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MID-TERM EVALUATION OF OUTCOMES IN RHINOPLASTY AND RHINO-SEPTOPLASTY

Otorhinolaryngology

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ABSTRACT

Introduction: Rhinoplasty improves the facial aesthetics. But the perceived ideal outcome for each patient is different for similar disease. Here comes the role of health-related quality of life questionnaires which determine the improvement based on patient's viewpoint.
Materials: A total of 30 patients were enrolled and underwent the procedure of rhinoplasty or septo-rhinoplasty. Quality of life questionnaires (QoL) specific to disease were completed such as ROE (Rhinoplasty Outcomes Evaluation) and NOSE (Nasal Obstruction Symptom Evaluation) pre-operatively as well as post-operatively at completion of 6 months follow up.
Results: The condition of patients significantly improved related to disease specific questionnaires. The mean pre-operative score for ROE and NOSE is 30.41±16.31 and 61.33±27.06 respectively. While the score improved post-operatively for ROE and NOSE to 82.51±16.01 and 12.40±10.53 respectively. The p value for both scores <0.001 and is found to be highly significant.
Conclusion: The present study concludes that rhinoplasty greatly improves quality of life of patients in terms of functional, physical, emotional and social sufferings postoperatively.

KEYWORDS

INTRODUCTION

Rhinoplasty is a plastic surgery procedure to improve aesthetics as well as function of nose. Cosmetic-functional rhinoplasty or rhino-septoplasty, means the cosmetic repair of the nasal pyramid together with surgery of the nasal septum in order to improve patient's complaints associated with nasal obstruction and hyposmia.[1]

Pre and intraoperative planning are essential in order to achieve good results. Although, often times the procedure may be considered a success by the surgeon, the patient may not feel pleased with it, and the opposite is also true. Therefore, it is important for the surgeon to understand the patient's complaints, and to analyze the proportions and relationships between the nose and the face through physical examination and photographic documentation.[2]

A scientific method to estimate surgical results from the patient's viewpoint is by means of quality-of-life (QOL) questionnaires in every medical field. Rhinoplasty Outcomes Evaluation (ROE) questionnaire devised by Alsarraff is one such tool and is considered a gold standard to estimate rhinoplasty results. [3]Another disease-specific health status instrument to measure the efficacy of functional rhinoplasty is Nasal Obstruction Symptom Evaluation (NOSE) Scale. It is valid, reliable, and responsive instrument that is brief and easy to complete and has potential use for outcomes studies in adults with nasal obstruction.[4]

Several studies discussing cosmetic surgery are regarding surgical techniques, access pathways, complications, sequelae and reoperation rates.[4]The assessment of the intervention's final outcome has not been very much studied under the patient's viewpoint and such analysis is imperative because patient satisfaction is the principal means used to measure the results of facial cosmetic surgeries.[5]The objective of present study is to evaluate the same by health related quality of life (HRQL) questionnaires.

METHODS

The present prospective interventional trial was conducted among 30 consecutive patients in one year who fulfilled the inclusion criteria and outcomes were assessed at our institute. Informed consent was obtained from patients about getting enrolled in study and approval was obtained from the Ethical Committee of Government Medical College and Hospital, Amritsar under the affiliation of Baba Farid University of Health Sciences. The procedures followed were as per the Helsinki Declaration of 1975, as revised in 2000.

Inclusion Criteria

1. Patients of either sex between the age group of 18 to 50 years requiring rhinoplasty or septo-rhinoplasty willing to take part in the study.
2. Patients with associated septal deviation consistent with presenting symptom of chronic nasal obstruction; symptoms lasting at least 3 months; and persistent symptoms after a 4-week trial of medical management, were taken up for septo-rhinoplasty.

Exclusion Criteria

1. Sinonasal malignancy and radiation therapy to the head and neck.
2. History or clinical evidence of chronic sinusitis.
3. Septal perforation.
4. Craniofacial syndrome.
5. Acute nasal trauma or fracture in the past 3 months.
6. Adenoid hypertrophy.
7. Chronic granulomatous conditions such as Sarcoidosis; Wegener's granulomatosis.
8. Uncontrolled asthma.
9. Pregnancy.

Every patient was subjected to detailed history taking and physical examination. Specific onset of symptoms, such as facial trauma, which may have resulted in nasal obstruction, were enquired into. During external examination specific attention was paid to factors that were important to the functional outcome of the nose such as dorsum, columella, external nasal valve, internal nasal valve, vestibule and bony valve. Every patient was subjected to pre-operative photography based on Institute of Medical Illustrators National Guidelines 2006.[6]

Following views were obtained in each patient:
Antero-posterior view: Focus distance 3 feet
Right and left lateral views: Focus distance 3 feet
The Inferior or "Worm's eye" view: Focus distance 1.5 feet
The Superior or "Bird's eye" view: Focus distance 1.5 feet

These were compared with the pre-operative photographs and the results were graded on a 0-6 scale with 0 being worse and 6 being excellent outcome as per objective assessment.

Then the individualized surgical plan was proposed for each patient taking care of expected and realistic goal achievement using closed rhinoplasty approach. The patients were followed up every week for a month and then once a month till 6 months period was completed. The

outcome analysis was done by photographic evaluation of cosmetic deformity and by ROE and NOSE scale.

Every patient was asked to fill the Rhinoplasty Outcomes Evaluation (ROE) questionnaire [3] consisting of six questions before as well as after surgical procedure (**Table1).** Each question in the questionnaire was answered with scores within a scale between zero and four (zero being the most negative answer, and four being the most positive one). In order to reach the final result in the scale, the responses from each question were added up, and such result was divided by 24 and multiplied by 100 - from that a value which varied between zero and 100 was obtained. (Zero represents minimum satisfaction and 100 the maximum one). The final result was then divided in classes, according to quartiles: Zero to <25 and 25 to <50 (failure); 50 to <75 (good); ≥75 (excellent).

Table 1: Rhinoplasty Outcomes Evaluation (ROE) questionnaire

How much do you like the appearance of your nose?
How much can you breathe through your nose?
How much do you think your friends and those close to you like your nose?
Do you think the appearance of your nose limits your social or professional activities?
How safe are you that your nose has the best possible appearance?
Would you like to surgically change the appearance or function of your nose?

NOSE questionnaire [4] **(Table 2)** was also filled by patient alongwith preoperatively as well as postoperatively. Because of the s coring algorithm for each item, the range of raw scores on the final instrument was from 0 to 20. The instrument was then scaled to a total score of 0 to 100 by multiplying the raw score by 5. Because of item wording, a score of 0 means no problems with nasal obstruction and a score of 100 means the worst possible problems with nasal obstruction.

Table 2: Nasal Obstruction Symptom Evaluation (NOSE) Scale

S.No.	Question	Score	Score	Score	Score	Score
1	Nasal congestion or stuffiness	0	1	2	3	4
2	Nasal blockage or obstruction	0	1	2	3	4
3	Trouble breathing through my nose	0	1	2	3	4
4	Trouble sleeping	0	1	2	3	4
5	Unable to get enough air through my nose during exercise or exertion	0	1	2	3	4

STATISTICALANALYSIS

Collected data were entered and analyzed with the Statisti¬cal Package for Social Sciences version 22.0 software (IBM Corp.; Armonk, NY, USA) using student t-test and ANOVA test.

A p<0.05 was con¬sidered statistically significant.

RESULTS

Study population

The total of 30 patients were enrolled in the study. The mean age of the study group was 20.97±5.41 years, with most participants in the age group of 18-25years. The majority of patients were males (73.3%). The primary outcome assessed was based on QoL questionnaires that is ROE and NOSE. While the secondary outcomes of study were photographic evaluation to assess surgeon outcome assessment (SOA) and evaluation of post-operative complications.

ROE (Rhinoplasty Outcomes Evaluation**)**

In the pre-operative evaluation, 43% of patients had ROE score between 25 to < 50. 40% patients had score <25, 16.7% patients had score between 50 to <75 and none of the patients had score of ≥75. In the post-operative evaluation, 80% of the patients had score ≥75, 16.7% remained in the same category of 50 to <75, one patient had score between 25 to <50 and none had the score of <25. No patient showed worsening of the ROE score. There was a sharp rise in post-operative ROE scores. Mean post-operative ROE score was calculated to be 82.51±16.01 as compared to the mean pre-operative ROE score that was 30.41±16.31. The p value when calculated came out to be <0.001, which showed that the difference seen was statistically highly significant.

NOSE (Nasal Obstruction Symptom Evaluation)

In the present study 36.66% patients had pre-operative NOSE score of ≥75. 30% patients had the score ranged between 50 to <75. 26.67% patients had the score between 25 to<50 and 6.67% patients had score <25. On post-operative evaluation, 93.3% patients had post-operative NOSE score between 0 to <25 and 6.67% patients had post-operative NOSE score between 25 to <50. None of the patient gave a post-operative score of ≥50. The mean pre-operative NOSE score was calculated and came out to be 61.33±27.06. The mean post-operative NOSE score of the study population was 12.40±10.53. The p value when calculated came out to be <0.001, which showed that the difference seen is statistically highly significant.

Assessment of type of external nasal deformity

In the present study, the patients were divided into three groups on the basis type of deformity as follows:

1. Nasal hump deformity (NHD)
2. Nasal axis deviation (NAD)
3. Both NHD and NAD

The mean post-operative ROE in the NHD group was 100, in NAD group it was 89.58±10.38 and in both NHD and NAD group it was 80.23±11.36. This difference observed was statistically significant. These results suggest that correction of deviation in a patient with NAD or in combination with other external nasal deformities (Figure 1) poses a challenge in terms of surgical outcomes. During the rhino-septoplasty procedure, a variety of need based surgical steps were performed (Figure 2). Most of the patients were subjected to septoplasty (90%) and it was done prior to the rhinoplasty in all these patients.

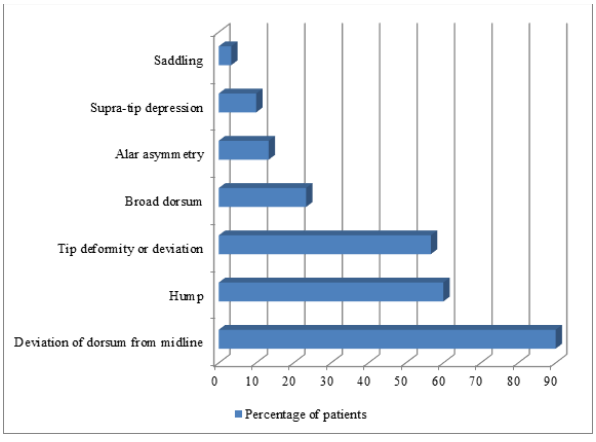

Figure 1: Types of cosmetic deformities

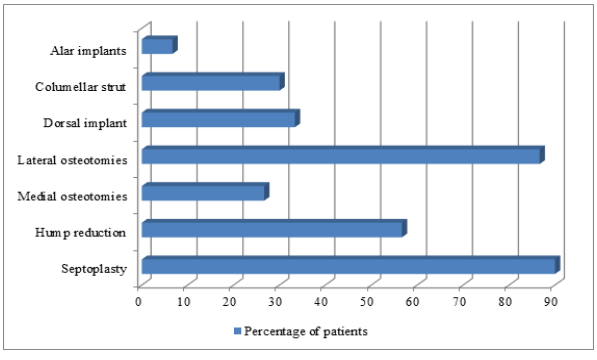

Figure 2: Various surgical steps performed during septo-rhinoplasty.

Photographic evaluation

Photographic documentation of patients undergoing rhinoplasty is essential for patient consultation, perioperative planning, and post-surgical evaluation (Figure3).[71]The photographic films so obtained were objectively compared and the results were scored on a 0-6 scale. The mean SOA (Surgeon's Outcome Assessment) score was 4.3±0.98. In 76% patients the SOA ranged between 4 and 5. The mean post-operative ROE score was 82.51±16.01. In 80% patients the ROE score was more than or equal to 75. These two findings are largely comparable.

Figure 3: Photographic evaluation of few patients pre and post operatively.

Post-operative Complications assessment

In all those patients where steps of rhino-septoplasty involved external or internal lateral osteotomies, medial osteotomies or hump reduction, a Grade IV or III facial edema developed on first post-operative day. No facial edema was observed in those patients where steps of the rhino-septoplasty procedure did not incorporate bone work. The facial edema began to subside by third post-operative day and by day 30 nearly 60% patients showed no evidence of facial edema and 40% patients had minimal edema or ecchymosis limited to nose and surrounding naso-labial fold. Other complications recorded in a small minority of patients included corneal abrasion due to plaster of Paris particles incursion into the eye, synechiae formation and septal perforation. Some kind of residual deformity was seen in one-third of the patients, the most common being deviation of dorsum in nearly 20% patients, broad dorsum in 10% patients, residual hump and residual saddling in one patient each. Newer cosmetic complaints were recorded in 16.66% of patients. Broadening of dorsum post-operatively was complained by two patients. Two patients complained of a feeling of a localized projection on the dorsum. Both these patients were females and had thin skin. This localized projection was due to dorsal graft felt under the thin skin. In the patient in whom a Biopore graft was used for augmentation, the upper end of the graft was mobile and the saddling also persisted at the end of follow-up, though it was less marked as compared to its pre-operative extent. These two complications are attributable to selection of an improper sized graft and deficiencies in the technique. However, there was no extrusion of the graft during the follow-up period.

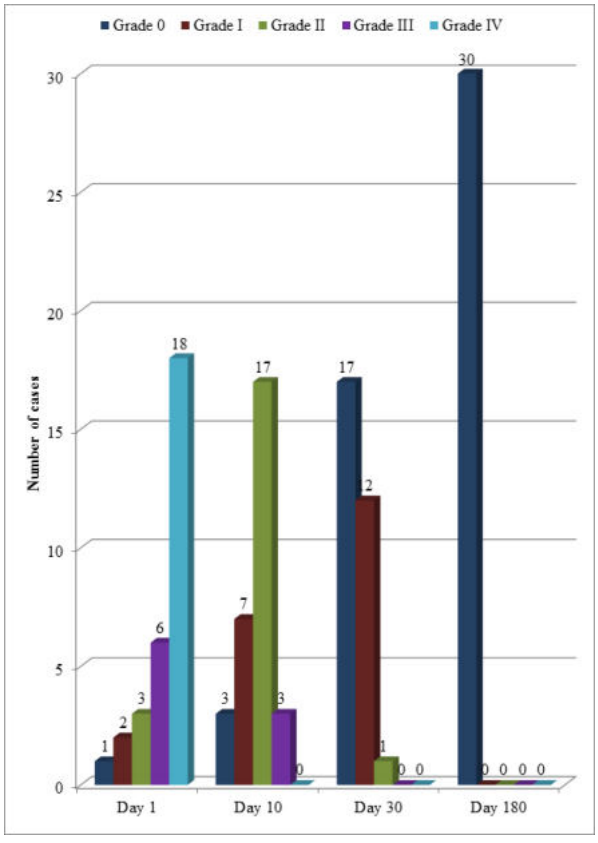

Figure 4: Post-operative facial edema

DISCUSSION

Rhinoplasty is a surgical procedure to reshape the nose. It's a surgical challenge for the operating surgeon as every patient has a different nasal anatomy and there is no single ideal nose for every face. Every patient has different expectations from the surgery. Moreover, the choice of techniques employed during rhinoplasty impacts the outcomes of procedure both in short-term and long-term. Outcome assessment is an integral part of any surgical intervention and especially for rhinoplasty in which the aesthetic expectations of the patients are very high. Thus, the outcome according to patient's viewpoint must be assessed.

Most of the patients enrolled in this study had both cosmetic as well as functional expectations from surgery. A study was carried out with an aim to compare patient satisfaction levels amongst three groups of patients with NHD, NAD and NHD plus NAD using the ROE questionnaire recorded pre and post-operatively. The results of the study showed that, patient satisfaction ranged from high to low for patients, with the NHD group being the most satisfied, followed by the NAD+NHD group and the NAD group. Comparable results are seen in the present study.[7] A study was conducted on 40 patients with crooked nose, to evaluate combined anatomical reconstruction and camouflaging techniques. The study reported that 7.5% patients had residual deviation of nasal dorsum.[8] Another study was undertaken in 191 primary rhinoplasty cases to analyze and compare the patient satisfaction and quality of life in patients with deviated dorsum ($>5^0$) and without deviated nose deformity ($<5^0$). The study concluded that, rhinoplasty can provide an objective improvement, high satisfaction and positive impact on quality of life. However, the degree of satisfaction and improvement in quality of life in patients with deviated nose deformity are less than patients with non-deviated nose deformity.[26] In the present study 90% of the patients had deviation of

the dorsum. In 22.2% of these patients some grade of residual deviation was observed at the end of follow-up period. It was the most common type of residual deformity encountered. It has been observed that the natural force existing in the cartilaginous structures and soft tissue continues to act on the nose submitted to rhinoplasty and makes it difficult to achieve excellent result in the post-operative time. Several studies proposed that another factor which may cause the nose to return to its crooked shape is the incomplete correction of the deviated nasal septum.[9,10,11]So the correction of a crooked/deviated nose still remains a challenge.[12] Another possible reason could be the limited surgical exposure provided by closed rhinoplasty approach adopted in the present study.

Along with correction of cosmetic deformity, 90% patients of our study needed septoplasty to get the functional gain as well. A retrospective study was conducted on 55 patients to aesthetically and functionally evaluate the outcome. Out of them, 49 (89%) patients required septoplasty along with rhinoplasty.[13] Another study was carried out to assess the role of septoplasty in the management of externally deviated nose and septoplasty was required in 90% patients.[14] In the study done for critical analysis for 500 consecutive primary as well as secondary rhinoplasties, septoplasty was performed in 72% cases.[15] Hence the findings of the present study are consistent with the findings of previous studies.

The mean pre-operative ROE score in the study population was 30.41±16.31. In a study carried out for evaluation of results following reduction rhinoplasty, the mean pre-operative ROE score was 28±11.2.[16] In another prospective study performed with an aim to analyze satisfaction outcomes in open functional rhinoplasty, the mean pre-operative value was found to be 24.8±14.6.[17] In yet another study carried out to evaluate the satisfaction of patients undergoing rhinoplasty for crooked nose, the mean pre-operative ROE value was found to be 24.6±11.3.[12]In all these studies including the present study, in most of the patients the pre-operative ROE score was <50. Thus this finding recorded in present study is consistent with similar studies.

The mean pre-operative NOSE score in the study population was calculated to be 61.33±27.06. A study was conducted on 59 patients with a goal to assess disease-specific quality of life outcomes after nasal septoplasty in adults with nasal obstruction. The mean pre-operative NOSE score was 67.5.[18] Another study comprising of 46 patients was carried out to assess the impact of septoplasty on patients with nasal obstruction secondary to deviated nasal septum based on the disease-specific quality-of-life questionnaire. The median pre-operative NOSE score was 75 in the study population.[19]Thus the mean pre-operative NOSE score in present study is comparable with the mean pre-operative NOSE score in the similar studies.

The above data shows that the results of present study are comparable with the results of the other similar studies quoted in literature. The findings of the present study suggest the subjective improvement reflected in the change of NOSE scale after rhino-septoplasty correlates well with the post-operative objective assessment. It can be safely concluded that NOSE score when used in combination with ROE, provides a holistic representation of outcomes in patients undergoing rhino-septoplasty. The results of present study are in-line with the results of similar studies quoted above. ROE is a helpful tool to show the satisfaction of patients submitted to rhinoplasty.[12] It helps surgeons select suitable candidates for rhinoplasty who will benefit most from the surgery.[17] Through use of ROE it is possible to demonstrate the impact of rhinoplasty on quality of life of the patients submitted to it.[12]While NOSE scale is a valid, reliable, brief and easy to complete instrument with its potential use for outcome studies in adults with nasal obstruction.[20] NOSE scale correlates well with clinical examination findings.[21]

All patients were subjected to photography and antero-posterior, right and left lateral views, inferior view and superior views were obtained before and six months after the surgery. The pre-operative photography not only helps in peri-operative planning but also records the pre-surgery aesthetics. The post-operative photographs document the changes in aesthetics and assist in evaluation of outcome. The experience of present study acknowledges that basic understanding and appreciation of this vital tool (photography) is invaluable in surgical practice, especially in rhinoplasty.[22]

Existing quantitative techniques such as rhinomanometry, acoustic rhinometry, and nasal peak flow may lack sensitivity for assessing the QOL of patients with nasal obstruction. Although nowadays there is increasing trends among surgeons to assess the disease specific QoL for better evaluation of surgical outcome, the literature is deficient in this perspect.

CONCLUSION

The final goal of rhinoplasty is to achieve an aesthetically pleasing nose while rhino-septoplasty in addition brings in the functional component. Even though the surgeon may rejoice over the outcomes, the real benchmark is patient's satisfaction. The development of ROE questionnaire and NOSE scale is the result of pursuit of operating surgeons to find precise tools that aptly portray the patients' perspective. Whereas these tools were designed and validated in different socio-cultural backgrounds, the results of present study affirm their utility in Indian scenario. The regular use of these tools would help in better appraisal of outcomes in rhinoplasty and rhino-septoplasty.

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