Postoperative cephazolin usage is sufficient for preventing infection after septoplasty procedure

Evren Erkul, M.D.,[1] Mustafa Babayigit, M.D.,[2] and Ozan Kuduban, M.D.[1]

ABSTRACT

The use of antibiotics in septoplasty is a common practice among most ear, nose, and throat doctors; however, there are few studies proving the efficacy, which is considered as unnecessary by some authors. The aim of this pilot study was to evaluate the effect of two different kinds of antimicrobial agent on efficacy and safety after septoplasty surgery and to show that use of cephazolin, 1.0 g, postoperatively, might be sufficient for preventing infection after septoplasty procedure. Patients were randomly divided into two groups with a simple randomization method. The first group of 80 patients received cephazolin, 1.0 g i.v., once postoperatively and the second group of 80 patients received amoxicillin–clavulanate orally for 7 days postoperatively (1000 mg). An early and late postoperative questionnaire and nasal endoscopy evaluation was performed and patients were followed up in the outpatient service to investigate the presence of complications. There was no significant difference in postoperative pain between groups A and B, using visual analog scale scores at the 1st postoperative day. There were no differences related to the amount of purulent discharge found at the lower margin of the inferior turbinate through nasal endoscopy performed on the 14th day postoperatively. There were no statistical significances among groups for complications rates and postoperative endoscopic evaluation. Septoplasties are considered potentially contaminated surgeries, and cephazolin, 1.0 g i.v., given once postoperatively is enough to prevent potential complications with its easy and effective use.

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Septoplasty is one of the most common procedures in ear, nose, and throat (ENT) clinics. The use of antibiotics in septoplasty is a common practice among most ENT doctors; however, there are few studies proving the efficacy, which is considered as unnecessary by some authors.[1,2] A survey performed among the Members of the U.S. Rhinology Society showed that 66% of 448 doctors that answered the questionnaire used antibiotics as a routine practice in the postoperative period of septoplasties.[3]

The surgical procedures of airways/digestive tract are potentially considered as contaminated and may be associated with postoperative infectious complications.[4] Because of this potential contamination, use of postoperative antibiotics at septoplasty is becoming more important. Severe complications are described after septoplasties such as toxic shock syndrome (TSS), endocarditis, osteomyelitis, meningitis, and cavernous sinus thrombosis; however, the latter are, fortunately extremely rare.[5–7]

From the Departments of [1]Otorhinolaryngology and [2]Preventive Medicine, Elazig Military Hospital, Elazig, Turkey

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Address correspondence and reprint requests to Evren Erkul, M.D., Elazığ Asker Hastanesi, KBB Kliniği, 23000 Elazığ, Turkey

E-mail address: evrenerkul@yahoo.com

The incidence of allergic reactions and antibiotics may vary from 0.7 to 10%, and fatal anaphylaxis occurs in 1 of 25,000 patients.[8]

The aim of the this first pilot study was to evaluate the effect of two different kinds of antimicrobial agent on the efficacy and safety after septoplasty surgery as well as making a comparison for major postoperative complications and show that cephazolin 1.0, g i.v., postoperatively could be sufficient and the first choice for use of antibiotics after septoplasty procedure.

MATERIALS AND METHODS

Patients

This pilot study revaluated 160 patients that had undergone septoplasty at our hospital, during 2008 and 2009. The protocol of the study was approved by the Ethics Committee. Selected patients were >15 years old, and those patients with immunodeficiencies, receiving medication with intranasal steroid for at last 2 months, or those with any other signs of infection on surgery as well as those patients who had undergone previous nasal surgeries and presented nasal polyps and/or allergic and vasomotor rhinitis or chronic sinusitis were excluded. Patients were selected for surgeries based on clinical history, otorhinolaryngological exam, and nasal endoscopy. Preoperative laboratory evaluation was performed in all patients using complete blood test, thrombin time, prothrombin time, and thromboplastin time.

All patients received general anesthesia and orotracheal intubation and signed the informed consent term

related to the research protocol, surgical risks, and likely complications resulting from the surgery itself. All of the patients' vital signs were monitored during surgery.

Antibiotics

Only the septoplasty procedure was performed. Patients were randomly divided into two groups with a simple randomization method. The first group of 80 patients received cephazolin, 1.0 g i.v., postoperatively once and the second group of 80 patients received amoxicillin–clavulanate orally for 7 days postoperatively (1000 mg every 12 hours).

Surgeries were performed by two surgeons. The patients did not know the type of the antibiotic agent that was used, and the surgeons were blinded too. Anterior nasal packing was applied in all cases and removed on the 2nd postoperative day.

Postoperative Evaluation

An early and late postoperative questionnaire was completed and follow-up was performed in the outpatient service after 7, 14, and 30 days, investigating presence of bleeding events, fever, nausea, vomiting, pain, septal hematoma, or abscess and purulent discharge at the lower margin of the inferior turbinate. Patients were medicated with symptomatic drugs (analgesic, fever, and antiemetic drugs) if required, and graded pain from 0 (absence of pain) to 10 (maximum intensity) to objectively quantify it at the 1st postoperative day.

All patients underwent nasal endoscopy evaluation for septal infection in the outpatient follow-up on the 7th and 14th days postoperatively. Intranasal discharge may also originate from the sinus or nasal mucosa after removing nasal packs, especially on the first 2 days. Thus, we evaluated purulent discharge on the 7th and 14th days postoperatively. Endoscopic exam was always performed by the same professional who did not take part in the protocol and did not know the antibiotic that the patient used. This professional assigned a grade from 0 to 4 related to purulent discharge at the lower margin of the inferior turbinate as follows: 0, absence of secretion; 1, small amount; 2, moderate; 3, moderate to large amount; or 4, massive. Adding to endoscopic evaluation, we evaluated septal mucosa for tenderness and redness as parameters of septal infection.

Statistical Analysis

Statistical analysis was performed using SPSS (Chicago, IL) for Windows. The Kolmogorov-Smirnov goodness of fit test was used to control whether the distribution of parameters was normal. Homogeneity of variance of the groups was tested with Levene's test.

Table 1 **Patients' ages and postoperative visual analog scale scores for groups A and B**

	Mean	SD	*p* Value*
Age (yr)			0.816
Group A	23.7	4.2	
Group B	24.3	5.1	
Visual analog scale			0.07
Group A	2.9	1.1	
Group B	3.4	1.1	

**Mann-Whitney U test.*

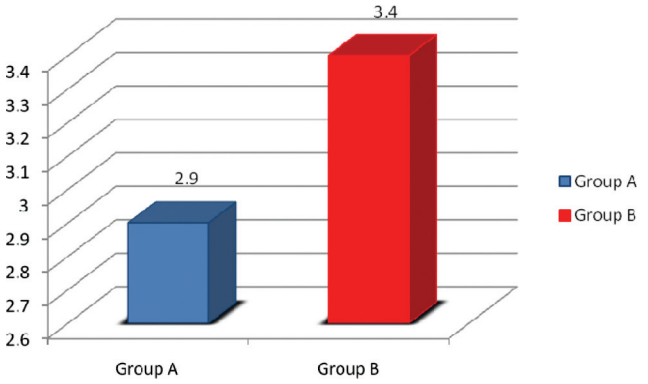

Figure 1. *Postoperative visual analog scale scores on the 1st postoperative day.*

Mann-Whitney *U* test was used in the parameters in which the distribution was not normal. Between categorical variables χ^2-test was used. All values of $p < 0.05$ were considered statistically significant.

RESULTS

The study included 160 patients as follows: 80 patients took cephazolin I.V. (group A) once postoperatively; 80 patients took amoxicillin-clavulanate orally for 7 days postoperatively (group B). All patients, data were included in the statistical analysis. Mean average of age in group A was 23.75 years and 24.38 years in group B, therefore it was not statistically significant among groups ($p = 0.816$; Table 1).

One patient from both group developed hematoma postoperatively. Hematoma was drained and nasal packing was performed for 2 more days. Patients were treated with amoxicillin, 1000 mg, plus metronidazole, 500 mg, two times a day orally for 7 more days. Both patients recovered on the 14th day. There was no significant difference of postoperative pain between groups A and B, using visual analog scale scores at the 1st postoperative day (Fig. 1). Visual analog scale score for group A was 2.9 and for group B was 3.4 ($p = 0.07$).

There was no nausea and vomiting-related difference between the groups. None of the patients presented any complaints related to pain, nausea, and/or

vomiting in the follow-up appointment on the 14th day postoperatively. Fever events also did not occur among patients. There was no statistical significance among groups caused by complications postoperatively ($p = 0.070$).

The rate of small–moderate purulent discharge (grades 1 and 2 at nasal endoscopy) for group A was 85.7% and for group B was 68.6%. There were no differences related to the amount of purulent discharge found at the lower margin of the inferior turbinate through nasal endoscopy performed on the 14th day postoperatively. Three patients in group A and three patients in group B had grade 3 in nasal endoscopy on the 7th day. None of the patients received grade 3 or 4 in nasal endoscopy on the 14th day postoperatively.

There was no statistical significance among groups for complication rates and postoperative endoscopic evaluation. The follow-up after 30 days for all patients were complaint free.

DISCUSSION

The first study regarding prophylactic use of antibiotics in surgical procedures was conducted in 1938[2]; since then, several management regimes have been proposed. The use of prophylactic and postoperative antibiotics is preferred among ENT surgeons to prevent postoperative infections, avoid TSS and legal-medical aspects.[1] The most common reasons for antibiotic use according to a survey among the members of the U.S. Society of Rhinology are "to prevent postoperative infection (60.4%), avoid TSS (31.5%) and legal-medical aspects" (4.9%).[3] Serious complications such as TSS, endocarditis, sepsis, and meningitis can be observed after septoplasty surgery.[5–7] TSS is extremely rare, with an estimated incidence of 0.0002%,[1] and there is no evidence that it could be prevented with prophylactic use of antibiotics.[3] Therefore, the upper airway and the surgical area of contamination thought to be gaining importance for the postoperative antibiotic therapy,[9] but bacteremia after surgery often is not seen.[10] If nasal packing was used for 48 hours postoperatively, the risk of bacteremia is increased. Kaygusuz *et al*.[4] found bacteremia in 9 of 53 patients (16.9%) after packing removal. Even if bacteremia was seen, it did not cause serious complications.[4] In our study, because of anterior nasal packing, we preferred to use postoperative antibiotics even though bacteremia risk is low. In one study performed in 50 patients who underwent septoplasty, 46% of the patients had nasal mucosa colonized with *Staphylococcus aureus* and none of the blood swabs collected during the surgical procedures showed bacterial growth.[10]

In our study, cephazolin was selected because of its activity against methicillin-susceptible *S. aureus* and most of the *Enterobacteriaceae* was isolated from nasal mucosa. Additional considerations were the low cost and good soft tissue and bone penetration of this antibiotic.

Weimert *et al*.[2] evaluated the postoperative interval of 174 patients that had undergone nasal surgeries, which were split into two groups. One group was treated with ampicillin, 500 mg, 12 hours before surgery for 5 days after the procedure, and the other group did not take any antibiotics. Patients were evaluated through questionnaires and serial x ray of paranasal sinuses and there were no significant abnormalities between the groups concerning infection, scabs, bleeding, synechia, pain, or ecchymoses. In our study we evaluated nasal fossa endoscopically even though Weimert did not.

Caniello *et al.* divided[9] a group of patients into three groups—treated with amoxicillin, cefazolin, and not given any antibiotics—and concluded that there was no need to use prophylactic antibiotics. In our study amoxicillin–clavulanate and cefazolin were given to two different groups and there was no statistical significance difference among groups caused by complications postoperatively. We suggest using cephazolin instead of oral antibiotics because cephazolin, 1.0 g i.v., is sufficient to prevent postoperative complications.

Caniello *et al.*[9] stated that there was no statistically significant difference among amoxicillin, cephazolin, and no antibiotics groups concerning the amount of purulent discharge in the nasal fossa. In our study, nasal endoscopy results were similar. There were no differences related to the amount of purulent discharge found at the lower margin of the inferior turbinate through nasal endoscopy performed on the 14th day postoperatively. Three patients in group A and three patients in group B had grade 3 in nasal endoscopy on 7th day. None of the patients received grade 3 or 4 in nasal endoscopy on the 14th day postoperatively.

A review[11] showed that use of prophylactic antibiotics in elective nasal surgery was not essential because of its low risk of postoperative infection. We believed that although there was a low risk of complications, those complications are fatal[3] and antibiotics should be given postoperatively.

CONCLUSION

The incidence of nasal surgery complications is rare. Septoplasties are considered potentially contaminated surgeries, and use of cephazolin, 1.0 g i.v., postoperatively can be sufficient to cephazolin, 1.0 g i.v., once postoperatively can be applied easily with low drug costs, prevention of the patient's possible drug usage compatibility problems and allergies due to oral use, avoiding the side effects and decrease of drug use postoperatively.

This study is the first pilot study suggesting stages for evaluation of postoperative antibiotic use. Addi-

tional studies are needed to determine the use of cephazolin, 1.0 i.v., given once postoperatively evaluating with placebo control, increased number of patients, and different parameters for infection (culture from nasal mucosa and amount of discharge).

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