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Postoperative Outcome of Transseptal Suturing and Merocele Nasal Packing During Septoplasty among Cases with Symptomatic Deviated Nasal Septum

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Abstract

Introduction: Nasal obstruction is one of the most common complaints in cases attending otorhinolaryngology surgeon's practice. One of the causes for nasal obstruction is deviated nasal septum. Deviation of the nasal septum is a common structural cause of nasal obstruction and can arise from dislocation of the quadrangular cartilage from its bony boundaries. Septoplasty is a surgical procedure that corrects a deformity of the nasal septum.

Aim: To assess and compare the postoperative outcome of transseptal suturing versus merocele nasal packing during septoplasty regarding the postoperative pain, bleeding and synechia.

Material and methods: This is a prospective, comparative study done in the Department of ORL-HNS, Bir Hospital, Kathmandu with the patients undergoing septoplasty. A total of 70 patients with an age range of 15-65 years were included irrespective of gender diagnosed as symptomatic DNS (Deviated Nasal Septum) who underwent septoplasty. The patients were divided into two groups Group A and Group B during registration in outpatients department. Group A patients underwent septoplasty with transseptal suturing without merocele nasal packing whereas Group B patients underwent septoplasty with merocele nasal packing without transseptal suturing. Postoperative pain and bleeding were assessed on 6th hour, 12th hour, 1st, 2nd, 3rd, 7th and after 42nd POD (postoperative day). Presence of synechia was assessed on 7th POD and 42nd POD.

Results: The mean age was 28.31 +/- 9.149 years. Patients who underwent septoplasty with transseptal suturing reported lower pain scores compared to their counterparts and the differences were statistically significant at 6th hour, 12th hour, 1st POD, 3rd POD and 7th POD with p-value 0.0001, 0.0001, 0.0001, 0.29 and 0.0001 respectively. Synechia was observed in patients who underwent septoplasty with merocele nasal packing on 7th POD. The p-value for synechia on 7th POD was 0.028. No synechia was observed on 42nd POD. Bleeding was only the complication that was commonly associated with septoplasty with transseptal suturing as compared to septoplasty with merocele nasal packing which was statistically significant (p=0.42).

Conclusion: There were increased potential morbidity (pain and synechia) in cases of septoplasty with merocele nasal packing without transseptal suturing in comparison to septoplasty with transseptal suturing without merocele nasal packing. So, septoplasty with transseptal suturing can be good alternative to septoplasty with packing.

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Keywords: Septoplasty, merocele nasal packing, transseptal suturing, symptomatic DNS

Introduction

The nasal septum develops as a down growth from the merged medial nasal processes and the nasofrontal process and thus defines the right and left nasal cavities ^[1]. The nasal septum is divided into bony, cartilaginous and membranous parts (from cephalad to caudal).

The cartilaginous septum (i.e. quadrilateral cartilage) is not an isolated cartilage and in fact is united with the upper lateral cartilages forming one cartilaginous unit [2]. Nasal obstruction is one of the most common complaints in cases attending otorhinolaryngology practice of which nasal septum deviation is the most common cause [3].

The patients may have a history of trauma to the nose whereas on many instances there is no clear history of an inciting event [4]. The nose being the most projecting part of the face, is subjected to tremendous amount of compression and rotational forces in the intrauterine life, which ultimately leads to DNS [5]. Deformity of the nasal septum can be classified as spurs, deviations and dislocations [6]. The prevalence of septal deviation in newborns with vaginal delivery is found to be as high as 22%, while birth from a caesarean section resulted in only 4% DNS [7].

Only few deviated nasal septa affect nasal function and therefore requires treatment. The presenting complaints of DNS are [8]: nasal obstruction, nasal discharge, headache, sneezing, throat discomfort, postnasal drip, nasal bleeding, snoring, anosmia/hyposmia. A septal deviation once diagnosed, medical management is attempted. If medical therapy fails, a surgical intervention to correct the underlying septal deformity is considered [9]. Septoplasty is a surgical procedure that corrects a deformity of the nasal septum. Septoplasty procedure is preferred especially in young adults and female [10].

The complications associated with septoplasty are hemorrhage/septal hematoma, septal perforation, infection, adhesions, atrophic rhinitis, structural deformity (saddle nose, nasal tip ptosis, angulation of the nasal dorsum), anosmia/hyposmia, infection, septal abscess, Toxic shock syndrome, tooth anesthesia, endocranial complications like Cerebrospinal Fluid (CSF) leak, ocular complications [11].

Along with transeptal suturing with quilting by figure of 8 suture technique, Nasal packing is the current standard practice after septoplasty. However nasal packs are uncomfortable while they are in situ and cause pain and bleeding while removing. Merocele (Medtronic Inc., Minneapolis, MN, USA) is one of the most common nonabsorbable nasal packing materials which is a compressed, dehydrated sponge composed of hydroxylated polyvinyl acetate that can increase in size within the nasal cavity and compress a bleeding vessel through rehydration with normal saline [13].

Many surgeons believe that, nasal packing postoperatively is not needed if proper technique is followed, and it should be avoided to prevent significant morbidity associated with nasal packing. Some surgeon say that packing should be reserved for cases where, there is concern about persistent hemorrhage [12].

Recent studies have proposed that alternative approaches such as trans-septal suturing can significantly reduce the complications [14]. Septal quilting avoids the morbidity of

packing or splints.^[15] This technique deducts demerits of nasal packing but it is technically difficult. It may lead to prolonged operation time.^[16] Transseptal suturing prevents the complications such as septal hematoma and bleeding.^[17] Since, septoplasty is a common surgical procedure done in our ORL & HNS department it is imperative to know which of these techniques provide better benefit to the patients. Since, this study is a study of first kind in our institute, the rationales are:

1. To compare the efficacy of septoplasty with transseptal suturing without merocele nasal packing and septoplasty with merocele nasal packing without transseptal suturing in relation to postoperative pain, bleeding, synechia formation and other complications
2. Cost effectiveness of the surgery for the patients as it reduces the cost of merocele.
3. Alternative surgical practice for the surgeons.

Methods

This was prospective and comparative study conducted in Otorhinology Head and Neck (ORL & HNS) department, Bir Hospital, National Academy of Medical Sciences (NAMS), Kathmandu, Nepal from May 2020 to April 2021. Ethical approval was obtained from Institutional Review Board of NAMS and written consent was taken. Total of 70 cases or more (35 allocated in transseptal suturing Group A and 35 allocated in merocele nasal packing Group B) who underwent septoplasty under local anesthesia (LA) or general anesthesia (GA) were included in the study. The inclusion criteria included the patients of the age between 15-65 years and those patients with symptomatic DNS. The exclusion criteria included the patients of age less than 15 years, revision septoplasty, chronic rhinosinusitis with polyposis or without polyposis undergoing septoplasty, cases requiring turbinate reduction, patients with bleeding disorder and nasal mass. All cases undergoing septoplasty who fulfilled the inclusion were enrolled. The cases were allocated based on convenient sampling method. The cases were allocated into Group A or Group B by drawing a lottery indicating the Group A or Group B for the 1st case following which the next case was allocated as even or odd number for subsequent surgery after surgery done for 1st case during OPD registration.

Transseptal Suture Technique with Figure of 8 Technique [22]

The posterior edge of flap was pulled anteriorly to close the wound and to keep the cartilage unexposed. Then the needle was passed through the posterior superior part of the septum, then the needle was passed through the anterior inferior part on the lower anterior edge of the wound followed by passing the needle through the posterior inferior part then lastly through the anterior superior part where the knot was fixed. The Freer's incision site was sutured at the end. (Figure 1a-f)

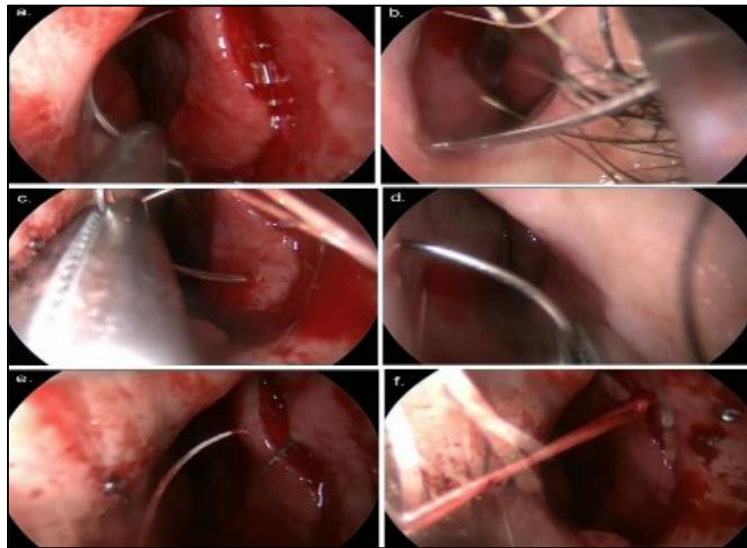


Fig 1a-f: Figure of eight suture for right incision. (a) 1st pass is posterior superior (to the incision). (b) 2nd pass is anterior inferior. (c) 3rd pass is posterior inferior. (d&e) 4th pass is anterior superior. (f) Knot is fixed

Postoperative evaluation was done. The pain score charts (VAS) consisted of a linear scale with 10 gradations ranging from 1 (no pain) to 10 (severe pain) which was evaluated on 6th hour, 12th hour, 1st, 2nd, 3rd, 7th and after 42nd POD and all the complications like hemorrhage, septal hematoma, infections, and adhesions were noted. At the same time (time-point of the study), cases were evaluated in terms of major and minor hemorrhage. Mild postoperative nasal secretions

containing blood was not evaluated as hemorrhage. The cases were asked to report any hemorrhage in the following 1 week and 6 weeks. The cases were discharged on 3rd postoperative day. After discharge cases were reevaluated after 1 week and then after 6 weeks during which diagnostic nasal endoscopy was done to assess synechia, adhesion formation and septal perforation.

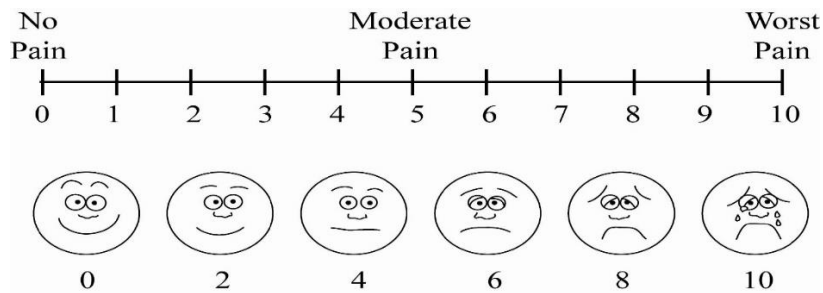


Fig 2: Visual analogue scale

The collected data was stored in an electronic database (MS-excel datasheet). Statistical analysis was done using SPSS version 25 for Windows. Data analysis was done using mean, chi-square test, Fischer exact test. A p-value of less than or equal to 0.05 was considered significant.

Results

A total number of 70 patients were enrolled for the study who

underwent septoplasty.

Table 1: Mean age of patients

	Mean	Standard Deviation
Age	28.31	9.149

The mean age +/- SD was 28.31 +/- 9.149 year.

Table 2: Age distribution into different age groups and sex

Age	Sex				Total	%
	Male	%	Female	%		
15-25	26	76.47	8	23.52	34	48.75
26-35	19	86.36	3	13.63	23	32.85
35-45	7	58.33	5	41.66	11	17.14
46-55	2	100	0	0	2	2.85
56-65	0	0	0	0	0	0
Total	54	77.14	16	22.85	70	100

Table 3: Age distribution in different age group and technique group

Age	Group A	% of total patients	Group B	% of total patients
15-25	19	27.14%	15	21.42%
26-35	12	18.57%	10	14.28%
36-45	4	5.71%	8	11.42%
46-55	0	0	2	2.85%
56-65	0	0	0	0
Total	35	50%	35	50%

Table 4: Preoperative findings in different group of technique

Findings	Group A	Group B	Total	% of total patients	p- value*
DNS to right	17	7	24	34.3%	0.022
DNS to left	18	28	46	65.7%	
Right spur	7	1	8	11.42%	0.171
Left spur	5	5	10	14.28%	
Discharge	16	10	26	37.1%	0.216
“S” shaped DNS	1	3	4	5.7%	0.614
Hypertrophied inferior turbinate	19	24	43	61.4%	0.326

*Chi-square test

Table 5: Distribution of frequency (%) of synechia formation in 7th POD and 42nd POD

Group	Synechia	7 th POD	42 nd POD
Group A	Yes	1 (2.9%)	0 (0%)
	No	34 (97.1)	35 (100%)
Group B	Yes	8 (22.95)	0 (0%)
	No	27 (77.1%)	35 (100%)
p- value*		0.028	0.025

*Chi-square test

There were 8 (22.95%) cases of synechia in Group B in comparison to 1 (2.9%) cases of synechia in Group A. There was statistically significant difference noted between presence of synechia in Group A and Group B on 7th POD (p<0.005). v There were 6 (17.1%) cases of synechia in

Group B in comparison to 0 (0%) cases of synechia in Group A. There was statistically significant difference noted between presence of synechia in Group A and Group B on 42nd POD (p<0.05).

Table 6: Distribution of frequency (%) of bleeding in each group of surgery

Group	Bleeding			p- value*
	None	Major	Minor	
Group A	20 (57.1%)	1 (2.9%)	14 (40%)	0.42
Group B	24 (68.6%)	0 (0.0%)	11 (31.4%)	
Total	44 (62.9%)	1 (1.4%)	25 (35.7%)	

*Chi-square test

Only 1 (2.9%) patients of Group A had bleeding in the 6th hour of postoperative period. No statistical significance observed (p>0.05). Only 1 (2.9%) patients of Group A had bleeding in the 12th hour of postoperative period. No statistical significance observed (p>0.05). Only 5 (14.3%) patients of Group A had bleeding in the 1st POD. No statistical significance observed (p>0.05). Only 3 (8.6%) patients of Group A had bleeding in the 2nd postoperative day

whereas 4 (11.4%) patients of Group B had bleeding in the 2nd postoperative day. No statistical significance observed (p>0.05). Only 1 (2.9%) patients of Group A had bleeding in the 3rd POD whereas 8 (22.9%) patients of Group B had bleeding in the 3rd POD. Statistical significance observed (p<0.05). None of the patients of Group A and Group B had bleeding in the 7th and 42nd postoperative day.

Table 7: Group statistics for pain between two groups of technique

Pain in different postoperative period	Group	N (total cases)	Mean of Pain score (VAS)	Standard deviation of Pain score (VAS)	Standard error mean Pain score (VAS)	p-value*
Pain at 6 th hour	Group A	35	3.60	0.497	0.084	0.0001
	Group B	35	4.97	1.071	0.184	
Pain at 12 th hour	Group A	35	3.17	0.382	0.065	0.0001
	Group B	35	4.91	0.781	0.132	
Pain at 1 st POD	Group A	35	3.60	0.553	0.093	0.0001
	Group B	35	5.14	1.309	0.221	
Pain at 2 nd POD	Group A	35	3.20	0.473	0.080	0.54
	Group B	35	3.66	1.282	0.217	

Pain at 3 rd POD	Group A	35	2.00	0.343	0.058	0.29
	Group B	35	1.54	1.146	0.194	
Pain at 7 th POD	Group A	35	1.26	0.443	0.075	0.0001
	Group B	35	0.23	0.646	0.109	
Pain at 42 nd POD	Group A	35	0.00	0.000	0.000	NA
	Group B	35	1.00	0.000	0.000	

*Fischer's exact test

Group A patients reported lower pain scores compared to their counterparts and the differences were statistically significant at 6th hour, 12th hour, 1st POD, 2nd POD, 3rd POD and 7th POD with p-value less than 0.0001, 0.0001, 0.0001, 0.54, 0.29 and 0.0001 respectively.

Discussion

Correction of nasal septal deformities date back to the beginning of medical literature in the Egyptian papyri and has been modified and improved since then. The techniques used have attempted to preserve physiological functions of the nose and to provide maximum functional and respiratory improvement and at the same time improve nasal flow. Septoplasty is the most favored surgical procedure in otolaryngology done for DNS with nasal obstruction failing medical therapy. Nasal packing is being used for the control of bleeding. There are side effects of tight nasal packing like nausea, surgical trauma pain, problem in diet and emotions. Nasal packing makes the mucosa raw and more prone to synechiae. This study compares the study between patients undergoing septoplasty with nasal packing and septoplasty without nasal packing. In our study, patients were evaluated based on otorhinolaryngological examination and only patients with symptomatic.

In this study we found male to female ratio to be 3.3:1. As the p-value=0.04 which was less than 0.055, it was statistically significant. The study done by Dadgarnia *et al* had Group A was composed of 27 (75%) men and 9 (25%) women, and Group B consisted of 23 (63.9%) men and 13 (36.1%) female cases. There was no statistical differences between two groups regarding age (p=0.432) and gender distribution (p = 0.443) [18]. Similarly, the study done by A Ghimire, TR Limbu and R Bhandari consisted of 44 cases among which 31 cases were male and 13 cases were female. 70.5% belonged to male while 29.5% of cases belonged to female (M:F=2.3:1). The incidence of DNS was more in males than females with an approximate ratio of 2:1 in study done by Dipak Ranjan Nayak *et al* [24].

The present study included patients aged between 15-70 years with mean \pm S.D age of 28.31 \pm 9.149 years. The incidence of patients undergoing septoplasty was found to be maximum (48.75%) in the age group of 15-25 years. Similar results were seen in the study done by Walikar *et al*, where 83.4% of patients belongs to age group of 10- 30 years [21]. The study done by Prayaga N. Srinivas Moorthy *et al*. found out maximum number of patients i.e., 45% of the patients in their study was in the age group of 16 - 25 years [25]. There is similar age group of the patients as compared to other study.

Postoperative status

6th hour of postoperative period

The mean VAS score at 6th hour of postoperative period in Group A and Group B were 3.60 \pm 0.497 and 4.97 \pm 1.07 respectively which was significantly significant as p-value=0.0001. Group A had less pain compared to Group B.

R. Ocalan *et al* did the study in 60 patients who found out the pain at 6th hour of postoperative pain during septoplasty with p-value=0.047 which was statistically significant [26]. Similarly the study done by Dominic Ku *et al* did the study in 30 patients who underwent septoplasty did not found any difference in between pain at 6 hours of post-operative period [27].

In our observation, we found 1 (2.9%) Group A patients had major bleeding whereas none of the Group B patients had bleeding during 6th hour of postoperative period which was statistically insignificant as p-value =1.00.

12th hour of postoperative period

The mean VAS score at 12th hour of postoperative period in Group A and Group B were 3.17 \pm 0.382 and 4.91 \pm 0.781 respectively which was statistically significant as p-value=0.000. Group A patients had less pain as compared to Group B patients. R. Ocalan *et al* did the study in 60 patients who found out the pain at 12th hour of postoperative pain during septoplasty with p-value=0.032 which was statistically significant [26].

In our observation, we found 1 (2.9%) of Group A patients had minor bleeding whereas none of the Group B patients had bleeding during 12th hour of postoperative period which was insignificant as p-value =1.00. Hafeez *et al* in a study of 70 post-septoplasty patients revealed that 2.85% had excessive intra-operative bleeding, and intranasal packing was performed. 7.14% patients had bleeding during 12th hour of operation [28].

1st POD

The mean VAS score on 1st POD in Group A and Group B were 5.14 \pm 1.309 and 3.60 \pm 0.553 respectively which was significantly significant as p-value=0.000. Group A has less pain as compared to Group B patients. Cukurova found that the pain levels were statistically significant in packing as compared non packing group (p< 0.05). This clearly indicates that the septal suturing group felt less pain than the packing group [14]. Similarly study performed by Said SM, Abdulrazzaq AF showed that pain is higher in packing group in comparison to non-packing and it was statistically significant in 1st POD (p=0.001) [29].

In our observation, we found no bleeding in Group B patients whereas 5 (14.3%) of Group A patients had bleeding. Similarly, Naghibzadeh B, Peyvandi AA, Naghibzadeh G, found 1.2% cases from packing and 2.9% from unpacking group had bleeding at end of operation [30]. Similarly, study done by Ghimire A, Limbu TR, Bhandari R, showed that one patients from non-packing group developed bleeding in 1st POD which needed anterior nasal packing [19]. The results from our study are similar to other study.

2nd POD

The mean VAS score at 2nd POD in Group A and Group B were 3.20 \pm 0.0.473 and 3.66 \pm 1.282 respectively which was not significant as p-value=0.054. There was no significant

difference in pain in between Group A and Group B patients. In study performed by Said SM, Abdulrazzaq AF, pain was higher in packing group in comparison to non-packing group and it was statistically significant in 2nd POD (p-value=0,001). Similarly, study done by Awan M, Iqbal M, pain occurred in 21.43% (n=15) in Group A (patients without nasal packing) and 11.43% (n=8) in Group B (patients with nasal packing) patients (p< 0.05) [31]. Other study had similar result as our with more pain in nasal packing group than transseptal suturing group.

In our observation, we found 3 (8.6%) of Group A patients had bleeding whereas 4 (11.4%) of Group B patients had bleeding during 2nd POD of which was statistically insignificant as p-value =1.00. In study by Günaydin *et al*, seven patients (7%) had minor and two patients (2%) had major bleeding in the transseptal suture group. Neither minor nor major bleeding was observed in the patients with nasal packing. In a study done by Plasencia *et al*, none of the nasal packing patients had postoperative bleeding, 4 patients reported significant bleeding after removal of the packing although, none had to use them again [32]. Ansari *et al* mentioned in their study that in transseptal suturing technique without intranasal packing in nasal septal surgery, the postoperative bleeding was noticed to be 11.43% (n=8) in packing group, and 7.14% (n=5) in suturing group. The data obtained concludes that patients with nasal packing have a risk of postoperative hemorrhage which is not significant from a statistical point of view [33]. The results from our study is insignificant and similar insignificant results are obtained from other study.

3rd POD

The mean VAS score in 3rd POD in Group A and Group B were 2.00 ± 0.343 and 1.54 ± 1.146 respectively which was significant as p-value=0.029. There was significant difference in pain in between Group A and Group B patients. Similarly, in the study done by Eduardo Bantistella *et all* in 152 patients, pain was more in immediate postoperative period with good analgesia in the 3rd POD compared statistically the number was not significant but is remarkable the practically absolute control with analgesia after 72 hours [34]. Similar results were obtained with other study.

We found 1 (2.9%) of Group A patients had bleeding whereas 8 (22.9%) of Group B patients had bleeding during 2nd POD of which was statistically insignificant as p-value =1.00. In the study done by Mohamed Ahmed Alshawadfy M.D, Yasser Ahmed Fouad M.D in 50 patients, 3 cases in the nasal packing group versus 6 cases in non-packing group (P= 0.7252) which was statistically nonsignificant [35]. Similarly, in the study done by Eduardo Bantistella *et all* in 152 patients, 2.7% of the patients without splint and 5.0% of the patients with splints had bleeding in 3rd POD. Compared statistically, the number was not significant but the absolute number of cases of Group B with bleeding in the immediate post-operative [34]. The results are similar to the other study which could be due to trauma during removal of nasal packing.

7th POD

The mean VAS score on 7th POD in Group A and Group B were 1.26 ± 0.0443 and 0.23 ± 0.646 respectively which was significant as p-value=0.000.

In our observation, we found no bleeding in either of the group of patients. 8 (22.95%) of cases developed synechiae in merocele nasal packing group whereas 1 (2.9%) of cases

developed synechiae in transeptal suturing group. The study done by Mohammadi M, Bastaninejad S found 3% cases had synechiae in packing group and 2 % from non-packing group [36]. In contrary, study by Naghibzadeh B, PeyvandiAA found 1 % cases developed synechiae in both packing and non-packing group [30]. Similarly, study done by Ghimire A, Limbu TR, Bhandari R, 2 patients of packing group developed synechiae between the lateral wall of nasal cavity and nasal septum [19]. Similar results are obtained from other study too stating that there was increased frequency in synechiae formation with the use of nasal packing.

In our observation, we found no synechiae were observed. 1 patients (3.3%) in suturing group and 2 patients (6.7%) in packing group developed unilateral adhesions and p-value was 0.38 which was not significant in study done by Said SM, Abdulrazzaq AF [20].

Major and minor bleeding

In our observation, 1 (2.9%) of Group A patients had major bleeding in 6th hour postoperative period which required merocele nasal packing whereas no major bleeding in Group B patients. 14 (40%) of Group A patients had minor bleeding whereas 11 (31.4%) of Group B patients had minor bleeding. In a study done by Pérez *et al*, none of the nasal packing patients had postoperative bleeding. 4 patients reported significant bleeding after removal of the packing although, none had to use them again [32].

Conclusions

The patients who underwent septoplasty with transseptal suturing without merocele nasal packing reported lower pain scores compared to their counterparts and the differences were statistically significant at 6th hour, 12th hour, 1stPOD, 3rd POD and 7th POD with p-value 0.0001, 0.0001, 0.001, 0.29 and 0.0001 respectively. Synechiae was observed more in packing group on 7th POD (p=0.02). Bleeding was only the complications associated with septoplasty with transseptal suturing as compared to septoplasty with merocele nasal packing (p=0.42).

Thus, routine use of nasal packing in septoplasty is not justified for symptomatic DNS because of insignificant bleeding between two groups and increased potential morbidity (pain and synechiae) in cases of septoplasty with packing. So, septoplasty can be performed without packing and is preferred to avoid postoperative pain and synechiae.

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