

ROLE OF INTRANASAL SPLINTS IN PREVENTING POSTOPERATIVE NASAL MUCOSAL ADHESIONS

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ABSTRACT

Objective: The objective of this study was to compare the efficacy of intranasal splints in the prevention of nasal adhesion following septal surgery.

Study Design: Randomized control trial.

Place and Duration of Study: Ear, nose and throat (ENT) Department, Combined Military Hospital (CMH) Kharian, from Aug 2014 to Dec 2015.

Material and Methods: Patients undergoing septal surgery fulfilling the inclusion criteria were selected. All the patients were randomly allocated a group (A or B) by using the random numbers table. All surgeries were performed by consultant ENT surgeons under general anaesthesia. After septal surgery in group A, both the nostrils were packed with simple nasal packing using vaseline gauze packs. In group B, silastic nasal splint was placed on operated side only and both the nostrils were packed with vaseline gauze packs. Vaseline gauze nasal packs were removed 48 hrs postoperatively. Nasal splint was removed after seven days of surgery. Nasal cavities were inspected for adhesions after 2 weeks from the date of operation. For follow up sconac number of patients was recorded.

Results: In our study, out of 234 cases (117 in each group), 57.26% (n=67) in group-A and 53.85% (n=63) in group-B were between 16-30 years of age while 42.74% (n=50) in group-A and 44.61% (n=54) in group-B were between 31-55 years of age, mean \pm SD was calculated as 31.45 ± 6.41 and 30.57 ± 4.54 years in group-A and B respectively, 62.39% (n=73) in group-A and 68.38% (n=80) in group-B were male while 37.61% (n=44) in group-A and 31.62% (n=37) in group-B were females, comparison of the efficacy of intranasal splints in the prevention of nasal adhesion following septal surgery was recorded as 86.32% (n=101) in group-A and 96.58% (n=113) in group-B while remaining 13.68% (n=16) in group-A and 3.42% (n=4) developed nasal adhesion. A *p*-value was calculated as 0.000, showing a significant difference.

Conclusion: We concluded that the frequency of efficacy of intranasal splints for the prevention of nasal adhesion following septal surgery is significantly higher when compared with nasal packing.

Keywords: Intranasal splints, Nasal packing, Nasal adhesion, Septal surgery.

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INTRODUCTION

Nasal septum surgery is one of the most common surgical procedures performed in the field of otorhinolaryngology¹. Even though the post operative complication rate of this procedure is rather low, adhesions, bleeding, hematoma, septal perforation or abscess formation can occur. Among these complications, adhesion between the lateral nasal wall and septum is one of the common complications and is a frequent cause of

post operative nasal obstruction^{1,2}.

Nasal adhesions form as a result of contact between raw surface of operated nasal septum and the lateral nasal wall. This results in partial or complete nasal obstruction of affected side. Apart from septal surgery, functional endoscopic sinus surgery may also result in adhesions formation^{3,4}. Prevention of postoperative nasal adhesions is an important aspect of nasal surgery. To prevent the formation of these adhesions, meticulous nasal toilet has been advocated^{1,4}. In addition, silastic, plastic or silicone splints are placed alongside of nasal septum to prevent contact between raw surface of septum and

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lateral nasal wall. Intranasal splints are also helpful in maintaining postoperative septal stability^{5,6}.

For this reason, since 1955 an intranasal septal splint has been used to avoid postoperative mucosal injury and to maintain septal stability^{5,7}. Use of nasal splints to prevent nasal adhesion formation following septal surgery has been documented in literature. However, controversy surrounds the justification of using septal splints as their use could increase postoperative pain^{7,8}. In the routine, it is advocated that splints should be placed on both sides of septum^{4,9,10}. Recently, silastic septal splints have been introduced in the septal surgeries which are thinner and more flexible than the previous products, thus decreasing postoperative pain^{1,11}. In 2012, Veluswamy et al, have shown that use of intranasal splints in septal surgery significantly reduced formation of postoperative nasal adhesions (2.5%) as compare to simple nasal packing (12.5%)⁶. The aim of this study was to determine the role of intranasal splints after performing septal surgery in the prevention of formation of nasal adhesions between the splint and control group. We planned to insert a silastic septal splint into one side of the nasal cavity, referred to as the "group B". As no local statistical data was available, this study would help us in determining whether the use of nasal splints for prevention of nasal adhesions after septal surgery would be justified or not.

MATERIAL AND METHODS

This was a randomized controlled trials carried out in Combined Military Hospital, Kharian Pakistan between Aug 2014 and Dec 2015 after approval by the hospital ethical committee. All patients between the age group of 18–55 years of both the sexes with symptomatic deviated nasal septum were included in this study. After taking an informed written consent to take part in the study, all the patients were randomly allocated a group (A or B) by using the random numbers table. Non probability consecutive sampling technique was applied, and

234 (117 in each group) cases of symptomatic deviated nasal septum were included using "WHO Sample Size Calculator". While the exclusion criteria were concomitant sinus surgery, combined turbinate surgery, nasal polyposis, previous septal surgery with formation of postoperative nasal adhesions and nasal allergy.

All the surgeries were performed by consultant ear, nose and throat (ENT) surgeons under general anaesthesia, the septum was infiltrated with 1% lignocaine with adrenaline, 1:100,000. A Killian's incision was made on one side of the nasal septum. The septum is approached by elevating the perichondrium flap; the various septal parts were dissected free and mobilized by chondrotomies, as required. Trans-septal matrix sutures were applied for approximation and stabilization of the mucosal flap. A silastic splint was inserted into incision side of the nasal cavity in group B, and this was fixed by a silk 3-0 in the nasal cavity to the nasal septum and secured well to avoid slippage of the splint and both the nostrils were packed with vaseline gauze packs and in group B both the nasal cavities were packed lightly with vaseline gauze. Patients were advised tab co-amoxiclav 625mg 8 hourly, tab mefenamic acid 500mg 8 hourly, tab chlorpheniramine maleate 4mg once daily, xylometazoline nasal spray and liquid paraffine nasal drops 2 drops 8 hourly and regular nasal toilet for 5 days.

Vaseline gauze nasal packs were removed 48 hours and nasal splint was removed one week postoperatively^{1,13,22}. Nasal cavities were inspected for adhesions after 2 weeks from the date of operation. For follow up sconac number of patients was recorded.

Data Analysis Procedure

Data was analyzed by international business machine (IBM) and SPSS (statistical package for the social sciences) version 21. Mean and standard deviation (SD) was used to describe results of quantitative data like age. Frequency and percentage was used to describe qualitative

data like gender and formation of postoperative nasal adhesions. Effect multipliers like age and gender were controlled by stratification. To compare the groups for nasal adhesion frequency, chi-square test was applied. A *p*-value of <0.05 was considered statistically significant. The final data representation comprised of pie charts, cross tabulation and tables.

RESULTS

A total of 234 cases fulfilling the inclusion/exclusion criteria were enrolled to compare the efficacy of intranasal splints in the prevention of nasal adhesion following septal surgery. Age distribution of the patients was

37.61% (n=44) in group-A and 31.62% (n=37) in group-B were females (table-II).

Comparison of the efficacy of intranasal splints in the prevention of nasal adhesion following septal surgery was recorded as 86.32% (n=101) in group-A and 96.58% (n=113) in group-B while remaining 13.68% (n=16) in group-A and 3.42% (n=4) developed nasal adhesion. A *p*-value was calculated as 0.000, showing a significant difference (tableIII). Stratification for efficacy for the prevention of nasal adhesion following septal surgery was done for age and gender in in both groups in table-IV&V.

Table-I: Age distribution (n=234).

Age (in years)	Group-A (n=117)		Group-B (n=117)	
	No. of patients	Percentage (%)	No. of patients	Percentage (%)
16-30	67	57.26	63	53.85
31-55	50	42.74	54	46.15
Total	117	100	117	100
Mean ± SD	31.45 ± 6.41		30.57 ± 4.54	

Table-II: Gender distribution (n=234).

Gender	Group-A (n=117)		Group-B (n=117)	
	No. of patients	Percentage (%)	No. of patients	Percentage (%)
Male	73	62.39	80	68.38
Female	44	37.61	37	31.62
Total	117	100	117	100

Table-III: Comparison of the efficacy of intranasal splints for prevention of nasal adhesion.

Efficacy	Group-A(n=117)		Group-B (n=117)	
	No. of patients	Percentage (%)	No. of patients	Percentage (%)
Yes	101	86.32	113	96.58
No	16	13.68	4	3.42
Total	117	100	117	100

p-value<0.001

done showing that 57.26% (n=67) in group-A and 53.85% (n=63) in group-B were between 16-30 years of age while 42.74% (n=50) in group-A and 46.15% (n=54) in group-B were between 31-55 years of age, mean ± SD was calculated as 31.45 ± 6.41 and 30.57 ± 4.54 years in group-A and B respectively (table-I).

Patients were distributed according to gender, it showed that 62.39% (n=73) in group-A and 68.38% (n=80) in group-B were male while

DISCUSSION

Septoplasty is a routine surgical procedure performed by otolaryngologists for the correction of symptomatic deviated nasal septum. This surgery may be associated with numerous complications and to minimize these complications, otolaryngologists frequently pack both nasal cavities with different types of nasal packing. Intranasal septal splints have been used as an alternative to achieve good approximation

of septal flaps and prevention of haematomas, and nasal adhesions^{5,14,15}.

The findings of our study are in agreement with a study done in 2012 by Veluswamy et al, have shown that use of intranasal splints in septal surgery significantly reduced formation of postoperative nasal adhesions (2.5%) as compare to simple nasal packing (12.5%)⁶. Cook and colleagues revealed that intranasal septal splints

operatively. The position of the septum, presence of adhesions, degree of discomfort and patency of the airways were recorded, with no demonstrable benefit to the patient.

Malki et al used trimmed silastic type splints, and all patients experienced a similar degree of pain within the first 2 days, but at 1 week the mean pain score was higher in the splints group (2.2 vs. 0.5, $p < 0.0001$)²¹. At 6 weeks, 1.8% of the

Table-IV: Stratification for efficacy of intranasal splints for prevention of nasal adhesion with regards to age.

AGE: 16-30.

Groups	Efficacy		<i>p</i> -value
	Yes	No	
A	59	8	0.14
B	60	3	

AGE: 31-55.

Groups	Efficacy		<i>p</i> -value
	Yes	No	
A	42	8	0.01
B	53	1	

Table-V: Stratification for Efficacy of intranasal splints for prevention of nasal adhesion with regards to gender.

Gender: Male

Groups	Efficacy		<i>p</i> -value
	Yes	No	
A	62	11	0.00
B	78	2	

Gender: Female

Groups	Efficacy		<i>p</i> -value
	Yes	No	
A	39	5	0.29
B	35	2	

have been used to maintain septal stability and prevent nasal adhesions following septoplasty²⁰. Their prospective study of 100 adults was divided into patients undergoing septoplasty or submucous resection of the nasal septum alone (n=50) and those undergoing combined septal and inferior turbinate surgery (n=50). All patients were randomized to have paired silicon splints inserted for 7 days or not at all. All patients were lightly packed with 2 pieces of Jelonet for 12-20 hrs and examined at 1 and 6 weeks post-

splint group had intranasal adhesions compared to 7.7% of the no-splint group, with no significant difference⁹. Von Schoenberg et al used exmoor silastic (Exmoor Plastics Ltd., Taunton, UK) splints and the splint group had experienced greater pain (visual analog scale [VAS] score of 4.6 vs 3.4, $p < 0.001$). Of these, 31.6% of the no-splint group had adhesions at 1 week compared to 3.6% in the splint group. Ardehali and Bastaninejad randomized 114 septoplasty patients to have either insertion of septal splints

or placement of trans-septal horizontal mattress sutures and antibiotic meshes². These meshes were removed after 2 days, and splints were removed at 1 week. Postoperative pain on a 10-point VAS was found to be higher in the packing group (5 vs 2.1, $P = 0.01$). There was no statistically significant differences in the rates of mucosal adhesions between groups were found¹². Jung et al used a 0.03 inch silastic splint (BioPlexus, Ventura, CA), and was inserted only on one side, with the other side serving as a control. All patients had bilateral nasal packing removed on day 1 and the unilateral splint removed at 1 week postoperatively. Mucosal status and pain at 1 and 2 weeks were compared between the splint side and the control side. Mucosal status was graded by a predetermined scale (1 = no erosion, 2 = focal erosion, 3 = multiple erosions, and 4 = synechia between septum and turbinate). At 1 week, the nasal discomfort score was insignificant on the splint and control sides. Average mucosal status was found to be better on the splint side compared to the control side (1.5 vs 2.5, $p < 0.001$). By 2nd week, the splint side had a lower discomfort score (2.7 vs 3.8, $p < 0.001$) and better mucosal status (1.5 vs 1.9, $P = 0.013$)¹

In the randomized control trails (RCTs) that report rates of other postoperative complications the rate of septal perforation was higher in the splint group (2.2%-3.5%) compared to the no-splint group (0%-2.1%), but this difference did not reach significance^{5,22}. None of the studies reported septal hematomas in either group.

CONCLUSION

All otorhinologists are familiar with intranasal adhesions formation and it is a troublesome complication following nasal septal surgery. Attempts have been made to prevent intranasal adhesion formation by inserting post-operative intra-nasal splints. However, nasal splints indicated a significant decrease in the postoperative intranasal adhesions formation;

therefore, it can be considered as the preferred technique in septoplasty. Considering these results, insertion of a silastic septal splint after septal surgery is worthwhile and should be accepted as a routine procedure.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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