prospective study was performed in a tertiary referral center. Thirty nine patients affected by chronic rhinosinusitis with nasal polyposis underwent endoscopic sinus surgery from March 2015 to March 2016 and followed for 12 weeks. The Rhinosinusitis disability index (RSDI) was used to quantify the patient's symptoms before, 6 weeks and 12 weeks after surgery. The correlation between RSDI and Endoscopic score and Computed Tomography (CT) based on Lund-Mackay scoring system were also assessed. **Results:** A strongly statistically significant reduction was seen between the mean scores on RSDI before and after FESS [Mean±SD(range) 40.79±20.041(2-93) at 0 weeks, 21.9±14.867(0-66) at 6 weeks and 13.95±11.288(0-45) at 12 weeks Wilcoxon signed rank test,  $p < 0.0001$ ]. There was no any correlation between total RSDI and endoscopic score at 0, 6 and 12 weeks and Lund Mackay CT score taken preoperatively. **Conclusions:** There is improvement in QOL outcomes after FESS in patients with CRS with polyposis.

**KEYWORDS:** FESS, RSDI, Lund Mackay CT and Endoscopic Score.

### INTRODUCTION

Quality of life (QOL) is a difficult concept to define and to measure. Although the symptoms of rhinosinusitis are not life threatening they are associated with a dramatic reduction in QoL (van Oene, van Reij et al. 2007) The last two decades have been characterized by increasing interest in assessing the quality of life which is related to the systematic development and validation of QoL questionnaires. To date, a number of rhinologic-specific instruments have been developed to measure quality-of-life (QOL) in patients with rhinologic conditions including the CSS, RSDI, RQLQ, and most recently the SNOT-22 (Gliklich and Metson 1995, Benninger and Senior 1997, Hopkins, Gillett et al. 2009).

Rhinosinusitis disability index (RSDI) questionnaire was developed in 1997 by Benninger and Senior (Benninger and Senior 1997).

Conventionally patients with rhinosinusitis are treated with medical therapy by a course of antibiotics, nasal irrigation and steroids. For those who do not respond to conservative medical treatment functional endoscopic sinus surgery (FESS) has been the preferred and a common method of treatment. Although there is still an

ongoing debate regarding the efficacy of management of chronic rhinosinusitis by medical therapy and FESS; the results largely depend on subjective and objective assessment of the patients (Fang 1994).

Objective assessment of disease severity by physician may not correlate with subjective assessment of symptoms by the patient. Primary objective was to assess quality of life outcomes after FESS. Secondary objective was to assess the relationship between disease severity and quality of life outcomes in chronic rhinosinusitis with NP after FESS.

### MATERIALS AND METHOD

A prospective study was performed in a tertiary referral center. Thirty nine patients affected by chronic rhinosinusitis with nasal polyposis underwent endoscopic sinus surgery from March 2015 to March 2016 in Department of Otorhinolaryngology & Head and Neck surgery, BPKIHS, Dharan.

**Inclusion Criteria:** Chronic rhinosinusitis (CRS) with nasal polyposis patients with failed medical therapy, age 16 years and above.

**Exclusion Criteria:** Patients with co-morbidities like uncontrolled diabetes mellitus, granulomatous conditions, revision surgery, rhinosinusitis patients with complication, pregnancy, and immunodeficiency.

**Ethical clearance was obtained** Institutional Ethical Review Board, BPKIHS and from every patient written consent was taken.

**Sampling Technique:** Convenient sampling.

### Research Instrument and Questionnaires Rhinosinustis disability index (RSDI)

All patients completed a disease specific quality of life questionnaire 'Rhinosinustis Disability Index'. Thirty questions were asked and each was scored on a 0 to 4 scale (0=never, 1=almost never, 2=sometimes, 3=almost always, 4=always). The RSDI was calculated both for a total score and for functional (questions 1-5, 13, 23, 28, 29), emotional (questions 12, 14-19, 21, 26, 27) and physical (questions 6-11, 20, 22, 24, 25, 30) domains at 0 week, 6 week and 12 weeks.

**Endoscopic evaluation based on Lund–Mackay scoring system** was used to assess clinical outcome which includes three parameters: nasal polyps (0 = absent, 1 = polyps within the middle meatus, 2 = beyond the middle meatus, 3 = reaching to or below the lower border of the inferior turbinate or medial to the middle turbinate); edema and crusting (0 = absent, 1 = mild, 2 = severe) and discharge (0 = absent, 1 = clear and thin discharge, 2 = thick and purulent discharge).

Postoperative endoscopic scoring included Scarring: (0-absent; 1-mild; 2-severe) and Crusting: (0-absent; 1-mild, severe).

### Lund–Mackay scoring system-CT scan

Assigns a value of 0, 1, or 2 to each of the following sinuses: maxillary, anterior ethmoid, posterior ethmoid, frontal, and sphenoid. Score assignments were 0 if the sinus was totally patent, 1 if the sinus was partially opacified, and 2 if the sinus was completely opacified. The OMC was scored either 0 if not occluded or 2 if occluded. The maximum score for each side was thus 12, with a total score determined out of 24.

**Statistical method proposed:** Data were analyzed on SPSS software version 17.0 for windows. Data was presented as mean, unless stated otherwise. The Wilcoxon signed-rank test was used to compare RSDI scores before and after FESS. Correlation was applied with RSDI and endoscopic and ct scoring. The "P" value less than 0.05 was considered as statistically significant.

CT Scan of nose and paranasal sinus was done in patients who don't respond to medical treatment. Radiological staging was done using the Lund and Mackay system. Patient was planned for fess. Patients were followed on day 7 for assessment and nasal

cleansing. Subsequent follow up was on 6 weeks and 12 weeks. RSDI questioners and the lund and mackay endoscopic score were used to assess subjective and objective improvement in quality of life postoperatively at 6 weeks and at 12 weeks.

## RESULTS

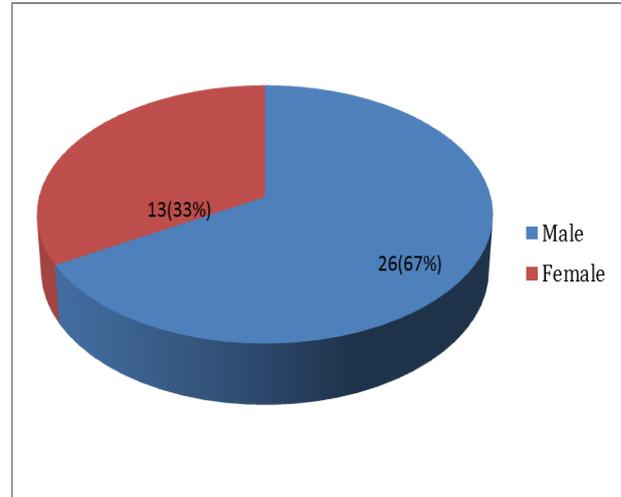


Fig 1: Gender distribution.

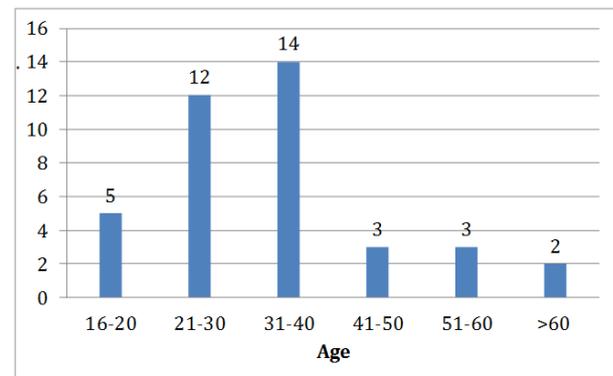


Figure 2: Distribution of patients according to the age.

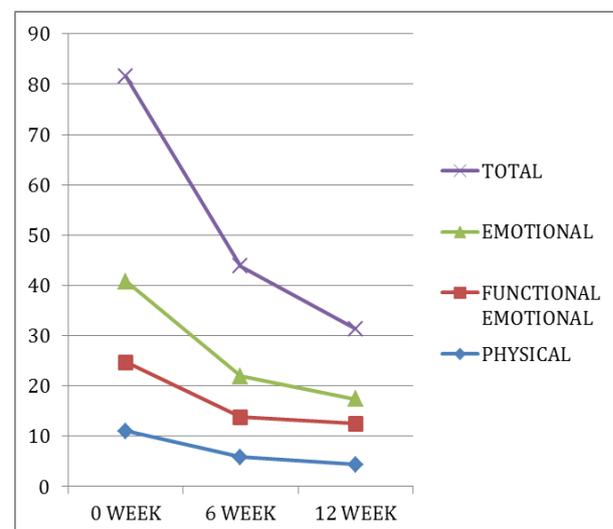


Figure 3: Mean total RSDI and each domain at different time interval with stacked line.

**Endoscopic outcome following FESS**

The mean endoscopic score (ES) preoperatively was 7.13 and it improved significantly to 2.82 at 6 weeks and 2.03 in the 12 post operative weeks. There was statically significant change in endoscopic score pre and post operative.

The mean of post operative endoscopic scoring at 6 and 12 weeks were  $2.08 \pm 0.807$  and  $1.41 \pm 0.637$ . Using sample T test there was significant change between 6 and 12 weeks was seen.

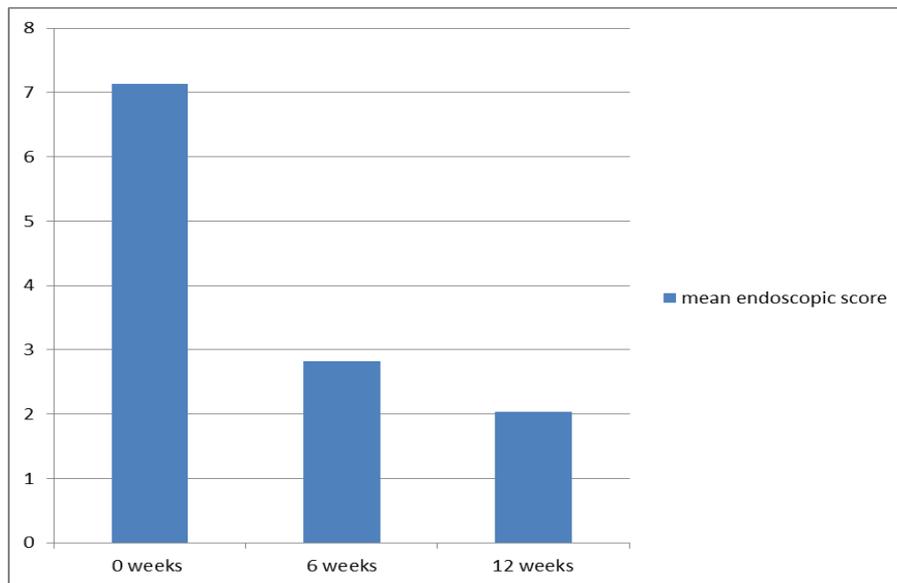


Figure 4: Mean endoscopic sore at 0, 6 and 12 weeks.

Table 1.a: showing correlation of total RSDI with Endoscopic score at 0, 6 and 12 weeks

Total RSDI score		Endoscopic score 0 week	Endoscopic score 6 weeks	Endoscopic score 12 weeks
0 week	Correlation Coefficient	-0.224	-0.048	-0.254
	Sig. (2-tailed)	0.171	0.771	0.119
6 weeks	Correlation Coefficient	-0.297	0.141	-0.190
	Sig. (2-tailed)	0.067	0.391	0.247
12 weeks	Correlation Coefficient	-0.426	-0.070	0.083
	Sig. (2-tailed)	0.007	0.674	0.614

Table 1.b: showing correlation of post operative endoscopic score with total RSDI.

Post operative Endoscopic score		Total 0 week	Total 6 weeks	Total 12 weeks
po6	Pearson Correlation	0.022	0.058	-0.017
	Sig. (2-tailed)	0.894	0.727	0.919
po3	Pearson Correlation	-0.078	-0.101	0.142
	Sig. (2-tailed)	0.638	0.541	0.389

**Correlation of total RSDI with Lund Mackay CT score**

There is no correlation of Lund Mackay CT score with physical, emotional, functional and total RSDI score

taken preoperatively except mild correlation with emotional scale.

Table 2: Showing Correlations of RSDI with CT score

		Physical 0 week	Functional 0 week	Emotional 0 week	Total RSDI 0 WEEK
Lund Mackay CT score	Pearson Correlation	-0.161	-0.295	-0.329*	-0.311
	Sig. (2-tailed)	0.327	0.068	0.041	0.054

\* Correlation is significant at the 0.05 level (2-tailed).

## DISCUSSION

Chronic rhinosinusitis is a common clinical entity. Prevalence of CRS is 5- 15% among general population. In US its prevalence is 13% (Ray, Baraniuk *et al.* 1999, Benninger, Ferguson *et al.* 2003).

Prevalence of CRS is more common among females with male to female ratio of 6:4 (Schlosser and Harvey 2008) but study in Korea found no difference between gender (Greisner and Settupane 1996). The prevalence of polyp is higher among men with 2.2:1 ratio (Johansson, Akerlund *et al.* 2003).

Bugten *et al.* in his study found mean age of presentation to be 38 years for the CRS group and 47 years for the NP group (Bugten, Nordgard *et al.* 2008). Hwang *et al.* reported mean age of patients as 47.4 years (Hwang, Irwin *et al.* 2003). In study by T. Shivakumar the mean age of presentation was 37 years with age range of 18 - 60 years (Shivakumar and Sambandan 2011)

### Rhinosinusitis disability index (RSDI)

The study conducted by Birch *et al.* found the mean total RSDI was 42 with a range of 5 to 69 and a SD of 17. When dividing the quality of life score into three domains, the 'functional' mean score of 13 (range 0 to 27, SD 6), the mean 'emotional' score of 13 (range 0 to 25, SD 7) and the mean 'physical' score was 16 with a range of 2 to 32 and a SD of 7 (Birch, Saleh *et al.* 2001). This result was similar with almost equal mean total RSDI with ours. Mean functional domain was similar but emotional domain was more affected in our study but in their study physical domain was more affected.

Adnane *et al.* observed in his study that the emotional domain was most affected as similar to our study followed by physical and functional aspect mean with 30, 28 and 27 respectively (Adnane, Adouly *et al.* 2015).

The study conducted by Smith *et al.* comparing total RSDI pre and postoperatively (46.6±21.4 versus 26.1±20.8) in patient with nasal polyposis with mean follow-up of 1.4±0.35 years found significant improvement with  $p < .0001$  (Smith, Mendolia-Loffredo *et al.* 2005). The result is similar to our result with pre (40.79±20.041) versus post-surgery (21.9±14.867).

The study conducted by Litvack (Litvack, Griest *et al.* 2007) showed improvement in QoL after primary endoscopic surgery using RSDI index pre (mean 10.0, SD 2.8,  $P < 0.0001$ ) and post operatively (mean 4.6, SD 4.4,  $P < 0.002$ ).

### Endoscopic score

Djukic *et al.* presented a study of 85 patients who had ESS for CRSwNP. At 6 month and 12-month follow-up endoscopy scores significantly improved to 2.8 and 3.7 respectively, compared to a baseline mean of 8.4 (Djukic, Dudvarski *et al.* 2015).

Thirty-one patients in Canada who had failed 3 months of maximal medical therapy continued their medical treatment whilst on the waiting list for surgery. During a mean of 7 months, endoscopy scores significantly worsened from 6.9 to 7.7 but improved to 2.4 post-operatively (Smith, Smith *et al.* 2014).

Sharma *et al.* conducted prospective study in Manipal Teaching Hospital and found significant improvement in endoscopic score pre (9.54±4.44) versus post (1.11±0.93) in patient undergoing FESS for nasal polyp and result were significant (Sharma, Rajbhandari *et al.* 2015).

Study done by Mace *et al.* in 102 patient found significant improvement in endoscopic score pre (7.9±4.8) versus post (5.1±4.5) in patient undergoing FESS for nasal polyp and result were significant with  $p < 0.05$  (Mace *et al.*, 2010b).

### Correlation of endoscopic score with RSDI score

Study done by Mace *et al.* found change in endoscopy score significantly correlated with improvement on the RSDI total score ( $p=0.051$ ), the RSDI physical subscale score ( $p=0.058$ ) and the RSDI functional subscale score ( $p=0.06$ ). Change in endoscopy score was not found to significantly correlate with the RSDI emotional subscale score ( $r=0.130$ ;  $p=0.20$ ) (Mace, Michael *et al.* 2010).

Study done by Tomoun on 124 patient using Spearman's rank correlation, revealed moderate to very strong correlation ( $0.4 < r < 1.0$ ) between the total RSDI and each of its different subscale scores on one hand and the total hospital Anxiety and Depression score (HADS) and its depression and anxiety subscale scores on the other hand. In contrast, the Lund-Kennedy nasal endoscopic score was poorly correlated ( $0.2 < r < 0.4$ ) with the total RSDI and its different subscale scores (Tomoun, Klattcromwell *et al.* 2015).

### Correlation of RSDI with Lund Mackay CT score

The study done by Krous Pearson product-moment correlations were computed among all variables as an index of association. Several significant associations were noted. First, there was strong internal correlation among all 3 scale scores and the overall score on the RSDI, as expected. These significant correlations reflect the internal consistency of the RSDI and support its reliability. There was a significant correlation between CT stage and skin end-point titration (SET) mean end point ( $r=0.42$ ,  $P < 0.01$ ). As SET end point scores increased among patients, their CT stage also increased. However there were no associations between CT stage and any of the scales on the RSDI (Krouse 2000).

## CONCLUSION

A strongly statistically significant reduction was seen between the mean scores on RSDI before and after FESS [Mean±SD(range) 40.79±20.041(2-93) at 0 weeks, 21.9±14.867(0-66) at 6 weeks and 13.95±11.288(0-45) at 12 weeks Wilcoxon signed rank test,  $p < 0.0001$ ]. There

was no any correlation between total RSDI and endoscopic score at 0, 6 and 12 weeks except endoscopic score at 0 weeks with total RSDI at 12 weeks. There was no correlation of Lund Mackay CT score with physical, emotional, functional and total RSDI score taken preoperatively except mild correlation with emotional scale. The present study proved that there is significant improvement in quality of life outcomes after FESS in CRS with polyposis patients.

## REFERENCES

1. Adnane, C., et al. "Quality of life outcomes after functional endoscopic sinus surgery for nasal polyposis." *Am J Otolaryngol*, 2015; 36(1): 47-51.
2. Benninger, M. S., et al. "Adult chronic rhinosinusitis: definitions, diagnosis, epidemiology, and pathophysiology." *Otolaryngol Head Neck Surg*, 2003; 129(3): S1-32.
3. Benninger, M. S. and B. A. Senior. "The development of the Rhinosinusitis Disability Index." *Arch Otolaryngol Head Neck Surg*, 1997; 123(11): 1175-1179.
4. Birch, D. S., et al. "Assessing the quality of life for patients with chronic rhinosinusitis using the "Rhinosinusitis Disability Index"." *Rhinology*, 2001; 39(4): 191-196.
5. Bugten, V., et al. "Chronic rhinosinusitis and nasal polyposis; indicia of heterogeneity." *Rhinology*, 2008; 46(1): 40-44.
6. Djukic, V., et al. "Clinical outcomes and quality of life in patients with nasal polyposis after functional endoscopic sinus surgery." *Eur Arch Otorhinolaryngol*, 2015; 272(1): 83-89.
7. Fang, S. Y. "Normalization of maxillary sinus mucosa after FESS. A prospective study of chronic sinusitis with nasal polyps." *Rhinology*, 1994; 32(3): 137-140.
8. Gliklich, R. E. and R. Metson. "Techniques for outcomes research in chronic sinusitis." *Laryngoscope*, 1995; 105(4 Pt 1): 387-390.
9. Greisner, W. A., 3rd and G. A. Setticone. "Hereditary factor for nasal polyps." *Allergy Asthma Proc*, 1996; 17(5): 283-286.
10. Hopkins, C., et al. "Psychometric validity of the 22-item Sinonasal Outcome Test." *Clin Otolaryngol*, 2009; 34(5): 447-454.
11. Hwang, P. H., et al. "Radiologic correlates of symptom-based diagnostic criteria for chronic rhinosinusitis." *Otolaryngol Head Neck Surg*, 2003; 128(4): 489-496.
12. Johansson, L., et al. "Prevalence of nasal polyps in adults: the Skovde population-based study." *Ann Otol Rhinol Laryngol*, 2003; 112(7): 625-629.
13. Krouse, J. H. "Computed tomography stage, allergy testing, and quality of life in patients with sinusitis." *Otolaryngol Head Neck Surg*, 2000; 123(4): 389-392.
14. Litvack, J. R., et al. "Endoscopic and quality-of-life outcomes after revision endoscopic sinus surgery." *Laryngoscope*, 2007; 117(12): 2233-2238.
15. Mace, J. C., et al. "CORrelations between endoscopy score and quality of life changes after sinus surgery." *Archives of Otolaryngology-Head & Neck Surgery*, 2010; 136(4): 340-346.
16. Ray, N. F., et al. "Healthcare expenditures for sinusitis in 1996: contributions of asthma, rhinitis, and other airway disorders." *J Allergy Clin Immunol*, 1999; 103(3 Pt 1): 408-414.
17. Schlosser, R. J. and R. J. Harvey. *Diagnosis of Chronic Rhinosinusitis. Rhinosinusitis: A Guide for Diagnosis and Management.* E. Thaler and W. D. Kennedy. New York, NY, Springer New York, 2008; 1-24.
18. Sharma, V., et al. "Functional Endoscopic Sinus Surgery Comparison in a Tertiary Care Hospital." *American Journal of Public Health Research*, 2015; 3(5A): 44-47.
19. Shivakumar, T. and A. P. Sambandan. "Retrospective analysis of the effectiveness of functional endoscopic sinus surgery in the treatment of adult chronic rhinosinusitis refractory to medical treatment." *Indian J Otolaryngol Head Neck Surg*, 2011; 63(4): 321-324.
20. Smith, K. A., et al. "Endoscopic sinus surgery compared to continued medical therapy for patients with refractory chronic rhinosinusitis." *Int Forum Allergy Rhinol*, 2014; 4(10): 823-827.
21. Smith, T. L., et al. "Predictive factors and outcomes in endoscopic sinus surgery for chronic rhinosinusitis." *Laryngoscope*, 2005; 115(12): 2199-2205.
22. Tomoum, M. O., et al. "Depression and anxiety in chronic rhinosinusitis." *Int Forum Allergy Rhinol*, 2015; 5(8): 674-681.
23. Van Oene, C. M., et al. "Quality-assessment of disease-specific quality of life questionnaires for rhinitis and rhinosinusitis: a systematic review." *Allergy*, 2007; 62(12): 1359-1371.