

The Effect of Intranasal Splint on Prevention of Adhesion After Septoplasty

Farhad Jalil Khayat (M.D, Ph. D)

Abdulmajeed Yaseen (M.B.Ch.B)

Abstract

Background: Intranasal adhesion is one of the common complications following nasal surgeries. Using nasal splint during the surgery is one of the methods for prevention of this complication.

Objectives: To determine the value of intranasal splints in preventing adhesion formation after septoplasty.

Patients and methods: This is a prospective study done in Rizgary Teaching Hospital - Erbil city from 1st August 2010 to 31st January 2011. Sixty patients included in this study. Their age range were 18-38 years old. Intranasal splint used during septoplasty in half of them. Follow up done for all patients at same interval.

Results: Intra nasal adhesion developed in one patient (3.5%) of splinted group, while adhesions occurred in three patients (10.0%) of non splinted group. One patient (3.5%) among male while three patients (10.0%) among females developed intranasal adhesion. One patient (3.0%) among those with right septal deviation while three patients (10.5%) among those with left septal deviation had adhesion. There was no difference in Adhesions development in both sides of the septum.

Conclusion: There is no statistically significant difference in intranasal adhesion development between splinted and non splinted group and no statistically significant influence of the gender and side of septal deviation on the adhesion formation.

Keywords: septoplasty, intranasal adhesion, nasal splint .

*College of Medicine / Hawler Medical University/Arbeel / Iraq.

**Rizgari Hospital/ Arbeel Health Governorate/Arbeel / Iraq.

Introduction

A common region of dynamic and static narrowing is the internal nasal valve area in the nose. This area is described as consisting of the nasal septum, the caudal margin of the upper lateral cartilages, the inferior turbinate and the pyriform aperture/nasal floor, static narrowing in this region is caused by crowding of these structures e.g. septal deviation, inferior turbinate hypertrophy, and small angle between the upper lateral cartilage and septum. Dynamic narrowing is due to collapsed upper lateral cartilage

secondary to disruption of support from the nasal bone, septum, and lower lateral cartilage. [1] (fig.1). Deviation of the nasal septum disrupts nasal functioning mainly by obstruction. [2]

Until the 1960s, submucous septal resection (SMR) as promoted by Freer and Killian, was standard practice in Western Europe.[3] The main criticisms of the submucosal resection were a high rate of septal perforation , external deformity, the inability to correct anterior deviations and the

difficulty in performing revision surgery. These criticisms led to the emergence of the septoplasty operation.[4] Septoplasty, is one of the most common surgical procedures in the otorhinolaryngology, performed for correction of the septal deviation.[2]

Long term outcomes of this treatment are still not satisfactory. Ho et al., reported gradual increment of nasal obstruction following septoplasty while Jessen et al. reported that almost half of the patients complained about nasal obstruction nine months following the operation.[5]

Complications after septoplasty include excessive bleeding; wound infection; septal abscess; septal perforation; saddle nose deformity; nasal tip depression; sensory changes, such as anosmia or dental anesthesia; cerebrospinal fluid rhinorrhea; extra ocular muscle damage,[6] Severe complications such as toxic shock syndrome, endocarditis, osteomyelitis, meningitis and cavernous sinus thrombosis.[7] Some of these complications are rare but life threatening.[8] For a long time, intranasal adhesion (synechia, fig.2) development has been a known important complication in the post-operative phase of nasal surgery with an incidence which varies from 10 to 36%.[9] Nasal splints first time used in intranasal surgery by Salinger and Cohen in 1955 to keep the septum in position after septal

surgery. [10,11] The commonest reason for using nasal splints which was mentioned by Pringle in UK was to prevent the formation of adhesions.[12] The scope for using intranasal splint has included holding septal grafts in position and as a means of securing anterior nasal packs in the treatment of epistaxis.[13]

Several types of materials have been used in the past such as strips of x-ray film, and the polyethylene tops of coffee cans, drug and intravenous fluid containers,[12] silicon or soft splints,[14] Wax plate splints,[15] magnet-containing silicone rubber intranasal splints,[16] Guastella/Mantovani septo-valvular splint can be left in situ as long as needed (up to 4 weeks) without interfering with normal nasal physiology.[17] Since its introduction 56 years ago intranasal splints has become, after pressure equalization tubes, the most frequently used prostheses in otolaryngology.[18] According to the Royal National Throat, Nose and Ear Hospital in London, UK, silicon is the most common material used for nasal splints.[19]

Many ENT specialists still use intranasal splints in nasal surgery, although their practice was not based on any scientific evidence of their effectiveness. Despite this the available literature does not give a clear definition of its role in intranasal surgery.[18]



Figure(1): Internal nasal valve. [20]



Figure(2): Synechia between right inferior turbinate and nasal septum.[21]

Patients and Methods

This is a prospective study of 60 patients underwent septoplasty surgery over a 6 month period from 1st August 2010 to 31st

January 2011 in Rizgary Teaching Hospital - Erbil city. Thirty patients were males and 30 were females, their age was ranging between 18-38 years (mean age 24 years), 32 patients

had right septal deviation and 28 left septal deviation. The patients randomly placed in two groups, first group 30 patients with nasal splint and the second group 30 patients without nasal splint.

Patients with other intranasal pathologies as nasal polyp, previous nasal surgery were excluded. Septoplasty done by several otorhinolaryngologists, with vertical standard hemitransfixion incision in the left or right nasal vestibule according to the deviated side, over the cartilaginous septum parallel to the caudal edge, then, between the cartilage and the perichondrium an anterior tunnel is made on both sides and inferior tunnels performed to complete the access to the septum, then deviated parts of septum corrected and spurs removed. At the end of operation Splints which made from X-ray films sterilized in anti septic solutions then inserted to nostrils, splint is always bilaterally molded during the surgery by the assistant or surgeon and trimmed in smaller size than the nostril and kept in position by means of silk through and through sutures, the splint material(X-ray film strips) adds no cost to the procedure and is readily available. Following surgery the nose were packed with antimicrobial wet dressing gauze in all cases. Packs were removed after 24 hours. The patients were given normal saline to have nasal douche at home 4-6 times daily for 2 weeks. The splints were removed 7 days after operation and Follow up done at 3rd month. The developed adhesions were recorded and treated under local anesthesia. The data were analyzed by Statistics Package for Social Sciences program (SPSS).

Results

Septoplasty done in 60 patients, 30(50.0%) were males and 30(50.0%) females. The age range was 18-38 years. (Mean age 24years).Septoplasty with splint done in 30

patients (50.0%); male 15(25.0%) and 15 female (25.0%) patients of different age groups. Septoplasty without splint done in 30(50.0%) patients; 15 male (25.0%) and 15 female (25.0%) of different age groups. (Table 1).

Septal deviation was to the right side in 32 patients (53.5%); 17 patients (28.5%) were splinted and 15 patients (25.0%) non splinted, while 28 patients (46.5%) had septal deviation to left side; 13 patients (21.5%) were splinted and 15 patients (25.0%) were non splinted. (Table 2).

Adhesion developed in the left side of One male patient (3.5%) in the splinted group while adhesions occurred in 3 females (10.0%) in the non splinted group; 2(6.5%) of these adhesion were in the right side and 1(3.5%) of them was in the left side.(Table 3).

Adhesion developed in one patient (3.5%) of the splinted group while 3(10.0%) of the non splinted group had adhesions. (Table 4).

Among the 30 male patients, adhesion developed only in one patient (3.5%). (Table 5).

Out of the 30 female patients, adhesion developed only in three patients (10.0%). (Table 6).

Septal deviation was to right side in 32 patients, adhesion developed in one (3.0%) of them, while in 28 patients with septal deviation to left side only 3(10.5%) patients had adhesions. (Table 7).

Adhesions occurred on the same side of septal deviation were 2(50.0%), while 2(50.0%) of adhesions occurred on the opposite side of septal deviation. (Table 8).

Table (1): Frequency distribution of type of operations according to gender and age.

		Type of operation				Total (n=60) Number (percentage)
		Septoplasty with splint		Septoplasty without splint		
		Male(n=15)	Female(n=15)	Male(n=15)	Female(n=15)	
Age (years)	18-23	7(11.5%)	8(13.5%)	4(6.5%)	6(10.0%)	25 (41.5%)
	24-29	6(10.0%)	3(5.0%)	8(13.5%)	6(10.0%)	23 (38.5%)
	30-35	1(1.5%)	2(3.5%)	3(5.0%)	3(5.0%)	9 (15.0%)
	>35	1(1.5%)	2(3.5%)	-	-	3 (5.0%)
Total		30(50.0%)		30(50.0%)		60(100.0%)

Table (2): Frequency of type of operations according to gender and side of septal deviation.

		Type of operation				Total(n=60) Number (percentage)
		Septoplasty with splint		Septoplasty without splint		
		Male(n=15)	Female(n=15)	Male(n=15)	Female(n=15)	
Side of septal deviation	Right	10(16.5%)	7(11.5%)	8(13.5%)	7(11.5%)	32 (53.5%)
	Left	5(8.5%)	8(13.0%)	7(11.5%)	8(13.5%)	28 (46.5%)
Total		30(50.0%)		30(50.0%)		60(100.0%)

Table (3): Frequency distribution of adhesions according to side, type of operations and gender.

	Type of operation					
	Septoplasty with splint			Septoplasty without splint		
	Male(n=15)	%	Female(n=15)	Male(n=15)	Female(n=15)	%
Right side adhesion	-		-	-	2	(6.5)
Left side adhesion	1	(3.5)	-	-	1	(3.5)
Total	1	(3.5)			3	(10.0)

Table (4): Frequency of adhesion according to type of operation.

Type of operation	Number of patients	Adhesions	P value
		Number (percentage)	
Septoplasty With splint	30	1(3.5%)	0.6
Septoplasty Without splint	30	3(10.0%)	

Table (5) : Frequency Distribution of adhesion among males.

Type of operation	Males (n=30)		P value
	Number of patients	Adhesions	
		Number (percentage)	
Septoplasty With splint	15	1(3.5%)	1
Septoplasty Without splint	15	-	

Table (6) : Frequency Distribution of adhesion among females.

Type of operation	Females (n=30)		P value
	Number of patients	Adhesion	
		Number (percentage)	
Septoplasty With splint	15	-	0.2
Septoplasty Without splint	15	3(10.0%)	

Table (7): Frequency distribution of adhesion in relation to the side of septal deviation .

Side of septal deviation	Number of patients	Adhesions	P value
		Number (percentage)	
Septal deviation to Right side	32	1(3.0%)	0.5
Septal deviation to Left side	28	3(10.5%)	

Table (8) : Frequency of side adhesion in relation to side of septal deviation.

Adhesions	Side of adhesions		P value
	Adhesions on the same side of septal deviation	Adhesions on the opposite side of septal deviation	
	Number(percentage)	Number (percentage)	
Total (n=4)	2(50.0%)	2(50.0%)	1

Discussion

In this prospective study sixty patients underwent septoplasty surgery over a six month period , thirty patients were males and thirty were females, their mean age were 24 years, thirty two patients had right septal deviation and twenty eight had left septal deviation. The patients randomly placed in tow groups, first group thirty patients with nasal splint and the second group thirty patients without nasal splint.

The results of our study showed that adhesion formation after septoplasty in the splinted patients was 1(3.5%) and 3 (10.0%) in the non splinted patients. (fig.3). Although there is higher incidence of adhesion in the non splinted group but in comparison of the both group statistically , the results was not significant this may be due to intra operative care and surgical technique with postoperative nasal douche by normal saline to prevent crust formation and minimize occurrence of adhesions. The findings of our

results are in agreement with the findings of some other studies. Von Schoenberg and Robinson found three months postoperatively the splinted and non splinted group had the same low rate of adhesion 2% because of early out patient review with careful nasal toilet at 1week.[22]The study of Cook et al showed the failure of intranasal splints in preventing intranasal adhesion and concluded that there is no clear advantages in inserting intranasal splints and they should therefore be used sparingly and he recommended the use of nasal toilet 1week after septal surgery (6.5% in splinted vs. 7.0% in non splinted group).[13] Pringle et al carried out a survey of 440 consultants and found that 33% of them never or rarely used intranasal splints, and reported an adhesion rate of (5.2% in non splinted patient vs. 3.9% in the splinted patients), there was no statistically significant difference in the adhesion rate between two groups. The results of survey finalized by asking can we

justify the routine use of nasal splints or are there a better method of postoperative care with a view to avoidance of adhesion? And if it is true that early nasal toilet dispenses with the need for splints so performing nasal toilet at 7days adds very little to the workload.[12] Results of the study done by Malki et al showed no statistically significant difference in the incidence of adhesions between the splinted and non-splinted patients.[23] Study of Almoflehi also showed that intranasal splints were not of significant value in preventing nasal adhesion(10% in splinted vs. 21% in non splinted group) and concluded that the use of intranasal splints in septal surgery has to be individualized. Nasal irrigation using saline is of importance to prevent crusting and minimize occurrence of adhesion. [24] Almazrou and Zakzouk in their study found non significant incidence of adhesions (2% in splinted vs. 10% in non splinted group).[18]

Some authors found results in contrast to our findings as they found a significant difference between splinted and non splinted patients, due to high rate of adhesions when septoplasty combined with lateral wall surgery like Schoenberg et al., they found a low risk of adhesion early in the first week post operatively when intranasal splints were used, and the highest incidence of intranasal adhesions occurred in non splinted patients who had surgery to both walls of their nasal cavity (3.6% in splinted vs. 31.6% in non splinted).[22] Campbell et al. inserted a nasal splint into one side of the nose of 106 patients undergoing a variety of intranasal procedures, all adhesions occurred on the non splinted side and more commonly when bilateral wall procedures had been performed (8% in splinted vs. 26% in non splinted), they concluded that splints were justified for bilateral wall procedures but that their increased morbidity did not justify their use in single wall procedures.[25] Roberto et al. found the high efficiency to prevent post-

surgical adhesion once any of the patient who underwent the septoplasty with turbinectomy (0% in splinted vs.10.6% in non splinted group).[10] Nabil-ur Rahman concluded that complications are related to the type of procedure performed and Adhesions are common complication if intranasal splint is not provided,[26] White and Murray concluded that adhesion may be prevented by insertion of nasal splint.[27]

After stratification by gender results showed 3 adhesions (10.0%) in females and 1(3.5%) in males (tables 5, 6), indicating there is no significant effect of gender on adhesion formation, Which is in agreement to White and Murray (14.5% males vs. 14.6% females) who pointed that an individual patient may have a greater propensity to develop adhesion and further studies on patient fibroblastic activity will be required to explore this possibility. [27]

Results of this study showed that 1(3.0%) of adhesions occurred among those with septal deviation to right side and 3(10.5%) of adhesions developed in those with septal deviation to left side (table 7). Adhesions occurred equally in the same side 2(50.0%) and opposite side 2(50.0%) of septal deviation indicating there is no significant relation between side of deviation and adhesion formation (table 8).

This study showed that using intranasal splints would not result in any further benefit to patients undergoing septoplasty over the non splinted patients regarding adhesion formation.

Conclusion

We found that there is no significant advantage by using intranasal splints in prevention of adhesion. There is no significant influence of the gender and side of septal deviation on the post-operative development of adhesion.



Recomendations

Maximal Care and attention to surgical technique during the operation and the use of nasal toilet following nasal septal surgery for 2 weeks after surgery. More studies with longer period of follow up, larger sample size and other surgical techniques advised.

References

[1] Egan KK, Kim DW. A Novel Intranasal Stent for Functional Rhinoplasty and Nostril Stenosis. *The Laryngoscope*. 2005; 115(5): 903–909.

[2] Uslu H, Uslu C, Varoglu E, Demirci M, Seven B. Effects of septoplasty and septal deviation on nasal mucociliary clearance. *Int J Clin Pract*. 2004; 58(12):1108-11.

[3] Olphen AF. The septum. In: Michael JG, Nicholas SJ, Ray C, Linda L, John H, John W. Scott-Brown's otorhinolaryngology: head and neck surgery. 7th ed. London. Hodder Arnold. 2008; 2:1577-80

[4] Low WK, Willat DJ. Submucosal resection for deviated nasal septum. *Singapore Med J*. 1992; 33:617-619.

[5] Ozlucedik S, Nakiboglu G, Sert C, Elhan A, Tonuk E, Akyar S, Tekdemir I. Numerical study of aerodynamic effects of septoplasty and partial lateral turbinectomy. *Laryngoscope*. 2008 ; 118:330-4.

[6] Amy SK, Joseph KH. Complications and Management of Septoplasty. *Otolaryngologic clinics of North America*. 2010; 43(4):897-904.

[7] Caniello M, Passerotti GH, Goto EY, Voegels RL, Butugan O. Antibiotics in septoplasty: Is it necessary? *Brazilian Journal of Otolaryngology*. 2005; 71(6): 734-8.

[8] Altinors K, Ocibi A, Aydin E, Yilmaz C, Gulsen S. Meningoencephalocele formation after septoplasty and management of this complication. *Turk Neurosurg*. 2008; 18(3):281-5

[9] Shone GR, Clegg RT. Nasal adhesions. *Cambridge Journal of Laryngology & Otolaryngology*. 1987; 101:555-57

[10] Roberto G, Fabiano H, Maria R. Frequency of nasal synechiae after septoplasty with turbinectomy with or without the use of nasal splint. *Arch Otolaryngol. Sao Paulo*. 2008; 12(1):24-27

[11] Salinger S, Cohen D. Surgery of the difficult septum. *Arch Otolaryngol*. 1955; 61: 419-421.

[12] Pringle MB. The use of intra-nasal splints: a consultant survey. *UK. Clin Otolaryngol Allied Sci*. 1992; 17(6):535-9.

[13] Cook AC, Murrant NJ, Evans KL, Lavelle RJ. Intra-nasal splints and their effects on intra-nasal adhesions and septal stability. *Clinical Otolaryngology*. 1992; 17:24-27.

[14] Johnson N. Septal surgery and rhinoplasty. *Transactions of the American Academy of Ophthalmology and Otolaryngology*. 1964; 68: 869-873.

[15] Nayak NR, Murty KD, Balakrishna R. Septal splint with wax plates. *J. Postgrad Med*. 1995; 41(3):70-1.

[16] Richard M, Goode L. Magnetic Intranasal Splints. *Arch. Otolaryngol*. 1982; 108 :319.

[17] Piatti G, Scotti A, Ambrosetti U. Nasal ciliary beat after insertion of septovalvular splints. *Otolaryngology–Head and Neck Surgery*. 2004; 130 (5):558-562.

[18] Almazrou KA, Zakzouk SM. The impact of using intranasal splints on morbidity and prevalence of adhesions. *Saudi Medical Journal*. 2001; 22(7): 616-618.

[19] Alexander N. Types of Nasal Splints. [www.eHow contributor.com]. 2010. [cited at Nov. 15, 20 10]. Available from [http://www.ehow.com/list 6876102 types-nasal-splints.html].

[20] Hoosemec P. Endoscopic introduction to the anterior nasal cavity. 2008. [cited at Nov. 15, 2010]. Available from [http://guest.6.forumer.com /index . php].

[21] Schlosser RJ, Kennedy DW. Nasal endoscopy. In: Michael JG, Nicholas SJ, Ray C, Linda L, John H, John W. Scott-Brown's



Otorhinolaryngology: head and neck surgery
.7th ed. London. Hodder Arnold. 2008;
2:1344-1354.

[22] Von Schoenberg M, Robinson P. The morbidity from nasal splints in 105 patients. Clin. Oto. Laryngol.1992;17:528-530.

[23] Malki D, Quine SM, Pfliederer AG. Nasal splints revisited . Cambridge Journal of Laryngology & Otology. 1999;113:725-727.

[24] Almoflehi MS.The impact of using intranasal splints on morbidity and prevalence of adhesions. J.Sc. Tech. 2009;10(1):1-6.

[25] Campbell JB, Watson MG, Shenoi PM. The role of intranasal splints in the prevention of post-operative nasal adhesions. Cambridge J. Laryngol. Otol. 1987; 101:1140-1143.

[26] Nabil-ur Rahman MA. Complications of surgery for deviated septum.J.Coll Physicians Surg. Pak. 2003;13(10):565-8.

[27] White A, Murray JA. Intranasal adhesions formation following surgery for chronic nasal obstruction. UK.Clinical Otolaryngology.88;13:139-43.