



SEPTOPLASTY OUTCOMES ON CHRONIC NASAL OBSTRUCTION AND QUALITY OF LIFE USING NOSE AND VAS QUESTIONNAIRE.

ENT

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ABSTRACT

Background: Chronic nasal obstruction is a common complaint in otolaryngology practice, often attributed to a deviated nasal septum. Septoplasty is frequently performed to relieve nasal obstruction, but subjective outcome measures are essential to assess improvement in symptoms and quality of life. The Nasal Obstruction Symptom Evaluation (NOSE) scale and Visual Analogue Scale (VAS) are validated tools that quantify patient-reported outcomes. **Objective:** To evaluate the impact of septoplasty on nasal obstruction and quality of life using the NOSE and VAS questionnaires in patients with symptomatic nasal septal deviation. **Materials And Methods:** A total of 42 patients with deviated nasal septum underwent septoplasty with partial inferior turbinectomy. NOSE and VAS scores were recorded preoperatively and postoperatively. The results were statistically analyzed to compare symptom improvement and assess outcome significance. **Results:** Preoperative NOSE and VAS scores averaged 72.62 ± 18.32 and 78.57 ± 11.39 . At one month post-op, scores dropped to 37.05 ± 11.10 (NOSE) and 28.81 ± 3.23 (VAS), and further to 7.26 ± 4.16 and 15.00 ± 5.97 at three months. The improvements were statistically significant ($p < 0.001$), reflecting substantial relief in nasal obstruction and enhanced quality of life. **Conclusions:** Septoplasty is an effective intervention for patients with a deviated nasal septum, leading to significant improvement in disease-specific quality of life. The NOSE and VAS questionnaires serve as reliable tools for evaluating surgical outcomes.

KEYWORDS

Nasal obstruction, septoplasty, NOSE scale, VAS, Quality of life.

INTRODUCTION

The primary function of nose include olfaction, heat exchange, humidification and defense. All of these processes require effective interaction between the mucosal membranes or olfactory system sensory cells and the inspired air. This is accomplished by intricate aerodynamics that rely on the internal nose geometry. This geometry is preserved in part by the septum. The septum also aids in cosmesis by supporting the dorsum, columella, and tip of the nose. Nose being the most prominent structure of the face is vulnerable to injuries starting from life in utero. Straight septum is more of exception than rule. [1] Traumatic incidents during vaginal delivery or childhood trauma, a frontal or lateral blow cause for the Deviated Nasal septum. Despite the fact that nasal obstruction is the most obvious symptom of a deviated nasal septum (DNS), many other symptoms in rhinology, including recurrent nosebleeds, anosmia, frequent crusting, headaches, sinusitis, post-nasal bleeding, snoring, external nasal deformity, etc. are also associated to this condition.[2] Among the various symptoms, nasal obstruction is the most common. Nasal obstruction is the feeling of blockage or insufficient air flow through the nose and it can significantly affect the quality of life. Nasal obstruction is one of the commonest presenting symptoms at most otolaryngological departments around the world.[3] Deviated nasal septum is one of the most common cause of unilateral nasal obstruction and nasal septoplasty is considered the definitive treatment for septal deviation.[4][5]

Numerous studies have attempted to objectively evaluate the degree of nasal obstruction before and after the appropriate operation, but in the vast majority of cases, these metrics do not correlate with patients' perceptions of nasal obstruction. [6][7]. In today's health care system health related quality of life is gaining importance in clinical assessment. Subjectivity and multidimensionality are elements of quality of life. According to expectations and coping mechanisms, it depicts the individualised perspective of how a disease or its treatment affects a person's well-being.[8] The research on health-related quality of life span a variety of personal and social activities, as well as practical, emotional, and general feelings. Questionnaires are created and validated to cover all of the aforementioned aspects. NOSE and VAS are the tools which can evaluate the quality of life before and after rhinologic surgeries. The American Academy of Otolaryngology has developed the disease specific outcome instrument Nasal Obstruction

Symptom Evaluation (NOSE) scale.[9].It is used to study the effectiveness of the septoplasty for treatment of nasal obstruction. It addresses the severity of complaints -nasal stuffiness/congestion, nasal obstruction, trouble breathing through nose, trouble sleeping and unable to get enough air on exercise or exertion. These set of 5 questionnaire is based on 4 point scale, with scores reported on a scale of 0 to 100 by multiplying the raw score by 5. The severity of NOSE scale is developed with (mild:5-25,moderate:30-50,severe: 55-75,extreme >80). It has a sensitivity and specificity of 90%.[10]. It is used in group of patients to compare the health status before and after surgical treatment. Another subjective method for analysis of symptoms is the VAS(Visual Analogue Scale). It is a psychometric response scale to measure subjective characteristics or attitudes and used in research and social science investigations. The VAS has been used in this study to determine the severity of nasal obstruction pre and post operatively after septoplasty and turbinectomy.[13] Using the Visual Analogue Scale and the Nasal Obstruction Symptom Evaluation scale, nasal obstructive symptoms can be subjectively evaluated.

The purpose of this study is to use the NOSE and VAS questionnaire to evaluate the effects of septoplasty on disease-specific quality of life in patients with chronic nasal obstruction caused by a deviated nasal septum .The comparison of preoperative and post operative scores will reveal the efficiency of the septoplasty.

Aims And Objectives

To analyze the changes in NOSE and VAS survey before and after surgery.

To evaluate symptom improvement during follow up with the patient

To evaluate the outcome of surgery.

MATERIALS AND METHODS:

A prospective study with the ethical committee approval was conducted in our tertiary care hospital. A total of 42 patients with nasal septal deviation posted for septoplasty in the Department of Otolaryngology and Head and Neck Surgery were analysed from Jan 2024 to Nov 2024.Written informed consent was obtained from all patients.

We used the following inclusion criteria: Patients with chronic nasal obstruction caused by nasal septum deviation , Symptoms persisting

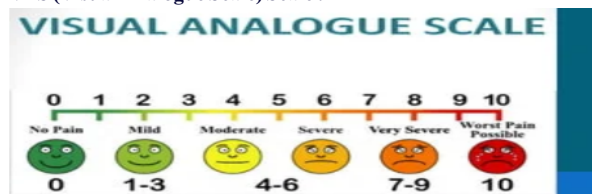
for over 12 weeks, No response to the medical treatment with topical steroids and anti-histaminic agents associated with nasal decongestants, Surgical indication for septoplasty and age above 18 years. The exclusion criteria were patients with head and neck radiotherapy. Septoplasty done with rhinoplasty, chronic rhinosinusitis, septal perforation, craniofacial congenital bone changes (except for deviated nasal septum), nasal trauma or fracture, granulomatous disease of nose, patients diagnosed and treated for sinonasal tumours, asthma without clinical control and pregnancy.

All the patients were evaluated thoroughly by anterior rhinoscopy followed by diagnostic nasal endoscopy preoperatively, to assess the septal deviation (using Mladinas classification of deviated nasal septum), site of obstruction, signs of sinusitis or any other pathology. Radiological investigations were done including X-ray and CT scan of the paranasal sinuses in required cases. Preoperative scores of NOSE and VAS were taken 3-7 days prior to surgery. Surgery was performed under general anesthesia, pressurized saline nasal spray were started after nasal pack removal and in postoperative period. The patients were submitted to septoplasty by senior surgeon from our department. The patients were independently evaluated by means of the NOSE and VAS questionnaire and the surgeon responsible for the patient was blind to the preoperative and postoperative NOSE and VAS questionnaire scores.

NOSE (Nasal Obstruction Symptom Evaluation) Scale:

Nasal obstruction symptom evaluation (NOSE) scale addresses the severity of complaints - nasal stuffiness/congestion, nasal obstruction, trouble breathing through nose, trouble sleeping and unable to get enough air on exercise or exertion. These set of 5 questionnaire is based on 4 point scale, with scores reported on a scale of 0 to 100 by multiplying the raw score by 5. The severity of NOSE scale is developed with (mild: 5-25, moderate: 30-50, severe: 55-75, extreme: >80).

VAS (Visual Analogue Scale) Scale :



The VAS scale ranges from 0 (no nasal obstruction) to 10 (complete nasal obstruction).

Follow-up visits were done at one and three months. During the follow up period NOSE and VAS questionnaire and diagnostic nasal endoscopy was done and it was compared with preoperative findings. The results were statistically analyzed.

Statistical Analysis

Statistical Methods: Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance.

Significant Figures

+ Suggestive significance (P value: 0.05 < P < 0.10)

* Moderately significant (P value: 0.01 < P < 0.05)

** Strongly significant (P value: P < 0.01)

RESULTS

Out of the 42 patients with nasal obstruction due to deviated nasal septum 27(64.3%) were males and 15(35.7%) were females with male to female ratio of 1.8:1

Table I: Gender- Frequency Distribution Of Patients Studied

Gender	No. of Patients	%
Male	27	64.3
Female	15	35.7
Total	42	100.0

Male: Female :: 1.8: 1

Table II: Age In Years-frequency Distribution Of Patients Studied

Age in Years	No. of Patients	%
18-30	18	42.9
30-40	18	42.8
>40	6	14.3
Total	42	100.0

Mean $\pm$ SD: 31.09 $\pm$ 7.49

Patients of age group between 18-30 constituted 18(42.9%) and between the age of 30-40 years 18 (42.8%) and 6(14.3%) were above the age of 40 with mean age at 31.09 $\pm$ 7.49

Table III: Preoperative DNE (Diagnostic nasal Endoscopy) findings.

Clinical findings(DNE)	No of patients
DNS-Type II	28
DNS- Type IV	08
DNS-Type V	04
DNS-Type III	02

Type II was the commonest type of septal deviation with type III being the least type.

Table III: NOSE score before and after surgery

Variables	PRE-OP	POST-OP 1M	POST-OP 3M	Z value	P value
NOSE SCORE (Out of 20)	14.57 $\pm$ 3.62	7.4 $\pm$ 2.22	1.48 $\pm$ 0.83	5.658	<0.001*
NOSE SCORE (OUT OF 100)	72.62 $\pm$ 18.32	37.05 $\pm$ 11.1	7.26 $\pm$ 4.16	5.655	<0.001*

The NOSE score analysis showed preoperatively mean NOSE score value of 72.62 and postoperatively 37.05 at one month and 7.26 at three months. The mean value increment was 35.57 and 65.36 at one month and three months respectively. This improvement in NOSE score value is calculated and statistically analyzed using Wilcoxon Signed Rank test and the p value was calculated to be less than 0.0001 which shows the improvement in score is statistically significant.

Table IV: Comparative analysis of the pre and postoperative NOSE symptom score

NOSE	PRE-OP	POST-OP 1M	POST-OP 3M	Z value	P value
Nasal congestion	3.45 $\pm$ 0.71	1.64 $\pm$ 0.58	0.64 $\pm$ 0.48	5.719	<0.001**
Nasal obstruction	3.17 $\pm$ 0.73	1.52 $\pm$ 0.59	0.29 $\pm$ 0.46	5.720	<0.001**
Trouble breathing through my nose	3 $\pm$ 0.91	1.62 $\pm$ 0.49	0.21 $\pm$ 0.42	5.709	<0.001**
Trouble sleeping	2.55 $\pm$ 1.17	1.21 $\pm$ 0.72	0.36 $\pm$ 0.48	5.313	<0.001**
Unable to get enough air through my nose during exercise or exertion	2.5 $\pm$ 1.19	1.4 $\pm$ 0.99	0.00 $\pm$ 0.00	5.448	<0.001**

The change in NOSE score symptoms were individually analyzed statistically using paired t test and all were found to be statistically significant.

Table V: Visual Analogue Score (VAS)

VAS	PRE-OP	POST-OP 1M	POST-OP 3M
Visual Analogue Score (VAS) out of 10	7.86 $\pm$ 1.34	2.88 $\pm$ 0.83	1.50 $\pm$ 0.59
WICOXON SINGED RANK TEST	Z=5.702; p<0.001**		
Visual Analogue Score (VAS) out of 100	78.57 $\pm$ 1.39	28.81 $\pm$ 3.23	15.00 $\pm$ 5.97
WICOXON SINGED RANK TEST	Z=5.702; p<0.001**		

The average preoperative VAS score was 78.57 $\pm$ 11.39. The average postoperative score at the end of one and three months postoperatively was 28.81 $\pm$ 3.23 and 15.0 $\pm$ 5.97 respectively. Wilcoxon Signed Rank test applied for graded improvement of the score showed statistically significant improvement with z value 5.702 and p value of <0.001 .

DISCUSSION

Nasal obstruction is one of the most common that a otolaryngologist come across in day to day practice. Deviated nasal septum being the most common cause for nasal obstruction. The definitive treatment is

universally accepted as surgical correction or septoplasty. Septoplasty is one of the most common otorhinological surgeries performed throughout the world. Since the beginning of corrective surgery, there have been a number of alterations, initially moving from radical submucosal resection to a more conservative approach called septoplasty. Less problems and minimum resection are positives. The need for proof of the efficacy of several interventions has grown as a result of rising healthcare costs and broad variations in clinical practise. The various surgical treatments' patient-focused outcomes must come first.

The clinical examination, objective rhinometry, and a subjective quality of life questionnaire are the three main criteria by which the success of a septal surgery can be assessed. To evaluate the nasal problems, disease-specific quality of life questionnaires are available: Chronic sinusitis survey (CSS), Rhinosinusitis disability index (RSDI), Sino-nasal outcome test (SNOT-22), Rhino-conjunctivitis quality of life questionnaire (RQLQ) and Allergy outcome survey (AOS). Self-reporting questionnaires may have a distinct impact on the outcomes. The patient's perception of their symptoms is captured in these questionnaires. Other psychological and personal factors might influence how they perceive their symptoms; as a result, it might not correlate well with the degree of deviation as indicated by the results of the clinical examination and the rhinomanometric research. Therefore, patients with moderate deviation and serious symptoms may gain more than those with extensive deviation and minor symptoms.

To measure the symptoms seen in DNS patients, a validated screening tool called NOSE (Nasal Obstruction Symptom Evaluation) scale is commonly used. This is also used to evaluate the outcomes of septoplasty. NOSE scale is a valid, reliable and responsive instrument as given in Stewart et al., [4] and Spiekermann et al [14] It is said to be well correlated with examination findings and computed tomography in study reports of Kahveci et al., [15] and thus is a very useful tool to evaluate the effectiveness of septoplasty. Visual Analogue scores were used repeatedly for the assessment of septoplasty results when disease specific Quality of life instruments were not available. Success rates for objective assessment vary. Since the septoplasty is one of the most often performed surgeries in the otolaryngology department, the time required to study every case makes it a difficult instrument to evaluate. [16]. Only 3 out of 942 patients were determined to be applicable to Singh et al strict criteria in their metaanalysis, and they came to the conclusion that rhinometry is only partially feasible. [17]. Umihanic S et al [18] in 2016 was regarding the discrepancy between subjective and objective findings after septoplasty on a group of 40 patients with DNS and 30 healthy adults as control group. Both subjective and objective assessment was done before and after surgery with rhinomanometry and NOSE scoring. The study concluded uncertain correlation between rhinomanometric findings and subjective scoring similar to other studies by Zahedi FD et al [19] and Stewart et al. [4].

The average age of the 42 patients in our cohort was 31.09 years, and they were all between the ages of 18 and 30. According to previous studies like Behnam H et al in 2014, [20] Younas M et al [20] and Rubasinghe M S et al. [21], the male population was comparatively high, with a male to female ratio of 1.8:1. The mean age of the sample size in a different study by Velsco LC et al. [22] was 34.49 years, which is older than our study group but has a predominantly male population similar to our study. With a few notable exceptions, such as the study by Gandomi et al. [23], where the mean age was 22.4 years, which is lower than our study, most other studies reported a mean age higher than 40 years.

Patients received the NOSE questionnaire both before surgery and after, and the results were scored appropriately. On pre and postoperative analyses at one and three months, the total mean NOSE score values were 72.62±18.32, 37.05±11.1 and 7.26±4.16 respectively which according to statistical analysis, indicated a significant improvement. Additionally, preoperative and postoperative statistical comparisons of individual symptom scores from the questionnaire were made. Following surgery, there was statistical improvement in each of the five symptom scores. Numerous more studies also showed the symptomatic improvement in septal deviation following septoplasty. In a research by T. F. Bezerra on 46 patients, the median NOSE score preoperatively was 75, and the postoperative score after 3 months was 10, demonstrating a statistically significant improvement. [24] According to a 2009 study by Gandomi et al. on 86 patients who had septoplasty surgery, 89.5% of patients showed a

substantial improvement in their NOSE score at 3 months, and the same improvement remained for another 6 months. [23] A prospective investigation on 30 patients and a retrospective analysis on 35 participants were conducted in 2012 by Rubasinghe M. S. et al. They computed a mean NOSE score of 9.46 preoperatively and 0.53 postoperatively with a substantial improvement. [21] The patient's perception of the benefits of septoplasty varies greatly across different levels of satisfaction, from complete symptom relief to a complete failure. We require a disease-specific questionnaire in order to accurately quantify the benefit. Patients and healthcare professionals can utilise VAS with ease and simplicity in addition to its excellent sensitivity and reliability. [25]

However, it does not address all elements of nasal blockage and is not disease-specific. When the findings of the NOSE and VAS scales were compared, it was discovered that, although though the total NOSE score prior to surgery was quite close to the VAS score, the NOSE score showed more improvement than the VAS score at both 1 and 3 months, respectively. Additionally, the NOSE score considerably increased patient satisfaction. The VAS score in the study by R Bothra et al. revealed a steady improvement, going from a preoperative evaluation score of 74.8 to 51.0 at one month and 33.8 at three months. They observed a 62% patient satisfaction rate. [25]. Since there were no disease-specific Quality of Life tools available, VAS has been used frequently to evaluate the effectiveness of septoplasty. When measured against assessments of satisfaction, they represent methodical advancement. Dinis P. B. et al. conducted a retrospective long-term evaluation 2–10 years following a septoplasty, and the results showed a mean level of satisfaction of 6. [26] The benefit of a preoperative objective assessment of nasal blockage has been a topic of discussion for some time. Numerous writers contend that objective measurements (such as rhinometry and nasal inspiratory peak flow) frequently show conflicting results when used to predict outcomes and have poor correlation with symptomatology. Additionally, there is rarely a correlation between anatomical improvement as documented by Cottle's charts or visually judged, and clinical improvement. Although some writers found tests like acoustic rhinomanometry to be effective, we decided not to utilise this method because it is somewhat burdensome in daily practise [27]. In order to give a comprehensive validation of the NOSE and VAS we acknowledge the lack of objective monitoring of nasal patency. There are restrictions on the use of objective measures of nasal patency in the clinical setting, including nasal peak flow, rhinomanometry, and acoustic rhinometry. Although they offer objective measurements of outcome, they only represent one component of the disease and might not account for all of the other characteristics. Surveys are easier and less expensive ways to help the surgeon choose patients for surgery and to provide a trustworthy follow-up. They feature a collection of related symptoms. They reflect the patient's perception, misery, and hope in addition to the nasal airflow. They might enable the surgeon to satisfy the patient's demands.

CONCLUSIONS

Nasal obstruction is a common and bothersome condition that can significantly impair quality of life. A deviated nasal septum is one of the most frequent underlying causes of this obstruction. Septoplasty is a well-established and routinely performed surgical intervention for correcting septal deviation and relieving nasal obstruction. It is typically an elective procedure with a high success rate. However, there is no universally accepted standardized test for assessing the effectiveness of septoplasty. Evaluating postoperative outcomes is crucial for understanding the procedure's impact on patient quality of life, and several disease-specific quality of life questionnaires have been developed for this purpose.

Our prospective study, comprising a robust sample size of 42 patients, aimed to assess the subjective outcomes of septoplasty. All participants underwent septoplasty as the sole surgical intervention. The effectiveness of the surgery was evaluated using the Visual Analog Scale (VAS) and the Nasal Obstruction Symptom Evaluation (NOSE) scale. Septoplasty was found to improve nasal airway patency, leading to enhanced breathing and reduced inspiratory effort in patients with nasal obstruction. Additionally, it improved mucociliary clearance and alleviated associated symptoms such as headaches, epistaxis, snoring, and sleep disturbances, thereby contributing to a better quality of life. This was reflected in the significant improvement in subjective assessment scores observed in our study.

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