



Correlation between nasal septal deviation and headache

Nazal septum deviasyonu ve baş ağrısı arasındaki ilişki

Ela Araz Server¹, Çiğdem Kalaycık Ertugay¹, Uzdun Uz², Özgür Yiğit¹

¹Department of Otolaryngology, İstanbul Training and Research Hospital, İstanbul, Turkey

²Department of Otolaryngology, Bayındır State Hospital, Ankara, Turkey

ABSTRACT

Objectives: This study aims to evaluate the relationship between nasal septal deviation with a contact point and headache.

Patients and Methods: A total of 100 patients (22 females, 78 males; mean age 27.9±11.2 years; range 18 to 58 years), who underwent septoplasty under general anesthesia between July 2015 and July 2016, were included in the study. Patients were divided into two groups according to the presence of contact points between the lateral nasal wall structures and septal mucosa. All patients were asked about the presence of headache. They were requested to quantify the average intensity of headache by using a visual analog scale preoperatively and one year after surgery.

Results: Sixty-nine of the patients (56 patients had a complaint of headache) had contact points between the lateral nasal wall structures and the septum mucosa in the nasal septal deviation region, while 31 patients (nine patients had a complaint of headache) did not have any contact points. There was a statistically significant correlation between the presence of mucosal contact points and complaint of headache ($p<0.001$). Moreover, the intensity of headache was significantly reduced in patients with nasal septal mucosal contact points one year after the surgery ($p<0.001$).

Conclusion: Our results show that septoplasty could reduce the intensity of headache in patients who had mucosal contact points.

Keywords: Contact point; headache; nasal septal deviation; septoplasty.

ÖZ

Amaç: Bu çalışmada temas noktalı nazal septal deviasyon ve baş ağrısı arasındaki ilişki değerlendirildi.

Hastalar ve Yöntemler: Çalışmaya Temmuz 2015 - Temmuz 2016 tarihleri arasında septoplasti yapılan toplam 100 hasta (22 kadın, 78 erkek; ort. yaş 27.9±11.2 yıl; dağılım 18-58 yıl) çalışmaya dahil edildi. Hastalar lateral nazal duvar yapıları ile septal mukozaya arası temas noktaları varlığına göre iki gruba ayrıldı. Tüm hastalara baş ağrısı varlığı soruldu. Hastalardan baş ağrısının ortalama yoğunluğunu ameliyat öncesi ve ameliyattan bir yıl sonra görsel analog ölçeği kullanarak belirlemeleri istendi.

Bulgular: Hastaların 69'unda (56 hastada baş ağrısı yakınması vardı) lateral nazal duvar yapıları ile nazal septal deviasyon bölgesindeki septum mukozası arasında temas noktası vardı, 31'inde (dokuz hastada baş ağrısı yakınması vardı) ise temas noktası yoktu. Mukozal temas noktalarının varlığı ile baş ağrısı yakınması arasında istatistiksel olarak anlamlı ilişki vardı ($p<0.001$). Ayrıca, baş ağrısının şiddeti, ameliyat sonrası birinci yılda mukozal temas noktaları olan hastalarda anlamlı olarak azalmıştı ($p<0.001$).

Sonuç: Sonuçlarımız, mukozal temas noktaları olan hastalarda septoplastinin baş ağrısı şiddetini azaltabileceğini göstermektedir.

Anahtar sözcükler: Temas noktası; baş ağrısı; nazal septum deviasyonu; septoplasti.

Septal deviation may cause such symptoms as nasal obstruction, snoring, facial pain and may lead to infections of the paranasal sinuses.^[1-3] Nasal septal surgery, considered one of the most common surgical procedures in otolaryngology, is the main treatment and is generally performed to improve quality of life.

Headache is a common complaint that otolaryngologists encounter in practice and rhinogenic headache is a controversial but a distinct type that has been discussed under various clinical articles in the literature.^[4-9] The term mucosal contact point headache, which is a type of rhinogenic headache

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Correspondence: Ela Araz Server, MD. İstanbul Eğitim ve Araştırma Hastanesi, Kulak Burun Boğaz Kliniği, 34098 Fatih, İstanbul, Turkey.
Tel: 0505 - 468 31 34 e-mail: serverela@hotmail.com

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and is thought to be the major cause of headache in patients with septal deviation, is used extensively in surgical literature. Wolff^[10] first described a correlation between contact points within the nose and headache in 1948. Subsequently, various studies were performed to investigate anatomical variations of the septum and paranasal sinuses in patients with rhinogenic contact point headache but the role of nasal patency in its pathogenesis is still not fully understood.^[5,11,12] The most recent International Classification of Headache Disorders (ICHD) was published by International Headache Society in 2013. It includes a category of secondary headaches attributed to acute rhinosinusitis, chronic rhinosinusitis or disorders of the nasal mucosa, turbinates and septum.^[13] A recent review of Harrison and Jones^[14] has noted that although there have been many studies showing improvement of headache following the removal of contact points, there is still a lack of consensus about this issue because most studies comprised small case series, were subject to selection bias or had limited follow-up.

In this study, we aimed to evaluate the correlation between nasal septal deviation with a contact point and headache and find out whether rhinogenic headache is relieved with septoplasty. Depending on this hypothesis, we investigated the prevalence and intensity of headache in patients before, and after septoplasty using a visual analog scale (VAS).

PATIENTS AND METHODS

This was a prospective observational study. Ethics approval was obtained from the Istanbul Training and Research Hospital Ethics Committee (protocol number 29/05/2015-663), and written informed consent was obtained from each patient. The study was conducted in accordance with the principles of the Declaration of Helsinki.

One hundred forty patients who underwent septoplasty by one senior author were investigated. Inclusion criteria were age at least 18-years-old, septal deviation consistent with primary complaint of nasal obstruction, and imaging with paranasal sinus computed tomography (CT). Patients were excluded if they had undergone conchal surgery, had a history of nasal surgery, allergy, paranasal sinus pathologies, known systemic disease such as diabetes mellitus and vasculitides or other causes of headache such as migraine. Patients who had complications during and after surgery such as excessive bleeding, mucoperichondrial perforation, synechiae and infection or patients with no relief of symptoms of nasal obstruction after surgery were removed from the study. According to these criteria,

one hundred patients who were admitted with nasal obstruction and underwent septoplasty under general anesthesia were enrolled in this study.

Physical examination and symptom assessments

All the patients were evaluated by otorhinolaryngological examination. Nasal endoscopy was used to identify intranasal mucosal contact points and to rule out other pathologies as chronic rhinosinusitis with or without nasal polyposis and tumor. If there was a contact point, we routinely used a nasal decongestant (oxymetazoline 0.05% nasal spray, 2 puffs for each nostril) in order to permit easy passage and examine the nasopharynx. The continuing connection between septal and conchal mucosa after nasal decongestion showed us that it was a septum-induced problem rather than conchal hypertrophy. In addition, contact points were confirmed by CT scans (Figure 1). We asked the patients if they had any headache for at least one year that was resistant to medical treatment, and if they had this type of headache, if they were examined by a neurologist in order to exclude other causes of headache. If they had unilateral headache on the same side of the contact point, we used ICHD diagnostic criteria to evaluate rhinogenic headache.^[13] The patients who had rhinogenic headache were asked to complete a VAS scale (a 10 cm scale where 0 indicates no pain and 10 indicates most severe pain) to describe their pain before and after surgery. We did not give any pain killers or intranasal medication after surgery except for normal saline washing. Obstructive symptoms were improved in all patients.

The variables we examined included age, gender, existence of rhinogenic headache, and recorded VAS score of headache. After evaluation, one hundred patients



Figure 1. Computed tomography scan, coronal section at the level of the posterior ethmoids, showing nasal septal deviation and a mucosal contact point.

	Group A (nasal septal mucosal contact points)	Group B (no nasal septal mucosal contact points)
	n	n
Complaint of headache	56	9
No complaint of headache	13	22
Total	69	31

were allocated into two groups as group A (patients who had nasal mucosal contact points) and group B (patients who had no nasal mucosal contact points).

Patients with deviation of nasal septum underwent septoplasty under general anesthesia. Surgery proceeded with one senior author using a hemitransfixion incision via a closed approach followed by correction of the deviated segment with minimal excisions, trying to reshape and mold the most deviated parts.

Recorded postoperative evaluation was performed in the first day, first week, first month, and first year after surgery by one senior author who was blinded to the preoperative evaluation. Follow-up questionnaires were filled one year after surgery. One hundred patients successfully completed the survey.

Statistical analysis

The statistical analysis of the study was performed using IBM SPSS version 20.0 for Mac (IBM Corp., Armonk, NY, USA) statistical package program. Visual analog scale scoring results were given with average median, standard error (SE), and minimum-maximum values. When comparing the relationship

between septal mucosal contact point and headache, chi-square test was used. Visual analog scale values before and after the operation were compared with Wilcoxon test. Statistical significance level was determined as $p < 0.05$.

RESULTS

One hundred patients (78 male, 22 female) who were admitted with nasal obstruction and had septoplasty were included in this study. The age of the patients ranged from 18 to 58 years with a mean age of 27.9 ± 11.2 years.

Out of 100 patients who enrolled in this study, 69 patients had nasal septal mucosal contact points with the lateral nasal wall structures (group A) and 31 patients had no contact points (group B) (Table 1). Although it was not a primary complaint, 56 patients in group A had a complaint of headache whereas nine patients in group B had headache.

A total number of 65 patients had headache preoperatively and a statistically significant decrease in VAS scores for headache after surgery was found

	Mean	n	Standard deviation	Standard error mean
VAS-preoperative	5.6	65	2.7	0.3
VAS-postoperative	2.1	65	2.2	0.3

VAS: Visual analog scale.

	Mean	n	Standard deviation	Standard error mean
VAS-preoperative	5.8	56	2.6	0.4
VAS-postoperative	2.1	56	2.1	0.3

VAS: Visual analog scale.

($p < 0.05$) (Table 2). The presence of mucosal contact points was statistically significantly associated with presence of headache ($p < 0.001$). Moreover, the intensity of headache was significantly reduced in patients with nasal septal mucosal contact points at one year after septoplasty ($p < 0.001$) (Table 3).

DISCUSSION

The relationship between nasal septal deviation and headache is a controversial issue. According to the study of Ghazipour et al.^[15] which evaluated the existence of headache in patients with nasal septal deviation, the ratio of patients who had headaches was 46%. We found a higher prevalence of headache as the ratio in the present study was 65%.

The term contact point headache, which has been newly described as one of the causes of secondary headaches in the most recent ICHD by the International Headache Society^[13] has been used extensively in the surgical literature over many years. It is defined as a referred pain that arises from intranasal contact points between the nasal septum and lateral nasal wall. It could be caused by nasal septal deviation, spur of nasal septum, inferior turbinate hypertrophy, and so on.^[5] Although the exact mechanism of contact point pain remains unclear, it is now accepted that various irritants such as pressure could cause stimulation of polymodal receptors in the nasal mucosa. These receptors mediate central impulses to the cortex via trigeminal sensory pathway and the pain is perceived afterwards.^[16] Substance P is known as the major neuropeptide which was first identified by Stammberger and Wolf.^[17] Zhao et al.^[18] showed that the expression of substance P and neurokinin 1 (NK-1) receptor at contact points of nasal mucosal tissue was higher than non-contact points and they noted a strong association with mucosal contact point headache.

Contact point definitions vary in the literature according to visualization. They can be visualized by nasal endoscopic examination or radiologically by CT scans. The best method is diagnostic nasal endoscopy and confirmation of these findings with paranasal CT scans as in our study. Moreover, Kim^[4] suggests a shrinkage test (evaluation of improvement of headache after topical application of an anesthetic and vasoconstrictive solution) in his case report on nasal septal deviation-induced otalgia.

Various studies have been performed to investigate nasal and paranasal sinus anatomical variations in patients with rhinogenic contact point headache.^[5,11,12,19] Abu-Bakra and Jones^[19] reported the incidence of radiographic contact points as 4% in a study of 973 patients referred for a sinus CT scan. Moreover,

they pointed out that the incidence did not differ among those patients with facial pain complaints and those who were pain free. However, other reports had shown a higher incidence. For instance, Bieger-Farhan et al.^[11] determined the incidence of contact points up to 55%. Moreover, Roozbahany et al.^[5] evaluated the paranasal sinus CT scans of 65 patients who underwent endoscopic nasal surgery for rhinogenic contact point headache and investigated the anatomical variations. In that study, a concha bullosa of the middle turbinate was noted as the most common abnormality and they identified septal deviation as the cause of mucosal contact in 12 of 65 patients. In the present study, 69 patients (69%) had nasal septal mucosal contact points with lateral nasal wall structures. Furthermore, 56 patients of this group had a complaint of headache.

Although several studies have been published on the topic of effect of nasal surgery on headache, it is still a controversial issue.^[5,20] Ghazipour et al.^[15] noted a gradual recovery in patients' headache after septoplasty. Bektas et al.^[20] investigated the intensity of headache in a series of 36 patients with contact points who underwent septoplasty, anterior ethmoidectomy, partial turbinectomy and their varying combinations. They showed that all patients had a reduction in postoperative headache. Our data demonstrated that the intensity of headache was significantly reduced in patients with nasal septal mucosal contact points after one year of septoplasty, which is consistent with these studies.

To date, most studies on nasal contact points are either comprised of small numbers of patient series or of various patient groups including subjects who underwent endoscopic sinus surgery, septoplasty, lateralization of inferior turbinate etc. A major strength of our study is that we only studied the patients who underwent septoplasty and we have long-term follow-up results. Therefore, if a patient with symptom of headache has a septal deviation and contact points, the clinician should examine in order to exclude other causes of headache and use ICHD diagnostic criteria, because surgical correction of the septal deviation may be helpful.

A major limitation of our study is sample characteristics. That is because we had no patients with a chief complaint of headache and the ratio of patients who had mucosal contact points was double the patients who had no contact points. Moreover, the number of patients who had no contact points but had headache was too small. Therefore, we could not compare groups in terms of the improvement of headache. Secondly, we could not confirm the improvement of contact points by paranasal sinus CT postoperatively because of ethical reasons.

Future studies with larger groups are needed to verify our results and clarify if the contact point pain should be considered as one of the potential indications of septoplasty. Additionally, relief of headache should be investigated in patients who have a chief complaint of headache without any clear etiology related to sinus disease or other reasons.

In conclusion intranasal contact points should be evaluated in patients with headache who do not have any clear underlying etiology. To evaluate these patients, the best method is diagnostic nasal endoscopy and confirmation with paranasal CT scan. Our results demonstrated that if mucosal contact points were removed by nasal surgery and other causes of headache have been ruled out, the severity of headache could decrease and subjective improvement could be obtained.

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