

## A COMPARATIVE STUDY OF MANAGEMENT OF SEPTOPLASTY WITH AND WITHOUT ANTIBIOTIC COVER POSTOPERATIVELY

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### ABSTRACT

**Objective:** The septum is the cartilage that divides the nostrils of the nose. It usually lies in the middle and equally separates the nostrils. However, this is not the case with all. Many individuals have a septum that is uneven, causing one nostril to be bigger than the other. A deviated septum is a severe unevenness. It may lead to health problems including a plugged nose or trouble breathing. The aim of the study was to study role of the antibiotics in post-operative period after septoplasty and to compare complications with and without pre- and post-operative antibiotics.

**Methods:** It was a prospective longitudinal and comparative type study. The present study was carried out on 60 patients with microscopically evident deviated nasal septum and was listed for septoplasty. Patients were divided into three groups: Group A, Group B, and Group C. Alternate patients were randomized in Group A, Group B, and Group C, respectively, with each group is 20 patients. The study was conducted in the Department of Otorhinolaryngology in Nalanda Medical College and Hospital, during the period of January 2019 to December 2020.

**Results:** The present study included 60 patients among them 39 were male (65%) and 21 female (35%) with a male to female ratio of 1.85:1. In the present study, while analyzing pre-operative NOSE score, it showed that maximum 37 (61.7%) patients showed significant problem (3). Mild (1) and Moderate (2) problem was observed in 8 (13.3%) and 6 (10%) patients, respectively. Severe (4) problem was observed in 9 (15%) patients. Post-operative NOSE score showed a significant improvement after septoplasty in almost every case irrespective of groups.

**Conclusion:** We conclude that infections after elective nasal surgery in healthy patients rarely occur, making routine antibiotic prophylaxis redundant. Patients who are immunocompromised, those with valvular heart disease, or patients otherwise susceptible to infections should receive antimicrobial prophylaxis even for simple procedures, as bacteremia may occur during nasal procedures.

**Keywords:** Nose, Septoplasty, Bacteremia, Osteomeatal, Breathing problem, Nose score.

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### INTRODUCTION

The septum is the cartilage that divides the nostrils of the nose. It usually lies in the middle and equally separates the nostrils. However, this is not the case with all. Many individuals have a septum that is uneven, causing one nostril to be bigger than the other. A deviated septum is a severe unevenness. It may lead to health problems including a plugged nose or trouble breathing.

The septum should be centered in the nasal passages for them to be symmetrical [1]. A deviated septum is a condition in which the tip of the cartilaginous ridge leans to the left or right, obstructing the nasal passage affected. However, the nasal septum is slightly off-center in about 80% of cases, which goes unnoticed. The septum is most frequently significantly off-center. A deviated septum is the medical term for this condition. A deviated nasal septum is a physical condition of the nose in which the nasal septum is displaced. A deviated septum causes one side of the nose to be broader than average and the other to be narrower.

Nasal septum deviation is most often caused by trauma, either at birth or later in life. Genetic factors, on the other hand, can play a role. Ventilation obstruction (on both sides of the nose), complications with sinus drainage, desiccation of the nose mucosa with nosebleeds and atrophic rhinitis, anosmia, obstructive sleep apnea, and cosmetic deformation may all result from septum deviation. Not every patient with a nasal septum variance will experience both of these issues. It is still unclear which signs and complaints are linked to nasal septum deviation; sinusitis is unlikely to be one of them.

Septoplasty is surgical procedure that corrects a deviated septum by surgery. By trimming, repositioning, and removing cartilage, bone, or both, it straightens the nasal septum, allowing for more circulation into our nose.

With the work of Cottle e Guillen [2], septoplasty attained a high degree of excellence. Cottle published works in which he demonstrated the feasibility of correcting the septum and other structures using a method that considered the nose as a unit, as a functioning whole, and the nasoseptal access with under-osteoperichondrium displacement as in the so-called maxilla-premaxilla, with the development of tunnels between the mucosa and the septum osteocartilaginous skeleton.

Preventing perioperative infections with prophylactic antimicrobial treatment for elective rhinosurgery is a popular practice among surgeons around the world [3]. Nonetheless, infection rates seem to be very poor, casting doubt on the treatment's efficacy. Antibiotic therapy that is redundant can cause a variety of problems, including allergic reactions, toxicity, and the emergence of resistant pathogens, to name a few, and can jeopardize the patient's protection.

### METHODS

It was a prospective, longitudinal, and comparative type study. The study was conducted in the Department of Otorhinolaryngology in Nalanda Medical College and Hospital, during the period of January 2019 to December 2020.

### Selection of study subjects

The present study was carried out on 60 patients with microscopically evident deviated nasal septum and was listed for septoplasty. Total 60 patients were divided into three groups: Group A, Group B, and Group C. Alternate patients were randomized in Group A, Group B, and Group C, respectively, with each group is 20 patients.

Group	No. of Patients	Pre-operative	Post-operative
A	20	Administered	Administered
B	20	Administered	Not administered
C	20	Not administered	Not administered

- Group A patients were subjected to ceftriaxone 1 g (intravenous) during anaesthetic induction and twice a day postoperatively.
- Group B patients were administered with ceftriaxone 1 g (intravenous) during anaesthetic induction but not postoperatively.
- Group C patients were not at all subjected to antibiotic.

### Pre-operative work up

Patients with symptomatic DNS were selected. Random allocation for septoplasty was done by double blinding method. Patients were selected for surgeries based on clinical history, otorhinolaryngological examination and nasal endoscopy. Pre-operative laboratory evaluation was performed in all patients using complete blood test, thrombin time, prothrombin time, and thromboplastin time. Patients were evaluated by a hematologist before surgery if necessary. Pre-operative nasal obstruction symptom score was noted on the day before surgery using a 5-point grading scale. The questionnaire translated into Hindi/Bangla language was provided to patients.

### Intraoperative assessment

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 operation itself. Intraoperative time in minutes recorded from time of infiltrating local anesthetic agent to application of sutures.

The surgical technique used was endoscopy for septoplasty, using Cottle or Metzzenbaun technique and photophore. Anterior nasal packing was applied in some cases.

### Post-operative evaluation

An early post-operative protocol was applied, plus follow-up in the outpatient service after 1 week and after 1 month, investigating presence of bleeding events, fever (ancillary temperature above 38°C), nausea, vomiting, pain, septal hematoma or abscess, and purulent discharge in the nasal fossa. Patients were medicated with symptomatic drugs (analgesic, fever, and antiemetic drugs) if required. All patients underwent nasal endoscopy evaluation in the outpatient follow-up on the 7<sup>th</sup> and 30<sup>th</sup> day postoperatively. Endoscopic examination was always performed by the professional that did not take part in the protocol and did not know if the patient was using antibiotics or not. This professional assigned a grade from 0 to 4 related to purulent discharge in the nasal fossa as follows: 0 (absence of secretion); 1 small amount, 2 moderate, 3 moderate to large amount, and 4 massive.

Post-operative pain on visual analogue scale was assessed on 1<sup>st</sup> post-operative day in all the groups. Post-operative nasal obstruction symptom score was evaluated on 4-week follow-up. Measurement tool for nasal obstruction used was Nasal Obstruction Symptom Evaluation.

Score (NOSE SCORE) as Not a problem = 0, Very mild problem = 1, Moderate problem = 2, Fairly bad problem = 3, and Severe problem = 4. Tool used for pain grading was visual analog scale on the ratings of 1–10. Intraoperative time was recorded in minutes.

### Inclusion criteria

The following criteria were included in the study:

1. All patients between 18 years and 50 years of age.
2. All patients have deviated nasal septum.

### Exclusion criteria

The following criteria were excluded from the study:

1. Patients with pre-operative upper respiratory tract infection.
2. Patients with any previous septal surgery.
3. Patients with other nasal conditions along with deviated nasal septum.
4. Patients with any other systemic disorder (diabetes, hypertension, tuberculosis, asthma, etc.)
5. Malignancy.

Pre- and post-operative comparative evaluation was observed among the three groups and results were tabulated in Grand Chart. Statistical analysis was done by SPSS 19.0 software.

### RESULTS

Age distribution of the patients is mentioned in Table 1. Age range varied from 18 to 50 years with a mean age of years. Most common age group involved was 18–30 years in all the groups involving total 56.7% patients among them Group A and Group C consisted 11 (55%) patients each and Group B consisted 12 (60%) patients. The least common age group was 41–50 years involving 9 (15%) patients among them 4 (20%) belonged to Group A, 2 (10%) belonged to Group B, and 3 (15%) belonged to Group C.

In this present study, all the 60 patients presented with nasal obstruction. The next common symptom was headache present in 50 patients, out of which 18 (90%) belonged to Group A, 17 (85) belonged to Group B, and 15 (75%) belonged to Group C. This was followed by nasal discharge and facial pain present in 38 (63.3%) and 18 (30%) cases, respectively. Hyposmia, a neglected symptom, was present in 3 (5%) cases. Sneezing was present in 5 (8.3%) cases. The presenting symptoms are shown in Table 2.

Pre-operative anterior endoscopic findings are listed in Table 3. We observed that pre-operative rhinoscopic findings and anterior endoscopic findings are almost same. In anterior endoscopy, we observed that discharge in osteomeatal complex was present in 15% (9) patients out of which 4 (20%) belonged to Group A, 3 (15%) belonged to Group B, and 2 (10%) belonged to Group C. Accessory ostia was observed in 4 (6.7%) patients among them 2 (10%) belonged to Group A; Group B, and C consisted 1 (5%) patient each.

In the present study, all the 60 (100%) patients were classified according to Mladina classification which was modified by Rao *et al.* The distribution of patients according to this particular classification is tabulated in Table 4 according to their respective groups. The most common type of septum observed was Type V involving maximum 15 (25%) patients, followed by Type VI involving 12 (20%) patients and Type III involving 11 (18.3%) patients. The least common type observed was Type I involving only 2 (3.3%) patients.

Pre-operative NOSE score is mentioned in Table 5. Maximum 37 (61.7%) patients showed significant problem (3). Mild (1) and Moderate (2) problem was observed in 8 (13.3%) and 6 (10%) patients, respectively. Severe (4) problem was observed in 9 (15%) patients.

Post-operative NOSE score of the patients according to their respective groups is mentioned in Table 6. We found significant difference for NOSE score among three groups postoperatively ( $p=0.05$ ).

Purulent discharge-related comparison in the nasal fossa among the groups on 7<sup>th</sup> and 30<sup>th</sup> post-operative day is mentioned in Table 7. From the above tables, it can clearly understood that there were not any

Table 1: Age distribution

Age	Group A		Group B		Group C		Total		p value
	No. of Patients	%	No. of Patients	%	No. of Patients	%	No. of Patients	%	
18-30	11	55	12	60	11	55	34	56.7	0.932 (NS)
31-40	5	25	6	30	6	30	17	28.3	
41-50	4	20	2	10	3	15	9	15.0	
Total	20	100	20	100	20	100	60	100.0	
Chi-square	0.8431								

Table 2: Distribution of complaints

Complaints	Group A		Group B		Group C		Total	
	No. of Patients	%	No. of Patients	%	No. of Patients	%	No. of Patients	%
Nasal Obstruction	20	100.0	20	100.0	20	100.0	60	100.0
Headache	18	90.0	17	85.0	15	75.0	50	83.3
Nasal Discharge	14	70.0	13	65.0	11	55.0	38	63.3
Facial Pain	7	35.0	5	25.0	6	30.0	18	30.0
Hyposmia	0	0.0	1	5.0	2	10.0	3	5.0
Sneezing	2	10.0	2	3.3	1	1.7	5	8.3

Table 3: Pre-operative anterior endoscopic findings

Findings	Group A		Group B		Group C		Total	
	No. of Patients	%	No. of Patients	%	No. of Patients	%	No. of Patients	%
Septal deviation	20	100.0	20	100.0	20	100.0	60	100
Inferior turbinate hypertrophy	13	65.0	14	70.0	11	55.0	38	63.3
Congested mucosa	7	35.0	5	25.0	8	40.0	20	33.3
Spur	5	25.0	4	20.0	4	20.0	13	21.7
Discharge in osteomeatal complex	4	20.0	3	15.0	2	10.0	9	15.0
Presence of accessory ostia	2	10.0	1	5.0	1	5.0	4	6.7

Table 4: Septal deformities seen in the study group according to Mladina's classification modified by Rao et al.

Mladina's Classification	Group A		Group B		Group C		Total	
	No. of Patients	%	No. of Patients	%	No. of Patients	%	No. of Patients	%
I	1	5.0	0	0.0	1	5.0	2	3.3
II	2	10.0	3	15.0	2	10.0	7	11.7
III	3	15.0	5	25.0	3	15.0	11	18.3
IV	1	5.0	3	15.0	4	20.0	8	13.3
V	6	30.0	4	20.0	5	25.0	15	25.0
VI	5	25.0	4	20.0	3	15.0	12	20.0
VII	2	10.0	1	5.0	2	10.0	5	8.3
Total	20	100.0	20	100.0	20	100.0	60	100.0

Table 5: Pre-operative NOSE score

NOSE Score	Group A		Group B		Group C		Total	
	No. of Patients	%	No. of Patients	%	No. of Patients	%	No. of Patients	%
Not a problem (0)	0	0.0	0	0.0	0	0.0	0	0.0
Mild Problem (1)	3	15.0	3	15.0	2	10.0	8	13.3
Moderate Problem (2)	2	10.0	1	5.0	3	15.0	6	10.0
Significant Problem (3)	12	60.0	14	70.0	11	55.0	37	61.7
Severe Problem (4)	3	15.0	2	10.0	4	20.0	9	15.0
Total	20	100.0	20	100.0	20	100.0	60	100.0

Table 6: Post-operative NOSE score

NOSE Score	Group A		Group B		Group C		p value
	No. of Patients	%	No. of Patients	%	No. of Patients	%	
Not a problem (0)	4	20	6	30	9	45	0.05
Mild Problem (1)	10	50	12	60	6	30	
Moderate Problem (2)	3	15	2	10	4	20	
Significant Problem (3)	2	10	0	0	1	5	
Severe Problem (4)	1	5	0	0	0	0	
Total	20	100	20	100	20	100	
Chi-square	15.393						

Table 7: Purulent discharge-related comparison in the nasal fossa on 30<sup>th</sup> post-operative day

Purulent Discharge Grade	Group A		Group B		Group C		p value
	No. (n=20)	%	No. (n=20)	%	No. (n=20)	%	
0 (absence of secretion)	12	60	15	75	19	95	<b>0.03</b>
1 (small amount)	8	40	5	25	1	5	
2 (moderate amount)	0	0	0	0	0	0	
3 (moderate-to-large amount)	0	0	0	0	0	0	
4 (massive amount)	0	0	0	0	0	0	
Chi-square	6.894						

differences related to the amount of purulent discharge found in the nasal fossa through nasal endoscopy performed on the 7<sup>th</sup> and 30<sup>th</sup> day postoperatively among three groups. None of the patients received Grade 3 or 4 in nasal endoscopy on the 7<sup>th</sup> and 30<sup>th</sup> day postoperatively. Above analysis for amount of purulent discharge on 7<sup>th</sup> and 30<sup>th</sup> post-operative day, we found statistically significant difference between three group as p value was <0.05.

## DISCUSSION

In the present study, the age group of the patients included was between 18 and 50 years irrespective of groups. The mean age of our study was 31.200±8.26 years. Maximum number of patients belonged to the group between 18 and 30 years, that is, 34 (56.7%) patients, next between 31 and 40 years, that is, 17 (28.3%) patients. Nayak *et al.* [4] concluded that mean age of patients of their study was 28 years, which is quite similar to our study. The most of the patients belonged to between second and fourth decade of life in a study conducted by Rao *et al.* [5], which is comparable with our study.

In the present study, the most common symptom was nasal obstruction involving all 60 (100%) patients, followed by headache involving 50 (83.3%) patients, nasal discharge involving 38 (63.3%) patients, facial pain involving 18 (30%) patients, and hyposmia involving 3 (5%) patients. This finding is quite similar to a study conducted by Iqbal *et al.* [6], which concluded that nasal obstruction was present in 220 (100%) patients. Another study conducted by Bothra and Mathur [7] showed that nasal obstruction was the most common symptom found in 90% of the patients.

Like in the present study, majority if patients belonged to Types V and VI according to Mladina classification, Rao *et al.* [5] concluded that 63% patients belonged to Types V and VI where in his study where horizontal crest touches or not touches the lateral wall and there is prominent maxillary crest contralateral to the deviation with septal crest to the deviated side. In our study, accessory ostia was present in 4 (6.7%) patients which is quite similar to the study conducted by Sam *et al.* [8] where accessory ostia was present in 8% patients.

The first study about the prophylactic use of antibiotics in surgical procedures was conducted in 1938 [9], since then several management regimes have been proposed. The most common reasons for prophylactic use according to a survey among the members of the US Society of Rhinology are “to prevent postoperative infection (60.4%), avoid toxic shock syndrome (TSS) (31.5%), and legal-medical aspects” (4.9%) [10]. At present, in turbinectomy, due to the improvement of endonasal surgical techniques, post-operative nasal packing has become less used, reducing the infection risks. If septoplasty involves the use of nasal packing for 48 h postoperatively, the risk of bacteremia is increased.

Mäkitie *et al.* conducted a retrospective study to evaluate the incidence of post-operative infections in 100 consecutive adult patients who underwent SP [11]. In this study, symptoms such as hematoma with fever and submucosal swelling with erythema were considered indicative of infection. Altogether, 21 patients (21%) received prophylactic

antibiotics. A total of 12 patients (12%) suffered mild post-operative infections; three of them had received prophylactic antibiotics. None of the patients experienced life-threatening complications.

Bandhauer *et al.* [12] investigated the effect of antibiotic nasal packing on the potentially infectious nasal flora (PINF) during SP and/or turbinate surgery. All of the 95 patients were free of antibiotics for at least 1 week before surgery. Pre-operative nasal smears were performed. Thirty-seven patients received nasal packing with untreated polyvinyl acetate (Group A); 28 received cotton gauze strips with an antibiotic-free ointment (Group B); and 30 received nasal cotton gauze strips with an antibiotic ointment (Group C). Nasal packs were removed on the 3<sup>rd</sup> post-operative day, and their middle sections were submitted for microbiological analysis along with bilateral nasal smears. Pre-operative nasal smears were positive for PINF in 10.8% of Group A, 21.6% of Group B, and 40% of Group C. After removal of the packing, PINF was found in 78.4% of Group A, 75% of Group B, and 23.3% of Group C (*S. aureus* as the sole organism).

Caniello *et al.* divided [13] 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, ceftriaxone was given to Group A patients at the time of anesthetic induction as well as postoperatively, Group B patients received the same antibiotic only at the time of anesthetic induction, and Group C patients did not received any kind of antibiotic coverage, and there was no statistical significance difference among groups caused by complications postoperatively.

A review [14] 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 that fatal and antibiotics should be given postoperatively [10].

## CONCLUSION

The incidence of nasal surgery complications is rare. Septoplasties are considered potentially contaminated surgeries and do not require prophylactic use of antibiotics due to low risk of post-operative infection.

We conclude that infections after elective nasal surgery in healthy patients rarely occur, making routine antibiotic prophylaxis redundant. Patients who are immunocompromised, those with valvular heart disease, or patients otherwise susceptible to infections should receive antimicrobial prophylaxis even for simple procedures, as bacteremia may occur during nasal procedures.

## Limitations of the study

The present study has clear limitations. Major limitations of this study include the fact that only a small number of patients were surveyed and the lack of randomization. Our study only concerns the short-term follow-up. It has been shown in several published articles their symptom-relief and patient satisfaction in septoplasty patients are unsatisfactory when followed up long-term. Hence, this area requires further investigations.

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