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Septoplasti Sonrası Transseptal Sütür ile Nazal Tamponların Karşılaştırılması

Comparison of the Transseptal Suturing with Nasal Packs After Septoplasty

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Öz

Amaç: Nazal tamponlar septoplasti sonrası yaygın olarak kullanılır. Bununla birlikte, literatürde nazal tampon kullanımı ile ilişkili çok sayıda komplikasyon vardır. Bu çalışmada, septoplasti uygulanan hastalarda transseptal sütür tekniği (TSS) ile üç farklı tip nazal tampon postoperatif komplikasyonlar ve operasyon sonrası hasta memnuniyeti açısından karşılaştırıldı.

Gereç ve Yöntem: Çalışma grubuna septoplasti uygulanan 80 hasta dahil edildi: Hastalar 4 gruba ayrıldı. Merocel grubu (grup 1), internal nasal splint (INS) grubu (grup 2), sentetik poliüretan köpük (SPK) grubu (grup 3) ve TSS grubu (grup 4). Grupların VAS skorları ağrı (tamponlu kaldığı süre içerisinde, tamponun çıkarılması sırasında), basınç hissi, disfaji ve postnazal akıntı açısından karşılaştırıldı. Her grupta kanama, sineşi, septal hematom ve septal perforasyon gibi komplikasyonlar karşılaştırıldı.

Bulgular: Tamponlu kaldığı süre içerisinde ve tamponların çıkarılması sırasındaki postoperatif ortalama ağrı, basınç hissi ve disfaji VAS skorları Merocel grubunda silikon ve Nasopore gruplarına göre anlamlı olarak yüksek bulundu. Diğer üç grup arasında VAS skorları açısından anlamlı fark yoktu. Kanama oranı Merocel grubunda en yüksek, TSS grubunda en düşüktü. Sineşi oranı Merocel grubunda en yüksek, ardından TSS ve SPK grupları ile en düşük INS grubundaydı. Gruplar arasında septal hematom ve septal perforasyon açısından fark yoktu.

Sonuç: Sonuçlarımız septoplasti hastalarında TSS tekniğinin yüksek hasta memnuniyeti ve düşük komplikasyon oranları açısından güvenle kullanılabileceğini göstermiştir. Merocel, yüksek komplikasyon oranları ve düşük hasta yaşam kalitesi nedeniyle septoplasti için uygun bir materyal gibi görünmemektedir.

Anahtar Kelimeler: Septoplasti, nazal tamponlar, transseptal sütür tekniği,

Abstract

Objective: Nasal packs are commonly used after septoplasty. However, there are numerous complications associated with nasal packing in the literature. This study aimed to compare the efficacy of transseptal suture technique (TSS) versus three different types of nasal packs regarding to postoperative complications and patient satisfaction after septoplasty.

Material and Method: The study group included 80 patients who underwent septoplasty. The patients were randomly divided into four groups: Merocel group (group 1), internal nasal splint (INS) group (group 2), synthetic polyurethane foam (SPF) group (group 3) and TSS group (group 4). The VAS scores of groups were compared for pain (during pack, on removal of the pack), sense of pressure, dysphagia and postnasal drip. The complications including bleeding, synechiae, septal hematoma and septal perforation were also compared for each group.

Results: The mean VAS scores of postoperative pain during packed and on removal of packs, sense of pressure and dysphagia found significantly higher in Merocel group than in silicone and Nasopore groups. There was no significant difference between other three groups regarding to VAS scores. Bleeding ratio was highest in Merocel group, and lowest in TSS group. Synechiae ratio was highest in Merocel group followed by TSS and SPF groups and lowest in INS group. There was no difference between groups regarding to septal hematoma and septal perforation.

Conclusion: Our results showed that TSS technique might be safely used in septoplasty patients regarding to high patient's satisfaction and low complication ratios. Merocel does not seem to be an appropiate material for septoplasty due to its high complication and low patient's quality of life ratios.

Key Words: Septoplasty, nasal packs, transseptal suture technique

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Introduction

Nasal septum deviation is one of the most common pathologies in otolaryngology practice, and septoplasty is the most frequently performed surgical procedure to correct nasal septal deviations(1,2). Several types of nasal packing materials (PMs) have been used following septoplasty to prevent complications such as septal hematoma, bleeding, adhesion formation (3). These materials also maintain the elevated mucoperichondrial flaps apposition and avert dead space formation between flaps and retained septal structures. However, a large number of patients have reported that the pain during the removal of packings was the most painful experience of their life (4). Furthermore, these materials may lead to some local (i.e., synechiae, infection, bleeding, septal perforation) and systemic (i.e., toxic shock syndrome, sleep disturbance, respiratory and circulatory system problems) complications.

Various types of PMs including vaseline gauze in glove finger, Merocel, INS or Doyle splint, absorbable gelatine and cellulose foam, alginate, synthetic polyurethane foam and Telfa® have been defined and used in the literature(4,5,6). The experience and preference of the surgeon would affect the type of PM applied after surgery. The ideal PM should not cause discomfort and pain removal and should be implemented readily.

Merocel® (Medtronic Xomed Surgical Products, Jacksonville, FL) is one of the most commonly applied PMs. It is a solid, nonabsorbable and dehydrated sponge material which is composed of hydroxylated polyvinyl acetate. It may increase in size by rehydration with saline and makes pressure on mucoperichondrial flaps. The use of Merocel has some disadvantages such as total occlusion of nasal passages, mucosal edema and irritation, pain, and bleeding during its removal(6,7). Internal Nasal Splint® (INS) (Breathe-Easy Silicone Nasal Septal Splint with integral airway; Invotec, Jacksonville, FL) is a silicone material and has integral airway canals that allow nasal breathing during packed(8). Although it does not apply pressure on mucoperichondrial flaps, it supports and increases the stability of retained septum after surgery. Nasopore® (Polyganics BV, Groningen, the Netherlands) is a newly developed absorbable synthetic polyurethane foam (SPF) material for nasal packing. It is a fully synthetic, biodegradable and inert material produced using a freeze-drying process. In the nasal cavity, SPF absorbs the water and makes pressure on mucoperichondrial flaps. This

material rapidly starts fragmentation in the nasal cavity and dissolves within days. It can be suctioned readily and painlessly from the nasal cavity on the postoperative 2nd day(9).

Nonetheless, there is no consensus in the literature on which material to use when to remove packs from the nasal cavity and the indications for packing the nose after surgery.(7,8,10,11) In order to avoid the complications associated with nasal packing, several nasal suturing techniques have been described(11,12). Some researchers advocated that packing the nose after septoplasty would not be mandatory and nasal suturing techniques would be a reliable, comfortable and cost-effective alternative to nasal packing(11,13,14). Transseptal suturation (TSS) of mucoperichondrial flaps helps to prevent complications such as septal hematoma, bleeding, and preserve L-strut support. Furthermore, the iatrogenic mucosal injuries can be repaired with transseptal sutures(11).

In this study, we used three forms of nasal packing; total occlusive (Merocel), breathable (INS) and biodegradable (SPF). To our literature knowledge, this is the first study to compare the transseptal nasal suturing technique against three different forms of nasal PMs regarding patient comfort and postoperative complications following septoplasty operation.

Material Methods

This clinical trial was conducted in 80 patients undergoing septoplasty between February 2017 and January 2018. Prior to the surgery, all participants were examined with a 0-degree nasal endoscope and paranasal sinus computerized tomography. The patients who had a history of previous septal surgery, turbinate pathology, chronic sinusitis, allergic or vasomotor rhinitis or systemic disorders such as hypertension, asthma, cardiovascular disease or coagulation disorders were excluded from the study. The study protocol was approved by the institutional ethical committee (decree no: E-18-1859). An informed consent was obtained from all participating subjects. The study was conducted by following the principles of the Declaration of Helsinki.

All operations were performed under general anesthesia with endotracheal intubation by the same surgeon (BD). Jetokain® (Lidocaine HCl 20 mg/ml, Epinephrine Hydrochloride 0.0125 mg/ml) (Adeka, Turkey) was administered along with the nasal septum

mucosa for vasoconstriction and hydrodissection. After making a hemitransfixion incision, mucoperichondrial flaps were elevated and the deviations of cartilage and bony septum were excised by preserving the L-strut support. The hemitransfixion incisions were sutured using 4-0 Vicryl® rapid (Ethicon, Norderstedt, Germany) suture at the end of surgery. After all procedures, the patients were randomly divided into four groups. Bilateral anterior Merocel nasal packs were applied in the first group (20 patients), INS packs were applied in the second group (20 patients) and SPF packs were applied in the third group (20 patients) for postoperative packing. In the fourth group (20 patients), the elevated mucoperichondrial flaps were sutured transseptally using 4-0 Vicryl® rapid sutures. The sutures were placed along the cartilaginous septum. All patients were treated with amoxicillin/clavulanate 1000 mg p.o twice daily for seven days postoperatively. All patients were invited for control examination on the postoperative 2nd day. Merocel and INS were left in the nasal cavity for 2 days. In the SPF group, the material was suctioned on the 2nd postoperative day. After removal of PMs, patients were asked using questionnaires for the postoperative pain, pain during removal of packs, sense of pressure, dysphagia and postnasal drip. The severity of each symptom was graded using the visual analog scale (VAS) of 0 (none) to 10 (unbearable) as previously described(9,15).

Table 1. Grading scale for bleeding

Grade	Bleeding
0	No bleeding
1	Bleeding limited in the nasal cavity
2	Bleeding out of nasal cavity
3	Necessity of repacking

All patients were examined with anterior rhinoscopy and 0-degree nasal endoscope at postoperative 1st and 4th week. The comparison of the efficacy of PMs was made by evaluating postoperative bleeding and mucosal condition after removal of PMs. Postoperative bleeding after removal of PM was graded from 0 to 3 (Table 1.). The mucosal condition was evaluated regarding synechiae, septal hematoma and septal perforation using a 0-degree nasal endoscope.

Statistical analyses were performed using commercially available software (SPSS Statistics 21; SPSS Inc, an IBM Company, Chicago, Illinois). The Chi-square test was used to compare the categorical variables. The Fisher's exact test was used when Chi-square test did not meet the conditions. Differences between the groups were analyzed by one-way analysis of variance (for multiple comparisons, the Tukey honestly significant difference [HSD] test was used). P values <.05 were considered statistically significant.

Table 2. The distribution of patients in groups in terms of gender and age

		Groups (80)				
		Merocel (n=20)	**INS (n=20)**	**SPF (n=20)**	**TSS (n=20)**	*p* value
Gender (%)	Female	7 (35)	8 (40)	10 (50)	9 (45)	0.796
	Male	13 (65)	12 (60)	10 (50)	11 (55)	
Age Mean±S.D.		30.55±9.73	29.00±9.66	31.25±9.63	29.40±9.74	0.877

p<0.05, Chi-Square*/One-way ANOVA test**, S.D; Standard deviation

Results

Of the 80 patients included in this study, 46 (57.5%) were male, and 34 (42.5%) were female. The mean age was 30.05±9.55 years and ranged from 17 to 55 years. Each group consisted of 20 patients. The mean age was 30.55±9.73 in the Merocel group (13 male, 7 female), 29.00±9.66 in the INS group (12 male, 8 female), 31.25±9.63 in the SPF group (10 male, 10 female) and 29.40±9.74 in the TSS group (11 male, 9 female). There was no statistically significant difference between groups regarding age and sex (p=0.877, p=0.796, respectively) (Table 2.).

The mean VAS scores of patients regarding postoperative pain, pain during removal, sense of pressure and dysphagia are summarized in Table 3. Table 4 summarizes the postoperative complication rates including bleeding, septal hematoma, septal perforation, and synechiae.

Following the removal of the PMs, there was no severe nasal bleeding that required replacement of packings. In the Merocel group, four patients (20%) showed grade 1 bleeding, and eight patients (%40) showed grade 2 bleeding while eight patients (40%) did not have any bleeding. In the INS group, three patients (15%) showed grade 1 bleeding, and two patients (10%) showed grade 2 bleeding while 15 patients (75%) did not have any bleeding. In the SPF group, two patients (10%) showed grade 1 bleeding, and one patient (5%) showed grade 2 bleeding while 17 patients (85%) did not have any bleeding. There was a statistically significant difference between groups regarding bleeding ($p<0.001$). The bleedings rates were significantly higher in the Merocel group than the INS and the SPF groups after removal of PMs ($p=0.025$, $p=0.003$, respectively). There was no significant difference between the INS and the SPF groups regarding bleeding ($p=0.429$). In the TSS group, no patients showed bleeding on the postoperative 2nd day. The bleeding rates were significantly lower in the TSS group compared to the Merocel and the INS groups ($p<0.001$, $p=0.017$, respectively). There was no statistically significant difference between the TSS and the SPF groups regarding bleeding rates ($p=0.072$). No septal perforation was observed in any patients during the postoperative follow-up period.

Table 3. VAS scores of the patients in Groups

	Merocel	**INS**	**SPF**	**TTS**	***p*** value
Postoperative pain (Mean±S.D.)	6.10±1.33	3.35±1.26	2.90±1.11	2.80±1.00	**p<0.001**
Pain during removal (Mean±S.D.)	6.25±1.41	3.05±1.14	3.20±1.43	-	**p<0.001**
Sense of pressure (Mean±S.D.)	6.60±1.50	3.05±1.53	3.40±1.14	2.70±1.17	**p<0.001**
Dysphagia (Mean±S.D.)	4.25±1.65	2.70±1.55	2.55±1.73	2.35±1.59	**p<0.001**

p<0.05, One-way ANOVA test (Tukey's), S.D.:Standard deviation

The synechiae was seen in 6 patients (30%) in the Merocel group, one patient (5%) in the SPF group and two patients (10%) in the TSS group. No synechiae was seen in the INS group. There was a statistically significant difference between groups regarding synechiae ($p=0.024$). The synechiae rate was higher in the Merocel group than the INS group ($p=0.02$). There was no statistically significant difference between the Merocel and the SPF and the

TSS group (p=0.09, p=0.235, respectively). There was no statistically significant difference between the INS, SPF, and TSS groups regarding synechiae (p>0.05).

Septal hematoma was seen in 1 patients (5%) in the INS group, two patients (10%) in the SPF group. No septal hematoma was seen in the Merocel and the TSS group. There was no statistically significant difference between groups regarding septal hematoma (p=0.610).

The mean postoperative pain score was 6.10±1.33 in the Merocel group, 3.35±1.26 in the INS group, 2.90±1.11 in the SPF group and 2.80±1.00 in the TSS group. There was a statistically significant difference between groups regarding postoperative pain (p<0.001). The mean postoperative pain scores were significantly higher in the Merocel group than the other three groups (p<0.001). There was no statistical difference between other three groups regarding postoperative pain (p>0.05).

Table 4. The results of the postoperative complications in groups

		Merocel	**INS**	**SPF**	**TTS**	***p*** value
Bleeding (%)	Present	12 (60)	5 (25)	2 (10)	0 (0)	**p<0.001**
	Absent	8 (40)	15(75)	18 (90)	20 (100)	
Septal hematoma (%)	Present	0 (0)	1(5)	2 (10)	0(0)	**p>0.05**
	Absent	20	19 (95)	18 (90)	20 (100)	
Septal perforation (%)	Present	0 (0)	0 (0)	0 (0)	0 (0)	**p>0.05**
	Absent	20 (100)	20 (100)	20 (100)	20 (100)	
Synechiae (%)	Present	6 (30)	0 (0)	1 (5)	2 (10)	**p=0.024**
	Absent	14 (70)	20 (100)	19 (95)	18 (90)	
Total (n)		20	20	20	20	

p<0.05, Chi-square/Fisher's exact test

The mean pain score during removal of packings was 6.25±1.41 in the Merocel group, 3.05±1.14 in the INS group, 3.20±1.43 in the SPF group. There was a statistically significant difference between groups regarding pain during removal ($p<0.001$). The mean pain score during removal was significantly higher in the Merocel group than the other two groups ($p<0.001$). There was no statistical difference between other two groups regarding pain during removal ($p>0.05$).

The mean sense of pressure score was 6.60±1.50 in the Merocel group, 3.05±1.53 in the INS group, 3.40±1.14 in the SPF group and 2.70±1.17 in the TSS group. There was a statistically significant difference between groups regarding the sense of pressure ($p<0.001$). The mean sense of pressure score was significantly higher in the Merocel group than other three groups ($p<0.001$). There was no statistical difference between other three groups regarding postoperative pain ($p>0.05$).

The dysphagia score was 4.25±1.65 in the Merocel group, 2.70±1.55 in the INS group, 2.55±1.73 in the SPF group and 2.35±1.59 in the TSS group. There was a statistically significant difference between groups regarding dysphagia ($p=0.001$). The mean dysphagia score was significantly higher in the Merocel group than the INS, the SPF and the TTS group ($p=0.019$, $p=0.008$, $p=0.002$, respectively). There was no statistical difference between other three groups regarding dysphagia ($p>0.05$).

The mean postnasal drip score was 3.70±1.25 in the Merocel group, 3.10±1.10 in the INS group, 3.45±1.95 in the SPF group and 3.01±1.15 in the TSS group. There was no statistical difference between groups regarding postnasal drip ($p=0.661$).

Discussion

Septoplasty is one of the most frequently performed surgical procedure for the correction of nasal septal deviations. Anterior nasal packings are widely used in clinical practice to prevent postoperative complications, such as bleeding, hematoma, perforation and to increase the retained nasal structures following surgery(12). However, the nasal PMs have some inherent disadvantages, such as pain, bleeding, mucosal damage, dysphagia, epiphora, sneezing, sleep disturbance, local infection, allergic reactions, septal perforation, bacterial toxic shock syndrome and aspiration of PMs(8,10,11,12). Additionally, in the elderly population with

sleep apnea syndrome, chronic heart, and pulmonary disease total occlusive nasal packings may cause hypercapnia, hypoxia and cardiovascular problems(6,16). Among these problems, the most commonly reported complaints by patients are the postoperative pain while in situ and especially the pain during removal of packs(4,5). Coating the packs with gelfoam, humidification of packs with local anesthetics, sphenopalatine ganglion blockage, shortening the duration of packing and applicating pre-emptive analgesia may help to eliminate the pain and disturbance during the removal of packings(17,18,19).

Nonetheless, nasal packing is an uncomfortable procedure, and it reduces the patient's quality of life. It may lead to life threating complications, extend the length of hospital stay(20,21). In 1980, the TSS technique was introduced to the literature(21). This technique was conceived as a continuous septal suturing along the elevated parts of the nasal septum. The authors used this technique in more than 800 patients and found that the TSS technique had reduced patient discomfort and hospital stay in both septoplasty and septorhinoplasties(21). Recently, there have been various studies claiming that nasal packing would not be a gold standard procedure following septoplasty and different types of hemostatic nasal suturing techniques would be applied instead of PMs. The results of those investigations point to the fact that the TSS causes less pain and discomfort in patients compared to PMs and it is a reliable, cheap and effective alternative to nasal packings (7,8,11,13).

The pain during removal of PMs may be most uncomfortable part of the surgery in septoplasty patients. Moreover, the severity of the pain that is caused by the removal of PM may be greater than the severity of the pain caused by being packed in the nose. Yılmaz et al. compared the postoperative pain levels in septoplasty patients packed with Merocel, INS and SPF and found that the pain scores during packing and on the removal of packs were significantly higher in Merocel group(22). Cukurova et al. found significantly higher postoperative pain scores in Merocel group compared to TTS group in their study of 697 patients(23). Similar results were reported by Soylu et al. in their study of 240 patients (24). Ardehali et al. reported that the patients packed with internal splints and antibiotic meshes had considerably higher pain scores compared to the TTS group(8). Almost all studies have pointed out the fact that Merocel packings have a propensity to adhere to the nasal mucosa and cause more pain, discomfort, and bleeding during removal(17,25). In our study, being

consistent with the literature, the Merocel group reported the highest postoperative pain scores with a significant difference compared with other three groups. The lowest pain scores were reported by the TTS group, but the difference was not significant compared to the INS and the SPF groups. The Merocel group reported the highest pain scores during removal of packs with a significant difference compared to the INS ve SPF group.

The total occlusion of nostrils by nasal packings causes mouth breathing, and xerostomia and the patients may experience difficulty in swallowing and ingestion. Dysphagia, increased intranasal pressure and postnasal drip may have negative impacts on patient's life quality throughout packed in the nose. In a study, patients with total occlusive packings had higher scores on nasal fullness and sleep disturbance(26). The use of transseptal suturing rather than total occlusive nasal packs has been showed to reduce the problems observed in patients during awakening from anesthesia(11). In our study, the Merocel group reported higher dysphagia and sense of pressure scores with a significant difference compared to 3 groups. The TSS group reported lower dysphagia and sense of pressure scores compared to the INS and SPF groups, but the difference was not found statistically significant. Additionally, there was no significant difference between groups regarding postnasal drip.

Nasal packings have been used to control bleeding and prevent septal hematoma formation by applying mechanical pressure on mucoperichondrial flaps. In several studies where the TSS and nasal packing were compared, the researchers did not find any significant difference regarding bleeding and septal hematoma formation(8,11,13). Yılmaz et al. reported higher bleeding rates in Merocel group compared to INS and SPF(22). In our study, the bleeding rate was significantly high in Merocel group compared to other three groups. There was no significant difference between the INS and the SPF groups regarding bleeding rate. No patient showed bleeding in TSS group on the postoperative 2nd day. The lowest bleeding rates were observed in the TSS group with a significant difference compared to the Merocel and the SPF groups. There was no severe bleeding that repacking was needed in the study. Septal hematoma was observed in 1 patient in the INS group and two patients in the SPF group while there was no septal hematoma in the Merocel and the TSS groups. There was no statistically significant difference between groups regarding septal hematoma.

We did not observe any septal perforation in either of the groups. We observed synechiae formation in 6 patients in the Merocel group, one patient in the SPF group, two patients in the TSS group. There was no synechiae in the INS group. The synechiae formation was significantly high in the Merocel group with a significant difference. There was no significant difference between other three groups regarding synechiae.

Conclusion

Considering the results of our study, we demonstrated that the TSS could be safely performed in septoplasty patients without the need for nasal packing. This technique seems not only a reliable but also a cheap and comfortable alternative to PMs. As for the types of nasal packing, the INS and the SPF cause less pain, bleeding dysphagia and synechia compared to Merocel. The SPF has no superiority over the INS regarding complications and patient comfort and besides having higher costs. Consequently, when the patient comfort and postoperative complications were taken into account, we propose that the use of INS and the TSS technique are more convenient.

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