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A retrospective analysis with quality of life assessment of nasal surgery for nasal obstruction

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ABSTRACT

Background: Nasal obstruction is a common health problem that disrupts a person's quality of life (QoL). The Nasal Obstruction Symptom Evaluation scale (NOSE) is a QoL scale with questions specific to nasal obstruction symptoms. This study aimed to evaluate surgical success in patients who underwent nasal septal deviation surgery by using a NOSE assessment, thus determining the importance and efficacy of surgery in this group of patients.
Methods: This study was conducted in between January 2016 and June 2017, including a total of 60 patients. The age range of the patients was 18–57 (mean, 34.4±9.9 years). The preoperative and postoperative scoring and surgeries were performed by the same investigator. The surgeries were septoplasty and radiofrequency applied to the inferior concha to overcome conchal hypertrophy. Preoperative mean scores were compared with postoperative second-month values. The importance of difference was evaluated with the Wilcoxon signed-rank test.
Results: Preoperative minimum, maximum and mean scores were 65.0, 100.0 and 83.4 (83.41±8.15), respectively. Postoperative minimum, maximum and mean scores were 10.0, 35.0 and 21.6 (21.66±8.06), respectively. The difference in mean scores was significant ($Z=-6.778$; $p<0.001$).
Conclusions: The difficulty in evaluating patient satisfaction and postoperative success stems from differences in each surgeon's approach and the comparison of preoperative and postoperative findings. This study, which was carried out by the same researcher for all steps, differs it from similar studies.

Keywords: Nasal obstruction, NOSE scale, Nasal septal surgery, Inferior turbinate hypertrophy

INTRODUCTION

Nasal obstruction is a common complaint that disrupts a person's quality of life. Mucosal, developmental-traumatic, congenital and many other aetiologies can lead to this problem. Although mucosal nasal obstruction can be controlled with medical treatment, the pathologies causing various degrees of narrowing of intranasal anatomical structures and masses provokes the continuation of symptoms.[1] The patient should be asked about unilaterality or bilaterality of symptoms, duration, associated symptoms, history of nasal trauma, medications used, presence of any systemic disease and whether this condition affects vocal and sleep quality.

The blood vessels located on the nasal mucosa, in responding to the autonomic nervous system with dilatation and constriction (clinically known as congestion and decongestion) is called the nasal cycle. Physiologic nasal obstruction can be due to position, genitonasal reflex and menstruation and pregnancy.[2] Nasal obstructions due to mucosal aetiologies are classified as acute and chronic inflammatory rhinitis, allergic and nonallergic rhinitis, vasomotor rhinitis and atrophic rhinitis. Developmental–structural aetiologies, such as nasal septal deviations, nasal valve pathologies, septal perforations and conchal hypertrophies, result in severe degrees of nasal obstruction. Although relatively rare, trauma, congenital abnormalities, benign or

malignant masses, medications and variations of endocrine and metabolic diseases can also cause nasal obstruction.[1]

The most common cause of continuous nasal obstruction is nasal septal deformity. In his study on dried bones in 1657, MacKenzie first defined this pathology in 75% of cases.[3] Nasal septal deviation is the displacement of the nasal septum, which is a membranous cartilage mixed with bone, from the midline either to the right or left side. The most important symptom is ipsilateral or contralateral nasal obstruction. Paradoxical nasal obstruction refers to the obstruction being observed on the contralateral side, which is typically due to compensatory conchal hypertrophy.[4] Treatment for a nasal septal deviation is typically surgery; the degree of disruption in nasal function is important for the surgical approach.

The quality-of-life scales are categorized into two major headings: general and specific. General health scales can be used in situations that act on the majority of the population; however, they are insufficient for evaluating minor changes due to a specific condition. The specific quality-of-life scales include discrete questions for each investigated subject and are clinically more meaningful. The Nasal Obstruction Symptom Evaluation (NOSE) scale is a specific quality-of-life scale developed by Stewart et al. with questions specific to nasal obstruction symptoms.[5,6] The NOSE scale is helpful for both the surgeon and the patient in both preoperative and postoperative evaluations. It is a simple, useful and reliable tool commonly used for follow-up of patients undergoing nasal surgery.

This study aimed to evaluate patients with nasal obstruction symptoms who were diagnosed with physical and radiologic examinations as having nasal septal deviation. The patients were evaluated preoperatively and postoperatively with the NOSE quality-of-life scale to assess the success of surgery on the quality of life.

METHODS

This study was conducted in a secondary stage hospital for otorhinolaryngology clinic, between January 2016 and June 2017 including a total of 60 patients. The study followed the principles of Helsinki Declaration. This study was approved by the Institutional Review Board (Number: E-17-1694, January 31, 2018). Preoperative scorings, surgeries and postoperative scorings were performed by the same researcher who had worked in this hospital at the study period. Patients with mucosal nasal obstruction due to acute–chronic rhinitis, allergic and nonallergic rhinitis and isolated inferior turbinate hypertrophies were excluded from the study. A total of 79 patients with nasal septal deviation diagnosed with anterior rhinoscopy and zero-degree telescopic examination were included in the study. The diagnosis was confirmed with computed tomography of the paranasal sinus. Of these patients, 19 were excluded: 16 who did not come for a control visit, 2 with postoperative nasal septal perforation and 1 with concha-septal adhesions.

The following five questions were asked to patients preoperatively to score the NOSE: ‘Over the past month, how much of a problem were the following conditions for you?’

Q1: A feeling of fullness in the nose,

Q2: Nasal obstruction,

Q3: Difficulty in breathing through nose,

Q4: Difficulty in falling asleep,

Q5: Difficulty breathing through the nose during activity (Table 1).

Each symptom was scored between 0 and 4 depending on the severity: 0 was minimum and 4 was very severe. The points for each patient were calculated for the five questions. Each patient could have a total score ranging between 0 and 20; the preoperative NOSE score for each patient was calculated by dividing the patient score by 20, then multiplying the result by 100.

The surgeries were performed under general anesthesia. A hemi-transfixion incision 2 mm superior to the nasal septal caudal end was made. The incision was then elongated along the caudal septum to elevate the mucoperichondrial flap. Following elevation of mucoperichondrial and mucoperiosteal elevations, the septal cartilage was free to move. The integrity between the septal cartilage and the septum was preserved in the chondro-osseous area at the nasal dorsum and anterior to the premaxillary crest. Deviated cartilage and bone was resected, reshaped and inserted, then fixed with sutures. Lidocaine at 1% concentration and phenylephrine was injected at the anterior edge of the hypertrophied concha. We used the Gyrus Radiofrequency Workstation (GyrusMedical ENT TCRF Workstation v2.09 Somnoplasty Model 735000) with target parameters set at a temperature of 75°C; power of 15 W; and RF energy of 350 J with a total energy of 700 J to turbinate. The surgery was completed following insertion of a silicone nasal splint into the nasal cavity. Follow-ups were performed on days 3 and 7, and at months 1 and 2 following operation. At the 2-month follow-up, symptoms were re-evaluated, and the NOSE scale was calculated and compared with the preoperative values.

The mean values were plotted with standard deviations. The distribution of data was evaluated using the Kolmogorov Smirnov test. For the nonparametric values, the significance of difference between means was evaluated with the Wilcoxon signed-rank test. A p value less than 0.05 was considered statistically significant. For

the statistical analysis, SPSS statistical software (SPSS for Windows version 21.0; SPSS Inc., Chicago, IL, USA) was used.

RESULTS

The patients were a minimum of 18 years and a maximum of 57 years of age, with a mean of 34.4±9.9 years. A total of 34 male (56.6%) and 26 (43.3%) female patients were included in the study.

In the preoperative evaluation, the lowest point was 13.0 and the highest point was 20.0, with a mean of 16.6 (16.68±1.63). In the preoperative evaluation, NOSE scores ranged between 65.0 and 100.0, with a mean of 83.4 (83.41±8.15) (Table 2).

Postoperatively, at the 2-month control, the minimum point was 2.0, and the maximum point was 7.0, with a mean of 4.3 (4.33±1.61). In the postoperative evaluation, NOSE scores ranged between 10.0 and 35.0, with a mean of 21.6 (21.66±8.06) (Table 2).

The mean preoperative and postoperative NOSE score values were 83.4 and 21.6, respectively. This decrease was statistically significant (Z= −6,778; p=0.000).

Table 1: The questions asked to evaluate NOSE scale.

Questions	Not a problem	Very mild problem	Moderate problem	Fairly bad problem	Severe problem
A feeling of fullness in the nose,	0	1	2	3	4
Nasal obstruction,	0	1	2	3	4
Difficulty in breathing through nose,	0	1	2	3	4
Difficulty in falling asleep,	0	1	2	3	4
Difficulty breathing through the nose during activity.	0	1	2	3	4

NOSE: Nasal obstruction symptom evaluation scale.[6, 17] Over the past month, how much of a problem were the following conditions for you?

Table 2: Patients' preoperative and postoperative mean points and mean NOSE scores.

Preoperative point	Postoperative point	Preoperative score	Postoperative score
16.68±1.63	4.33±1.61	83.41±8.15	21.66±8.06

DISCUSSION

The nose is a complicated and sometimes underappreciated organ, given its many functions, including humidifying the air passing through to our lungs during breathing, preventing the passage of particles of certain dimensions into the lower airways and having secondary sexual organ functions through detection of odors and pheromones. Nasal obstruction is a major health problem that affects 9.5%–15% of the population.[7] The first step in solving this problem is determining its etiology. A rough estimation of the nasal obstruction's cause can be made by assessing the obstruction's duration, whether it is unilateral or bilateral, whether there are allergic symptoms and systemic diseases, the history of nasal or facial trauma, whether the obstruction worsens in specific places, the use of medications and whether sleep or speech disturbances accompany the obstruction. Open-mouth breathing-induced nasal speech, intranasal venous congestion-induced blue–purple discolouration on the lower eyelids, structural deformity of the nose and edema are important findings during inspection. Anterior rhinoscopy is the examination of the nasal cavity with a nasal speculum and light source with the tip of the nose raised. It gives a crude idea regarding the inferior and medial parts of the nose; however, the paranasal sinus ostia and meatus cannot be evaluated using this method. These structures can be successfully examined with endoscopic evaluation. Structures or pathologies that are impossible to visualize with anterior rhinoscopy or endoscopy can be evaluated with paranasal sinus computed tomography.

Mucosal obstructions can be successfully controlled medically; however, the treatment of choice is surgery for symptomatic nasal septal deviations. Patients' complaints do not always match the severity of the septal deformity; thus, not all septal deviations require surgical repair, given septal deviations are present in almost 80% of the population.[8]

The NOSE scale is a specific quality-of-life scale developed by the American Otorhinolaryngology Society. It consists of specific questions for nasal obstruction symptoms and has been validated for septoplasty.[5,6] In a study comparing the efficacy of NOSE with other methods in septoplasty, the NOSE scale scores were found to be significantly decreased following surgery and combined use with physical examination and CT was reported to be convenient.[9] In their study, Gandomi et al. reported an 89.5% reduction in the nasal obstruction symptoms of 86 patients undergoing septoplasty

compared with the preoperative and postoperative NOSE scales of these patients.[10] Mengi et al. evaluated the success of septoplasty with a quality-of-life scale and objective methods and reported a postoperative decrease in scales, including the NOSE scale.[11] Sisman et al. reported no association between localization of the septal deviation and the NOSE score; however, there was a postoperative significant decrease in the NOSE score compared with the preoperative values.[12]

Nasal obstruction is commonly observed ipsilateral to the side of the deviation; conversely, in some cases due to inferior conchal hypertrophy, the nasal obstruction can be observed on the contralateral side, known as paradoxical nasal obstruction.[4] There is no consensus on whether this hypertrophy requires treatment; and if so, which technique is to be used.[13] The treatment techniques are radiofrequency, turbinate outfracture, turbinoplasty, electrocautery, chemical cautery, extramural partial or complete resections and laser surgery.[14] In their study, Rao et al. reported that bipolar electrocautery was more reliable and effective than complete turbinectomy, sodium tetradecyl sulfate injection and monopolar electrocautery.[14] Akdag et al., investigating the long-term effects of radiofrequency on reduction of volume, reported a maximum decrease in the first 3 months, in which the efficacy continued for 20 months.[15] We believe that, given the aim of surgery in a patient with nasal obstruction symptoms is to overcome the obstruction, compensatory lower conchal hypertrophy must be treated simultaneously.

Kumar and Rajashekar, comparing NOSE scores of septoplasty alone versus septoplasty together with partial inferior conchal turbinectomy, reported improvements in the scores of all patients at 1, 3 and 6 months; meanwhile, this improvement was greater in patients who underwent septoplasty together with partial inferior conchal turbinectomy.[16] Resende et al, in their study evaluating bilateral lower conchal outfracture procedure together with septoplasty, reported a preoperative mean NOSE score of 74.8 and postoperative NOSE scores of 28.3 and 21.4 at the 1- and 3-month follow-ups, respectively, which were clinically meaningful.[17]

In our study population of patients with nasal obstruction, the mean NOSE score was 83.4 (83.41±8.15), whose anterior rhinoscopic examination and endoscopic evaluation revealed the cause of nasal obstruction to be septal deviation; paranasal sinus CT revealed no other pathology associated with the obstruction. Septoplasty together with radiofrequency to decrease the volume of inferior conchal hypertrophy was applied. The postoperative NOSE score was calculated as 21.6 (21.66±8.06). Our results are in agreement with the literature, showing a statistically significant reduction in scores and improvement in quality of life during the postoperative period.

Lodder and Leong, in their study to determine the clinically important endpoints in nasal obstruction surgery, reported that both NOSE scores and peak nasal inspiratory flow measurements correlate well with patient satisfaction, with preoperative scores of 64.0 in the most satisfied group and 39.2 in the satisfied group.[18] In our study population, a decrease of 61.8 points was observed during the postsurgical evaluation.

One of the difficulties of studies that compare preoperative and postoperative patient satisfaction and surgical success is the impossibility of comparing preoperative and postoperative findings and perhaps most importantly, the differences in surgeons and observers. This study, in which all procedures were performed by the same researcher, differs from similar studies.

In conclusion, for patients with nasal obstruction who have planned surgery, in addition to standard a medical examination, the use of scales to quantitatively evaluate the patient's quality of life, and frequency and intensity of symptoms is essential for both the patient and the surgeon.

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