

Is Performing the Paranasal Sinus CT Before the Septal Operation Change the Indication of Surgery?

Hülya Eyigör¹ , Ümit Küçüktepe¹ , M. Deniz Yılmaz¹ , Üstün Osma¹ , Emin Durmuş² , Bekir Erol² , Levent Renda¹ , Ömer Tarık Selçuk¹ 

¹Clinic of Otolaryngology-Head and Neck Surgery, Health Science University, Antalya Training and Research Hospital, Antalya, Turkey

²Clinic of Radiology, Antalya Training and Research Hospital, Antalya, Turkey

Abstract

Objective: Septoplasty is the most common surgical procedure in patients with nasal obstruction caused by septum deviation. Anterior rhinoscopy and endoscopic nasal examination used to be the gold standard procedures performed to determine the septum deviation. However, many otolaryngologists nowadays perform a paranasal sinus computed tomography (CT) scan as a preoperative procedure for the evaluation of nasal anatomy and other sinonasal pathologies that may accompany it. The aim of this study was to evaluate whether a surgical procedure was performed in addition to septoplasty after a paranasal sinus CT in cases, in which septoplasty was decided during a routine otorhinolaryngology examination.

Material and Methods: Patients who applied to the ENT outpatient clinic because of nasal congestion during the last year, were planned to have septoplasty after the nasal examination, and who accepted the operation were enrolled in the study. We investigated whether the planned surgical procedure changed after concomitant sinus pathologies were detected in CT.

Results: A total of 378 patients, 113 female (29.9%) and 265 male (70.1%), were included in the study. A total of 247 patients (65.3%) had undergone only the septoplasty procedure, whereas 54 patients (14.3%) had septoplasty + inferior concha reduction, 44 (11.6%) patients had septoplasty + lateral middle concha resection due to concha bullosa, 33 (8.7%) had septoplasty + endoscopic sinus surgery due to chronic sinusitis, polyposis, or osteoma.

Conclusion: We believe that sinonasal pathologies that cannot be determined a preoperative physical examination pre-operative CT is needed to detect any other deformities to correct by complimentary surgery added to septoplasty.

Keywords: Septoplasty, paranasal sinus CT, sinonasal anatomic variation

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Address for Correspondence: Hülya Eyigör

E-mail: hulinar@yahoo.com

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INTRODUCTION

Nasal septum deviation is the most common nasal pathology, and septoplasty is also known as the most common surgical procedure performed to eliminate this pathology. Anterior rhinoscopic examination and endoscopic examination are the most widely used diagnostic methods to detect the pathologies obstructing the nasal passage. Anterior rhinoscopy helps to detect middle and posterior pathologies. All anatomical structures cannot be evaluated by endoscopic examination, and all patients do not tolerate endoscopic examination. However, computed tomography (CT) may be needed in the detection of most sinonasal and sinus-related anatomical variations. In some septoplasty cases, postoperative studies revealed that patient's complaints continued after the surgery, and additional surgical procedures were needed. At this point, it is highlighted that performing a paranasal sinus CT before surgery is crucial (1).

The aim of this study was to evaluate whether a surgical procedure was performed in addition to septoplasty after a paranasal sinus CT in cases, in which septoplasty was decided during a routine otorhinolaryngology examination.

MATERIAL AND METHODS

The study was planned retrospectively and was approved by the ethics in research committee of the Antalya Training and Research Hospital (protocol number10/9-26.05.2016). Patients who were admitted to the ENT outpatient clinic with the

complaint of nasal congestion within the last year, diagnosed with septum deviation after a nasal examination, and who accepted septoplasty, were included in the study. Patients under 18 years of age, those who showed accompanying sinonasal pathologies (with acute and/or chronic rhinosinusitis symptoms, accompanying benign and/or malign masses) upon anterior rhinoscopic and endoscopic examinations, and had previously undergone sinonasal surgery were excluded from the study. Written informed consent was obtained from the patients who participated in this study.

Preoperative paranasal sinus CT was performed in all patients, and CT findings were recorded by the same radiologist. Furthermore, surgical procedures applied in addition to septoplasty were determined by reviewing the postoperative surgery notes. Thus, it was investigated whether surgical procedures were changed by detecting accompanying sinonasal pathologies on CT performed before septoplasty. It was planned to investigate the necessity of CT performed before septoplasty

considering moral damage and financial losses caused by re-operations that would be required due to continuation of the patient's complaints against radiation toxicity caused by the preoperative CT.

RESULTS

A total of 378 patients, of which 113 (29.9%) were female and 265 (70.1%) were male, were included in the study. The mean age was 32.5 ± 10.6 (18-71). Accompanying sinonasal variations and pathologies detected in addition to septum deviation on preoperative paranasal sinus CT are presented in Table 1.

Retrospectively examined surgery reports of the patients revealed that 247 patients (65.3%) underwent septoplasty only, while 54 (14.3%) patients underwent septoplasty and reduction of the inferior turbinate, 44 (11.6%) underwent septoplasty and lateral resection due to the con-

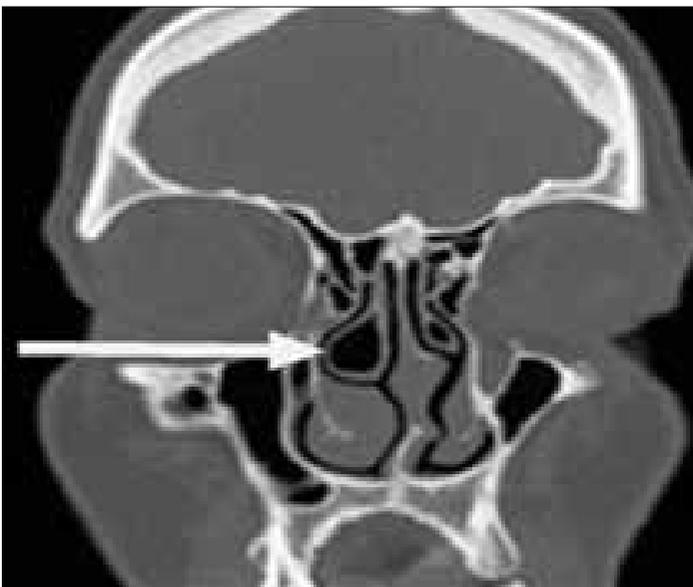


Figure 1. Septum deviation accompanied by concha bullosa and inferior turbinate hypertrophy



Figure 2. Septum deviation accompanied by bilateral maxillary sinusitis

Table 1. Septum deviation accompanied by sinonasal pathologies and anatomic variations

Sinonasal Anatomic Variation and Pathologies	Number of patients (n)	Percentage (%)
Concha bullosa	138	36.5
Inferior turbinate hypertrophy	95	25.1
Sinusitis	74	19.5
Agger nasi cell	61	16.1
Sinus hypoplasia	44	11.6
Paradoxical turbinate	41	10.8
Onodi cell	36	9.5
Haller cell	35	9.3
Sinus aplasia	14	3.7
Maxillary sinus septation	12	3.2
Osteoma	9	2.4



Figure 3. Septum deviation accompanied by chronic maxillary sinus atelectasis (Silent Sinus Syndrome)

cha bullosa, and 33 (8.7%) underwent septoplasty and endoscopic sinus surgery (due to chronic sinusitis, polyp, osteoma) (Figures 1, 2, and 3).

DISCUSSION

The incidence rate of septum deviation was reported to be at 20%-30% in general population. Physical and endoscopic examinations are considered the gold standard methods for the diagnosis of septum deviation. However, especially anterior rhinoscopy may fail to detect the middle and posterior nasal pathologies. Preoperative CT is usually performed to identify the nasal anatomy and detect accompanying sinonasal pathologies. In this study, additional surgical procedures with the rate of 34.7% were performed according to the accompanying sinonasal pathology in addition to septoplasty. The most frequently performed surgical procedures were inferior turbinate resection or lateral concha resection due to concha bullosa. Karatas et al. stated in the study with 76 patients who were planned to undergo septoplasty that the patients were more likely to benefit from detection of sinonasal pathologies and correction via surgery (1). Nevertheless, Ardeshirpour et al. (2) stated in the study examining 73 patients that a routine CT was not necessary in the uncomplicated nasal obstruction cases, and also CT findings and the symptoms of nasal obstruction were not correlated. Wotman et al. (3) assessed five studies in their study investigating whether paranasal sinus CT was indicated before septoplasty. Based on the reviewed literature, they indicated that preoperative CT may be helpful in identifying ancillary sinonasal pathologies not visible on physical examination, which were contributing to nasal congestion, especially concha cullosa and sinusitis. One of these studies is the study conducted by Lee et al. comparing the symptom scores of nasal obstruction and a CT scan. In this study, the authors declared that there was a correlation in the pathologies between nasal symptoms and CT findings at the level of osteomeatal unit and choana, and no relationship was found in the internal nasal valve pathologies. The investigators also pointed out the necessity of performing a preoperative CT in correction of the middle and posterior deviations (4). Karatas et al. (1) reported that the concha bullosa resection, inferior concha cauterization, and endoscopic sinus surgery due to chronic sinusitis were performed in 36 patients who had a preoperative CT scan in addition to septoplasty. Gunbey et al. (5) found that CT changed the surgical plan in 8.3% of patients in their study with 262 patients. They stated that nasal endoscopy had less sensitivity and specificity for detecting of concha bullosa, mucocele, and chronic sinusitis. In our study, we determined that endoscopic sinus surgery was performed at the rate of 8.7% to treat the pathologies detected by the CT scan, except concha pathologies. However, Sedaghat et al. (6) detected a correlation between the physical examination and CT only for the osseous septum in their study with the patients who had a history of sinonasal symptoms, in which they were assessing the nasal valve, cartilaginous, inferior/maxillary crest, and osseous septum on the retrospective CT, and they reported that a CT scan should not be used in septoplasty cases.

We could not find in the literature a radiologic study defining the accompanying anatomic variations in patients with only septal deviation. In present study, we detected concha bullosa (lamellar, bullous, and extensive) in 36.5%, agger nasi cell 16.2%, Haller cell 9.3%, and paradoxical middle turbinate at 10.5%. In the study determining the anatomic variations of the nasal cavity, Kayalioglu et al. (7) noted that they found concha bullosa 26.8%, Haller cell 3.6%, and agger nasi 4.8% of the paranasal sinus CT of the patients without sinus pathology. It was reported that paradoxical turbinate was found in 12.2%, concha bullosa in 28.8%, Haller cell in 5.5%, and agger nasi in 7.7% of 90 patients with sinus pathology.

The most important disadvantage of preoperative paranasal sinus CT is without a doubt the radiation exposure dose. Routine paranasal sinus CT scan is usually performed at 120 kVp, 300-400 m. As, 2-5 mm slice thickness in the coronal and axial plans (8). For multidetector CT of the paranasal sinus, it was reported that a standard radiation dose should be usually 0.70 mSv (mSv) in men and 0.76 mSv (mSv) in women (9). The radiation dose received by person, particularly by the ocular lens, become crucial in frequently repeated CT scans. However, when considering insufficient treatment, this radiation dose seems to be tolerable considering to prevent the recurrent operations, anesthesia risk, and workforce loss to be experienced due to the persistent complaints of the patient. In addition, when evaluated in terms of the surgery cost, the Ministry of Health is pricing septoplasty operation with the 601.620 Health Implementation Directive code at TL 629.25 and ESC with the 602.320 code at TL 1002.75. During a simultaneous surgical intervention, both of them (2nd surgery-50% rule) are priced at approximately TL 1317. According to the Ministry of Health's Health Implementation Directive, we think the preoperative CT scan avoids unnecessary health expenditure by preventing possible recurrent operations.

CONCLUSION

We think that a preoperative CT scan may be helpful to detect some sinonasal pathologies that cannot be found on physical examination, to relieve patient complaints by removing these pathologies simultaneously with septoplasty, and to prevent a possible second surgery to be performed later.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of the Antalya Training and Research Hospital (Approval Date: 26.05.2016/ Protocol number: 10/9).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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