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 polyposis 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±20.04(2-93) at 0 weeks, 21.9±14.86(0-66)at 6 weeks and 13.95±11.28(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
Rhinosinusitis disability index (RSDI)
All patients completed a disease specific quality of life questionnaire ‘Rhinosinusitis 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±0.807 and 1.41±0.637. Using sample T test there was significant change between 6 and 12 weeks was seen.

![Figure 4: Mean endoscopic score at 0, 6 and 12 weeks.](image)

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

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

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

<table>
<thead>
<tr>
<th>Post operative Endoscopic score</th>
<th>Total 0 week</th>
<th>Total 6 weeks</th>
<th>Total 12 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>po6</td>
<td>Pearson Correlation</td>
<td>0.022</td>
<td>0.058</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.894</td>
<td>0.727</td>
</tr>
<tr>
<td>po3</td>
<td>Pearson Correlation</td>
<td>-0.078</td>
<td>-0.101</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.638</td>
<td>0.541</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Lund Mackay CT score</th>
<th>Physical 0 week</th>
<th>Functional 0 week</th>
<th>Emotional 0 week</th>
<th>Total RSDI 0 WEEK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>-0.161</td>
<td>-0.295</td>
<td>-0.329</td>
<td>-0.311</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.327</td>
<td>0.068</td>
<td>0.041</td>
<td>0.034</td>
</tr>
</tbody>
</table>

*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 Settipane 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 Sambandam 2011).

Rhinosinusitis disability index (RSDI)
The study conducted by Birchet 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 found change in endoscopy score significantly improved with post operatively (46.6±21.4 versus 26.1±20.8 ) in patient with nasal polypysis with mean follow-up of 1.4±0.35 years found significant improvement with p <0.0001 (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, Dudvarks 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 (9.5±4.44) versus post (1.11±0.93) in patient undergoing FESS for nasal poly 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 value < 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 (Tomoum, Klettromwell 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 (Krous 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