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Original Article / *Özgün Makale*

Removing or repositioning of the basal crest during septoplasty operation in patients with severe basal crest deviation

İleri derecede bazal krest deviasyonu olan hastalarda septoplasti ameliyatı sırasında bazal krestin çıkarılması veya yeniden konumlandırılması

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ABSTRACT

Objectives: This study aims to compare how two different approaches used during septoplasty to remove the severe basal crest deviation affect the postopreative patient satisfaction.

Patients and Methods: Between January 2014 and October 2015, a total of 40 patients with severe basal crest deviation (25 males, 15 females; mean age 33±7 years; range 18 to 45 years) were included in the study. Patients were divided into two groups according to the operative approach. In group 1, the basal crest was repositioned, whereas it was removed in group 2. Participants were asked to complete Nasal Obstruction Symptom Evaluation (NOSE) questionnaire and visual analog scale (VAS) before and four weeks after the septoplasty in order to assess their nasal obstruction and postoperative satisfaction.

Results: Both the NOSE and VAS scores were significantly decreased in group 1 and group 2 after the septoplasty ($p<0.001$ and $p<0.001$ for group 1; $p<0.001$ and $p<0.001$ for group 2). When the pre- and postoperative NOSE and VAS scores were compared, we did not find any significant difference between group 1 and group 2.

Conclusion: Septoplasty can be performed with a high patient satisfaction. Repositioning of the basal crest is an alternative approach instead of removing it during this surgical intervention.

Keywords: Basal crest; nasal obstruction symptom evaluation; nasal septal deviation; septoplasty.

ÖZ

Amaç: Bu çalışmada septoplasti esnasında ileri derecede bazal krest eğriliğini gidermek için kullanılan iki farklı yaklaşımın ameliyat sonrası hasta memnuniyetini nasıl etkilediği karşılaştırıldı.

Hastalar ve Yöntemler: Ocak 2014 - Ekim 2015 tarihleri arasında yapılan çalışmaya şiddetli bazal krest eğriliği olan 40 hasta (25 erkek, 15 kadın; ort yaş 33±7 yıl; 18-45 yıl) dahil edildi. Hastalar yapılan cerrahi yaklaşıma göre iki gruba ayrıldı. Grup 1'de bazal krest yeniden konumlandırılırken, grup 2'de bazal krest çıkarıldı. Çalışmaya katılanlardan burun tıkanıklığının ve ameliyat sonrası memnuniyetin değerlendirilebilmesi için septoplastiden önce ve ameliyattan dört hafta sonra Burun Tıkanıklığı Semptom Değerlendirme (NOSE) ve görsel analog ölçeği (GAÖ) formlarını doldurmaları istendi.

Bulgular: Hem grup 1'de hem de grup 2'de septoplasti sonrası NOSE ve GAÖ skorlarında anlamlı düşüş saptandı (grup 1 için $p<0.001$ ve $p<0.001$; grup 2 için $p<0.001$ ve $p<0.001$). Ameliyat öncesi ve sonrası NOSE ve GAÖ skorları karşılaştırıldığında grup 1 ve grup 2 arasında anlamlı bir fark saptanmadı.

Sonuç: Septoplasti yüksek hasta memnuniyeti ile yapılabilir. Bazal krestin cerrahi girişim esnasında çıkarılması yerine, yeniden konumlandırılması alternatif bir yaklaşım olabilir.

Anahtar sözcükler: Bazal krest; burun tıkanıklığı semptom değerlendirme; nazal septum deviasyonu; septoplasti.

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Nasal septal deviation is a major cause of nasal obstruction, and as a result of this, septoplasty is one of the most frequently performed surgical interventions in otorhinolaryngology. Septoplasty techniques have been long-defined and little has been modified until today. After sub-mucous resection was described by Freer and Killian, septoplasty began to attain popularity after Cottle and Goldman described the surgical technique and its advantages compared to sub-mucous resection operation.[1-4] In recent years it has become popular to use endoscopy during septoplasty after the introduction of endoscopy in otorhinolaryngology practice by the efforts of Stammberger and Posawetz[5] and Lanza et al.[6]

Although removal of portions of deviated nasal septum is an important step of septoplasty, preserving a sufficient amount of nasal septum is important to retain nasal shape and prevent nasal valve collapse and saddle nose deformity. Avoiding redundant nasal septum excision is a major issue for preventing nasal septal perforation. Moreover, the status of nasal mucosa is frequently underestimated. Compromised nasal mucosa due to severe nasal septum deviation is prone to mucosal tears during septoplasty, and may be need to be repaired.[7]

The basal crest of nasal septum can be defined as the inferior part of the nasal septum that includes the premaxillary and maxillary crest anteriorly and their junction with the quadrangular cartilage, and also includes the inferior part of the vomer posteriorly.[8] Severe basal crest deviations can be removed using McKenty raspatory, chisels and metal mallet, or may be repositioned medially using an elevator and/or Blakesley nasal forceps. To the best of our knowledge there is no English or Turkish literature about these two approaches that can be used during septoplasty for fixing severe basal crest deviations. Thus, in this study we aimed to compare the patients' satisfaction from the septoplasty with two different approaches to severe basal crest deviation.

PATIENTS AND METHODS

The study was conducted at the otorhinolarygology clinic of Amasya University Sabuncuoğlu Şerefeddin Training and Research Hospital between January 2014 and October 2015. The informed consent was obtained from all participating subjects, and the study was conducted accordance with the principles of the Declaration of Helsinki. A total of 40 patients (25 males, 15 females; mean age 33±7 years; range 18 to 45 years) who were diagnosed with nasal septum deviation with severe basal crest deviation, were included in the study. The patients were divided in to two equal groups. Repositioning or removing the basal crest was determined randomly before the septoplasty.

Computed tomography and endoscopic nasal evaluation were performed for all the participants before the study began. These included Cottle maneuvers and external dilators to define dynamical valve collapse, and trials of decongestants to determine the contribution of mucosal congestion. Exclusion criteria were as follows: sinonasal malignancy, indications for nasal surgery other than septoplasty (such as endoscopic sinus surgery, nasal valve surgery, turbinate surgery, etc.), sinonasal infections, allergic rhinitis, septal perforation, craniofacial syndrome, adenoid hypertrophy, pregnancy, cardiac and lung disease.

Participants were asked to complete Nasal Obstruction Symptom Evaluation (NOSE) questionnaire and visual analog scale (VAS) before and four weeks after the septoplasty operation in order to assess their nasal obstruction and postoperative satisfaction from the surgery. The NOSE questionnaire

Table 1
Nasal Obstruction Symptom Evaluation questionnare

	Over the past one month how much of a problem were the following conditions for you? Please mark the most correct response				
	Not a problem	Very mild problem	Moderate problem	Fairly bad problem	Severe problem
Nose obstruction and stuffiness	0	1	2	3	4
Nose obstruction	0	1	2	3	4
Trouble breathing through my nose	0	1	2	3	4
Trouble sleeping	0	1	2	3	4
Unable to get enough air through my nose during exercise or exertion	0	1	2	3	4

was developed and validated as a disease specific quality of life instrument (Table 1).[9] This scale has also been validated for our setting.[10] The VAS is 10 cm long with markings of 0= completely open and 10= completely obstructed at either end. The patients are asked to mark their sense of obstruction on this scale. Scores are the distance between the mark and the left end of the line (measured in mm) and can range from 0 to 100. The VAS scores are measured and recorded manually.[11]

Surgical procedure

All the operations were performed under general anesthesia. A conventional septoplasty technique (maxilla-premaxilla approach described by Cottle) was used to operate on the patients. Lidocaine (20 mg/mL) and epinephrine HCl (0.0125 mg) were used for local anesthesia and vasoconstriction. After a right hemitransfixion incision, the left mucoperichondrium and, if needed, the right and left mucoperiosteums, were elevated according to the location of the pathology. Cottle tunnels were made by subperichondrial and subperiosteal dissection. Inferior and posterior chondrotomy was performed to create the "swinging-door" with the anterior part of the septum. After posterior and inferior chondrotomies, the cartilage deviations were corrected with excisions and sutures, conserving the L-strut support. In addition, deviation of the posterior bony part of the septum was corrected by excision. The method was selected randomly for fixing the severe basal crest deviation (Figure 1). In group 1, the basal crest was repositioned medially by using an elevator and/or Blakesley nasal forceps (Figure 2 and 3), whereas the basal crest was removed by using McKenty raspatory/chisel and metal mallet in group 2.

Surgical incisions were sutured with 3/0 Vicryl Rapide (Sutures limited, Wrexham UK). A nasal airway splint (Boston Medical Products, Westborough, MA, USA) was used as the nasal packing material.

The patients were discharged the day after the surgery with analgesic (650 mg paracetamol and 4 mg chlorpheniramine maleate combination, 2*1/day) and antibiotic (500 mg cefuroxime axetil, 2*1/day). Nasal airway splints were removed on postoperative fourth day. A follow-up visit was scheduled after one week from the removal of internal nasal splint to check for infection and after four weeks from the operation to check for patient satisfaction, septal perforation, and synechiae formation. Patients were also asked to report any bleeding in the following two weeks.

Statistical analysis

All the variables among the groups were analyzed statistically with the IBM SPSS Statistics for Windows version 21.0 (IBM Corporation, Armonk, NY, USA). Data were shown as mean±standard deviation for continuous variables, and number of cases was used for categorical variables. Differences between the groups were analyzed by Mann-Whitney U test or chi-square as appropriate. The preoperative and postoperative scores of each group were analyzed by Wilcoxon test. A p value less than 0.05 was considered statistically significant.

RESULTS

There was no significant difference between the groups in terms of age and sex (Table 2). The NOSE

Figure 1. An example of basal crest deviation.

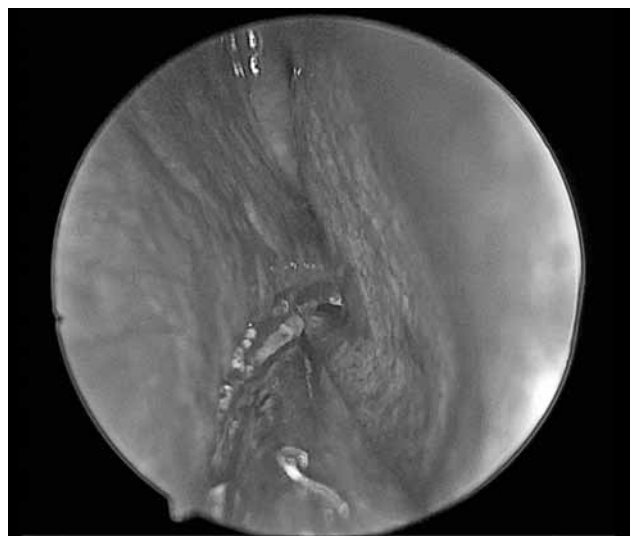

Figure 2. Basal crest deviation is repositioned medially using an elevator even if there is a mucosal tear.

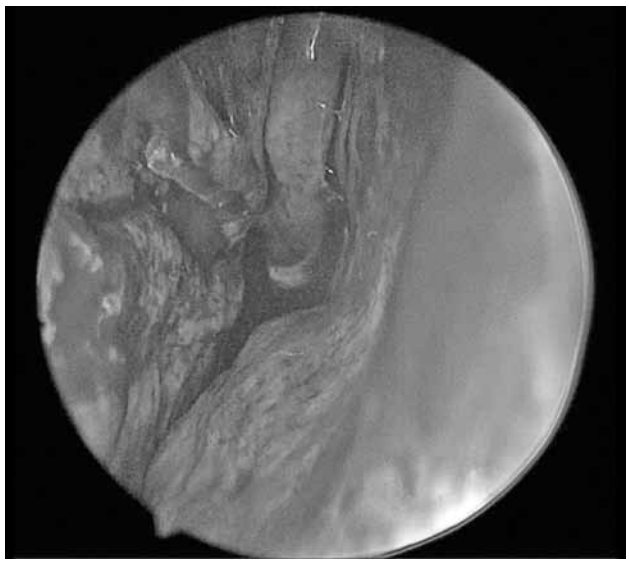

Figure 3. Nasal passage after repositioning of the basal crest.

scores were significantly decreased both in group 1 and group 2 after the septoplasty ($p<0.001$ and $p<0.001$, respectively). Also, the VAS scores were significantly decreased in both groups after the septoplasty ($p<0.001$ and $p<0.001$, respectively). When the preoperative NOSE and VAS score were compared, we did not find any significant difference between group 1 and 2 (Table 2). Similarly, there was no significant difference between the study groups after the postoperative fourth week control in terms of NOSE and VAS scores (Table 2). There was no need to use various anterior packing materials except internal nasal splints for postoperative bleeding. Also, we did not detect any septal perforation or synechiae formation at the fourth postoperative week evaluation.

DISCUSSION

The current investigation produced two major findings: *(i)* septoplasty is an operation that has very satisfactory results; *(ii)* repositioning the severe basal crest rather than removing it can be used in selected cases.

Nasal airflow is mainly ensured by an inferior airway through the inferior nasal cavity between the inferior part of the septum and inferior turbinate.[12] Deviations caused by the premaxilla, maxillary crest and the inferior part of the vomer have an important negative effect on nasal breathing. Also, it is known that approximately 50% of total airway resistance comes from the nasal airway, hence pathologies obstructing nasal airway lead to increased nasal airway resistance and total airway resistance which can impact overall respiratory function.[13] Septoplasty is an important and widely performed surgical intervention for the correction of nasal obstruction. This operation can have both aesthetic and functional complications. Aesthetic changes related to cartilage support weakness due to over-resection are noted in up to 21% of the operated patients.[14] Functional complications such as hemorrhage, septal perforation and infection are not seen rarely.[15] Different surgical techniques and incisions have been described for septoplasty. Although removing the deviated parts of the nasal septum was almost regarded as a rule, the importance of releasing as much tissue as possible during the operation gradually evolved. Based on this, we planned a study to compare the postoperative satisfaction of patients who underwent septoplasty operation with two different approaches (removing or repositioning the basal crest) for severe deviated basal crest. As mentioned above, we did not find any significant difference between the groups

Table 2
Comparison of the descriptive statistics of the study groups

	Group 1		Group 2		
	n	Mean±SD	n	Mean±SD	*p*
Age (years)		34.5±8		32±9	0.3*
Gender					0.8**
Male	13		12		
Female	7		8		
Preoperative NOSE score		14.5±1.2		14±1.5	0.6*
Postoperative NOSE score		4±1		3.8±1.1	0.5*
Preoperative VAS score		8.2±1		7.9±1.3	0.3*
Postoperative VAS score		1.3±0.7		1.2±0.9	0.7*

SD: Standard deviation; * Mann-Whitney U test; ** Chi-square; NOSE: Nasal Obstruction Symptom Evaluation questionnaire; VAS: Visual analog scale.

after the septoplasty operation in terms of patient satisfaction. The premaxilla and anterior part of the maxillary crest are important for support of the nasal tip. When deviations arising from this anatomical site are removed, nasal tip depression, saddle nose deformity and retraction of the columella can occur. Repositioning the premaxilla and anterior part of the maxillary crest can avoid those complications. Also, mucosal tears frequently occur during elevation of mucoperichondrial flaps over the deviated basal crest, and these mucosal tears can widen during removal of the basal crest with raspatory/chisel and metal mallet. Enlarged mucosal tears are difficult to repair, and can lead to septal perforation which is one of the worst complications of septoplasty and a nightmare for the surgeon. In selected cases, repositioning the basal crest using an elevator and/or Blakesley nasal forceps can be tried safely even if there are tears on the mucoperichondrial flaps. If adequate nasal passage is achieved with basal crest repositioning, it may be preferred to preserve basal crest instead of removing it.

The follow up time of four weeks after the operation can be considered too short for observing the results of repositioning of the basal crest. Although reinstatement of the basal crest may lead to failure of the septoplasty, surgeons always have a chance to remove the basal crest.

In conclusion, septoplasty can be performed with high patient satisfaction. Repositioning of the basal crest instead of removing it is an alternative approach during this surgical intervention.

Declaration of conflicting interests

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