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***Original Article / Çalışma - Araştırma***

# Evaluation of treatment efficacy in patients with minimal nasal septum deviation and concha bullosa using the nasal obstruction symptom evaluation scale

## Minimal nazal septum deviasyonu ve konka büllozası olan hastalarda tedavi etkinliğinin burun tıkanıklığı semptom değerlendirmesi ölçeği kullanılarak değerlendirilmesi

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**Objectives:** This study aims to compare the treatment efficacy of middle turbinate lateral lamella resection alone with septoplasty plus middle turbinate lateral lamella resection for nasal stuffiness in two patient groups using the nasal obstruction symptom evaluation (NOSE) scale in patients with concomitant minimal nasal septum deviation and concha bullosa.

**Patients and Methods:** A total of 80 patients who had minimal nasal septum deviation and concha bullosa at the middle turbinate were included in this study. Of these patients, 40 patients underwent middle turbinate lateral lamella resection, while 40 patients underwent middle turbinate lateral lamella resection plus septoplasty under general anesthesia. Complaints of nasal stuffiness in patients included were evaluated with the NOSE scale before the operation and three months after the operation.

**Results:** When preoperative and postoperative NOSE scale parameters were compared, all parameters statistically significantly improved postoperatively in both groups ($p<0.05$). The total NOSE scores were decreased significantly after surgery.

**Conclusion:** Middle turbinate lateral lamella resection alone is as efficient as septoplasty plus middle turbinate lateral lamella resection for the treatment of symptomatic nasal stuffiness in selected patients.

*Key Words:* Concha bullosa; nasal obstruction symptom evaluation scale; septum deviation.

**Amaç:** Bu çalışmada minimal nazal septum deviyasyonu ile beraber orta konkada konka büllozası olan hastalarda, yalnızca orta konka lateral lamel rezeksiyonu ile septoplasti ve orta konka lateral lamel rezeksiyonu birlikte yapılan iki hasta grubu arasındaki tedavi etkinliği burun tıkanıklığı semptom değerlendirme (NOSE) ölçeği kullanılarak karşılaştırıldı.

**Hastalar ve Yöntemler:** Minimal nazal septum deviyasyonu ve orta konkada konka bülloza saptanan toplam 80 hasta çalışmaya dahil edildi. Bu hastalardan 40'ına genel anestezi altında yalnızca orta konka lateral lamel rezeksiyonu diğer 40'ına ise orta konka lateral lamel rezeksiyonu artı septoplasti ameliyatları yapıldı. Çalışmaya alınan hastaların ameliyat öncesi ve ameliyattan üç ay sonrası burun tıkanıklığı yakınmaları, NOSE ölçeği ile değerlendirildi.

**Bulgular:** Ameliyat öncesi ve sonrası NOSE ölçeği parametreleri karşılaştırıldığında, cerrahi sonrasında tüm parametreler her iki grupta da istatistiksel olarak anlamlı bir iyileşme gösterdi ($p<0.05$). Total NOSE puanları ameliyat sonrasında anlamlı bir şekilde azaldı.

**Sonuç:** Seçilmiş hastalarda yalnızca orta konka lateral lamel rezeksiyonu, semptomatik burun tıkanıklığı açısından tedavide septoplasti ve orta konka lateral lamel rezeksiyonu kadar etkili olabilmektedir.

*Anahtar Sözcükler:* Konka bülloza; burun tıkanıklığı semptom değerlendirme ölçeği; septum deviyasyonu.

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Upper respiratory stuffiness, particularly nasal stuffiness, is a very common clinical problem in daily practice. It is reported that 25% of the community have complaints of nasal stuffiness that is not related to allergy.[1] Nasal stuffiness can be due to a congenital or acquired anatomical defect, or to a variety of diseases that can cause mucosal edema or obstruction of the nose due to a mass effect.

The most common cause of nasal stuffiness is nasal septum deviation. One study has reported the incidence of nasal septum deviation to be not less than 75-80%.[2] Additionally, nasal polyps and hypertrophies of the turbinates and adenoids can also cause nasal stuffiness. Concha bullosa is one of the most common anatomical middle turbinate variations and frequently causes symptomatic nasal stuffiness. At the same time, it can cause obstruction of the osteomeatal complex, which results in recurrent paranasal sinus infections. The diagnosis of this anatomical variation is made with computed tomography (CT) scans of the paranasal sinus, and the preferred treatment is surgical middle turbinate lateral lamella resection.[3]

The American Academy of Otolaryngology - Head and Neck Surgery developed the nasal obstruction symptom evaluation (NOSE) scale, as a disease-specific tool for the evaluation on nasal stuffiness.[4] With this scale, five parameters are evaluated. These parameters are: nasal congestion or stuffiness, nasal blockage or obstruction, trouble breathing through the nose, trouble sleeping, and inability to get enough air through the nose during exercise or exertion.

The aim of the current study was to compare the treatment efficacy of middle turbinate lateral lamella resection alone versus septoplasty plus middle turbinate lateral lamella resection for nasal stuffiness in two patient groups using the NOSE scale for patients who have concomitant minimal nasal septum deviation and concha bullosa.

## PATIENTS AND METHODS

This study was approved by the Ethical Committee of the Erciyes University Faculty of Medicine and signed informed consent was obtained from all patients. A total of 80 patients who had minimal nasal septum deviation and concha bullosa detected in the middle turbinate were included in the study. Diagnoses of the patients were made by anterior rhinoscopy and endoscopic nasal examination. Concha bullosa in the middle turbinate was diagnosed by CT scan of the paranasal sinuses. Of these patients, 40 patients (18 male 22 female; mean age 37.2±12.5 years; range 18 to 59 years) had middle turbinate lateral lamella resection alone (group 1) and 40 patients (17 males, 23 females; mean age 32.7±11.4 years; range 18 to 58 years) had middle turbinate lateral lamella resection plus septoplasty (group 2), under general anesthesia.

Nasal stuffiness complaints of the patients included in the study were evaluated with NOSE before the operation and three months after the operation. NOSE survey data was collected by nurses who were aware of the study before the operation and during the follow-ups.

Patients for whom a disease in the exclusion criteria was detected were not included in the study group. Patients that had severe nasal septal deviation resulting in nearly total obstruction, significant septum deviation, nasal polyposis, allergic rhinitis, active nasal and paranasal sinus infection, septal perforation, adenoid hypertrophy, inferior turbinate hypertrophy or previous rhinoplasty, endoscopic sinus surgery or septoplasty were excluded from the study.

All statistical analyses were done with the SPSS (SPSS Inc., Chicago, Illinois, USA) statistical software package version 16.0 for windows. Results were given as mean ± standard deviation. Chi-square test was used to compare categorical parameters between the groups. Mann-Whitney U test was applied to compare data of the NOSE scale between groups. Wilcoxon-signed rank test was used to compare the same parameters of NOSE scores of each group before and after surgery.

## RESULTS

The 80 patients in the study were included in the data analysis at the end of the three month evaluation period. There was no statistically significant difference between the two groups in terms of age or gender.

There was no statistically significant difference between the two groups when the total NOSE scores before surgery were compared. NOSE scale scores before and after surgery for the group that had middle turbinate lateral lamella resection alone are shown in Figure 1. For the group that had middle turbinate lateral lamella resection alone, when the NOSE score parameters before

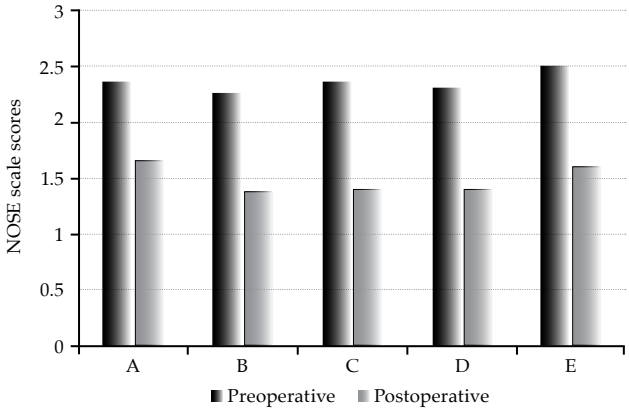


***Figure 1.*** *Nasal obstruction symptom evaluation scale scores before and after surgery for group 1. A: Nasal congestion or stuffiness; B: Nasal blockage or obstruction; C: Trouble breathing through by nose; D: Trouble sleeping; E: Unable to get enough air through by nose during exercise or exertion.*

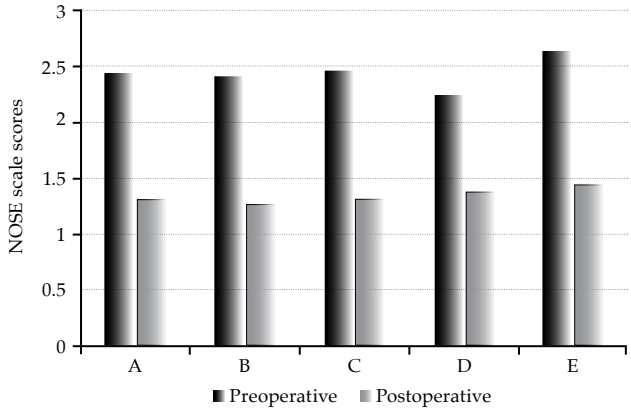


***Figure 2.*** *Nasal obstruction symptom evaluation scale scores before and after surgery for group 2. A: Nasal congestion or stuffiness; B: Nasal blockage or obstruction; C: Trouble breathing through by nose; D: Trouble sleeping; E: Unable to get enough air through by nose during exercise or exertion.*

and after surgery were compared, a statistically significant improvement was detected ($p<0.05$) for all parameters after surgery.

Similarly, for the group that had septoplasty plus middle turbinate lateral lamella resection, when the NOSE score parameters before and after surgery were compared, a statistically significant improvement was detected ($p<0.05$) for all parameters after surgery (Figure 2).

When total NOSE scores were compared before and after surgery, a significant decrease of total NOSE scores was detected for both groups after surgery (Figure 3). There was no statistically significant difference in post-surgery total NOSE scores between the two groups.

## DISCUSSION

In our study we detected a significant decrease of each NOSE score and total NOSE scores after surgery for both the group that had middle turbinate lateral lamella resection alone and for the group that had septoplasty plus middle turbinate lateral lamella resection.

Nasal stuffiness is one of the most common problems in rhinology practice. Septum deviation and turbinate hypertrophies are among the most common reasons for nasal stuffiness. However, adenoid hypertrophies, nasal polyps, anatomical turbinate variations, and tumoral masses are also among the causes of nasal stuffiness.

A common anatomical variation, septal deviation is defined as the leaning of the septum to one side.[5] Diagnosis is made with anterior rhinoscopy and endoscopic nasal examination. The most effective treatment is surgical correction of the septum.[6-9] Concha bullosa is the most common anatomical variation of the middle turbinate and causes symptomatic nasal stuffiness.[10] Diagnosis is made with endoscopic nasal examination along with a CT scan of the paranasal sinuses, and the treatment is surgical.[3] The most common surgical procedure is lateral lamella resection of the middle turbinate. Septoplasty and surgical intervention of the turbinates are the most common surgeries in rhinology daily practice.

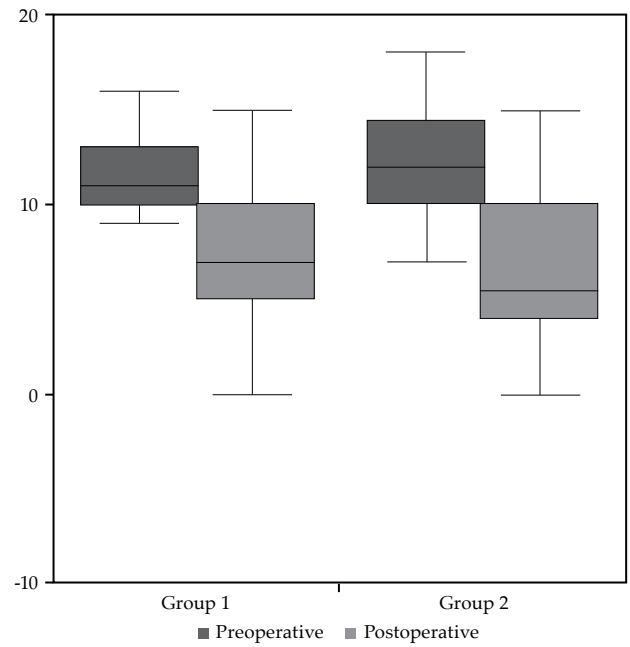


***Figure 3.*** *Total nasal obstruction symptom evaluation scale scores before and after surgery for both groups.*

The incidence of nasal septum deviation in the general population is 18-75%.[5] A recent study reported the incidence of concha bullosa to be 44% with a strong association detected between concha bullosa and concomitant contra-lateral nasal septum deviation.[10] This supports the 'ex vacuo' theory of Stammberger, which suggests that septum deviation plays a major role in the development of concha bullosa.[11] Because of this, for patients where nasal septum deviation is detected with anterior rhinoscopy, an endoscopic nasal examination must be performed and when middle turbinate hypertrophy is detected with this examination, the patient must be evaluated for concha bullosa with CT of the paranasal sinuses and treatment planned accordingly.

For evaluation of treatments for nasal stuffiness, many studies have been performed and scales developed.[7,8,12] However, none of them was disease-specific until 2004, when Stewart et al.[4] developed the NOSE scale. With this scale, five parameters were evaluated: nasal congestion or stuffiness, nasal blockage or obstruction, trouble breathing through the nose, trouble sleeping, and inability to get enough air through the nose during exercise or exertion. To evaluate the treatment efficacy of nasal surgery to fix nasal stuffiness, many studies have been performed but no disease-specific tool associated with nasal stuffiness has been used.[13,14]

A recent study by Harrill et al.[15] compared the treatment efficacy of a group of patients who had bilateral inferior turbinate radiofrequency with a group of patients given bilateral inferior turbinate radiofrequency plus septoplasty using the NOSE scale. They showed a significant improvement in NOSE scores for both groups. No statistically significant difference was detected between the two treatment groups in terms of postoperative results. Again using the NOSE scale, Bezerra et al.[16] evaluated the impact of septoplasty on the quality of life of patients who had nasal stuffiness and showed that the improvement in NOSE scores before surgery and NOSE scores three months after surgery was statistically significant. Mondina et al.[17] also evaluated nasal septoplasty results using the NOSE scale. However, to our knowledge, there is no study comparing the treatment efficacy of middle turbinate lateral lamella resection alone with septoplasty plus middle turbinate lateral lamella resection. In our study, we evaluated all NOSE parameters separately between the two groups in terms of treatment efficacy and showed that the improvement in both groups for all parameters was statistically significant.

Of note, this study has the limitation of not using acoustic rhinomanometry for evaluation of objective nasal stuffiness. Further studies which combine objective and subjective examinations are needed to evaluate treatment efficacy of patients with nasal stuffiness.

In conclusion, total NOSE scores were found to be significantly decreased in patient groups who had middle turbinate lateral lamella resection alone or who had septoplasty plus middle turbinate lateral lamella resection for patients who had minimal nasal septum deviation and concomitant concha bullosa. For these patients, middle turbinate lateral lamella resection alone was found to be as effective and sufficient as septoplasty plus middle turbinate lateral lamella resection for the treatment of nasal stuffiness.

**Declaration of conflicting interests**

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