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Comparison of the Results of the Effect of Nasal Packing on Patient Comfort

Burun Tamponunun Hasta Konforuna Etkisi ile İlgili Sonuçların Karşılaştırılması

Oğuzhan DİKİCİ[a], Osman DURGUT[a], Fevzi SOLMAZ[a]

[a]Department of Otorhinolaryngology, Health Sciences University Bursa Yüksek Ihtisas Training and Research Hospital, Bursa, TURKEY

ABSTRACT Objective: This study aimed to evaluate the effects of nasal packing on patient comfort and healing after nasal surgery. **Material and Methods:** A total of the 97 patients who underwent septoplasty and were included in this study, 35 had a 3-day silicone pack, 35 had a 7-day silicone pack, and 27 had a 3-day polyvinyl acetate nasal pack. All the patients also completed the "Nasal Packing Survey" after the packs were removed. Any haematoma, oedema, synechia, perforation, crusting and early/late haemorrhage were recorded during the examination 1 week, 1 month and 3 months after the packs were removed. **Results:** Crusting was more common in the polyvinyl acetate nasal packing group than in the silicone packing group ($p<0.05$). The nasal packing survey values of the silicone packing group were significantly lower than those of the polyvinyl acetate nasal packing group ($p<0.05$). **Conclusion:** Nasal silicone packs are suitable and comfortable for nasal surgery and have low complication rates. The use of nasal silicone packs for 3 or 7 days does not make a significant difference in terms of patient comfort.

Keywords: Nasal surgery; nasal packing; silicone; patient comfort; polyvinyl acetate

ÖZET Amaç: Bu çalışmada, burun ameliyatı sonrası uygulanan nazal tamponların hasta konforu üzerine etkileri değerlendirildi. **Gereç ve Yöntemler:** Septoplasti uygulanan ve bu çalışmaya dâhil edilen 97 hastanın 35'ine 3 gün silikon tampon, 35'ine 7 gün silikon tampon, 27'sine ise 3 gün polivinil asetat burun tamponu uygulandı. Hastaların tamamı, burun tamponları çıkarıldıktan sonra "Burun Tamponu Anketi"ni tamamladılar. Burun tamponlarının çıkarılmasından 1 hafta, 1 ay ve 3 ay sonraki muayenelerde hematom, ödem, sineşi, perforasyon, kabuklanma ve erken/geç kanama varlığı kaydedildi. **Bulgular:** Kabuklanma, polivinil asetat burun tamponu grubunda silikon tampon grubuna göre daha yaygındı ($p<0,05$). Silikon tampon grubunun burun tamponu anket değerleri, polivinil asetat burun tamponu grubuna göre anlamlı olarak daha düşüktü ($p<0,05$). **Sonuç:** Silikon burun tamponları, nazal cerrahi için uygun, hasta için konforlu ve düşük komplikasyon oranlarına sahiptir. Silikon burun tamponlarının 3 veya 7 gün boyunca kullanılması, hasta konforu açısından önemli bir fark yaratmamaktadır.

Anahtar Kelimeler: Burun cerrahisi; burun tamponu; silikon; hasta konforu; polivinil asetat

Septoplasty is a common surgical procedure in otorhinolaryngology practice. It can be performed alone or in combination with turbinate or sinus surgery.[1] However, complications such as epistaxis, septal haematoma, infection, septal abscess formation or septal adhesion may occur after septoplasty operations.[2] To prevent these complications after septal surgery, surgeons use nasal packing or intranasal splints.[1]

Nasal packings are primarily used to stop bleeding after septoplasty, turbinate surgery or paranasal sinus surgery. They are utilised to prevent synechia formation, in addition to haemostasis, after surgery. They are also applied to fix intranasal structures where the bone cartilage skeleton of the nose in septoplasty operations is operated.[3]

Various products, such as ribbon gauze soaked in Vaseline, absorbable biomaterials, polyvinyl acetate

Correspondence: Oğuzhan DİKİCİ
Department of Otorhinolaryngology, Health Sciences University Bursa Yüksek Ihtisas Training and Research Hospital, Bursa, TURKEY/TÜRKİYE
E-mail: oguzhandikici@yahoo.com.tr

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sponge (Merocel; Medtronic Xomed, Jacksonville, FL), Merocel in a glove finger, silicone splint and various balloon tamponades, have been described.[4] Merocel is a polymer made from esterified hyaluronic acid.[5]

However, the presence of tampon in the nasal cavity causes pain and discomfort, which are the most common problems after surgery.[2,6] The use of nasal tampons can cause pain and may induce an uncomfortable sensation of the nasal fullness when nasal secretions accumulate.[7] They may cause nasal discomfort, epiphora, local infection, discomfort in swallowing, sleep disturbances, pain during tampon removal and nasal mucosal trauma.[5,8]

This study aimed to investigate the effect of using silicone nasal splints or polyvinyl acetate for nasal packing after septoplasty on patient comfort.

MATERIAL AND METHODS

This retrospective study was conducted at the Department of Otorhinolaryngology of our hospital and approved by our ethics committee with the following approval number: 2011-KAEK-25 2016/22-05.

PATIENTS

Ninety-seven patients (54 males and 43 females) aged 18-54 years (mean age: 28.1 ± 9.1 years) and subjected to septoplasty were included in this study. Of these patients, 47 had inferior turbinate lateralisation, and 50 did not have inferior turbinate lateralisation. Septoplasty was performed with an open or endonasal approach. Silicone nasal packing was retained for 7 days after septoplasty (35 patients) and 3 days after septoplasty (35 patients). Polyvinyl acetate packing was retained for 3 days after septoplasty (27 patients). The patients under 18 years of age and those with chronic sinusitis, nasal polyposis, or concomitant systemic disorders (such as hypertension, heart disease, asthma or coagulation disorders) were considered as exclusion criteria.

DEVIATION PLACE AND SIDE

All the patients were evaluated before the surgery to determine the location of deviation. The place of deviation was classified as anterior, posterior or anteroposterior, and the deviation side was categorised as right or left.

NASAL PACKING SURVEY

For the assessment of the nasal packing effects, all the patients answered the questions in the nasal packing survey by using a visual analogue scale graded from 0 to 4 after the packs were removed (Table 1).

SURGICAL PROCEDURE

All the patients underwent septoplasty, and 47 patients also underwent bilateral inferior turbinate lateralisation. Intranasal silicone packs (Doyle II intranasal airway splints; Medtronic Xomed Inc., Jacksonville, FL) were placed in both nasal cavities and fixed to the nasal septum with sutures. Polyvinyl acetate packs (Merocel, Medtronic Xomed Inc., Jacksonville, FL) were also placed in both nasal cavities.

TABLE 1: Nasal packing survey items.

	Not a problem	Very mild problem	Moderate problem	Fairly bad problem	Severe problem
1. Feeling panic that I cannot get enough breatth through my nose	0	1	2	3	4
2. Pain while removing the nasal splint	0	1	2	3	4
3. Amount of Postoperative bleeding	0	1	2	3	4
4. Amount of bleeding after removing the nasal splint	0	1	2	3	4
5. Head ache depend on nasal splint	0	1	2	3	4
6. Nose ache depend on nasal splint	0	1	2	3	4
7. Open mouth sleeping and throat ache	0	1	2	3	4
8. Sneeze	0	1	2	3	4
9. Earache	0	1	2	3	4

NASAL PACKING

All the patients had packs after surgery. Intranasal silicone packs were removed 7 after open septoplasty and 3 days endonasal septoplasty operations. Polyvinyl acetate packs were removed 3 days after endonasal septoplasty operations. 22 patients had inferior turbinate lateralisation in 3-day silicone packing group. 25 patients had inferior turbinate lateralisation in 7-day silicone packing group. Polyvinyl acetate packing group patients did not have inferior turbinate lateralisation.

POSTOPERATIVE NASAL EXAMINATION

Haematoma, perforation, synechia, crusting, oedema on inferior turbinate, early/late haemorrhage and infection were recorded with examinations every 2 days for 1 week, 1 month and 3 months after the pack was removed. Haemorrhage lasting more than 5 min upon packing removal was called early haemorrhage. Haemorrhage continuing a week after the surgery was considered late haemorrhage.

STATISTICAL ANALYSIS

SPSS ver. 16.0 was used for statistical calculations. Mann-Whitney U and Kruskal-Wallis tests were conducted. Statistical significance was considered when $p < 0.05$. Nasal packing complication rates were calculated with Kruskal Wallis Test.

RESULTS

Deviations were on the right side in 45 (46.4%) patients and on the left side in 52 (53.6%) patients. Deviations were located in the anterior part in 25 (25.8%) patients, in the posterior part in 9 (9.3%) patients and in the anteroposterior part in 63 (64.9%) patients.

RESULTS OF THE 3- AND 7-DAY SILICONE PACKING GROUPS

Nasal Packing Complications

Synechia was not detected in all the groups during the 3-month examination. Late bleeding and perforation were not observed in either group. The total rates of early bleeding, oedema and crusting were 2.9%, 27.1% and 14.3%, respectively (Table 2). Crusting was significantly more frequent in the 3-day silicone packing group than in the 7-day silicone packing group ($p<0.001$). Early epistaxis was observed in 2 patient in 3- day silicone packing group. Oedema was observed more frequently in silicone packing group.

Nasal Packing Survey Results

The results of the nasal packing survey showed that the 'sneezing' values of the 7-day silicone packing group were significantly higher than those of the 3-day silicone packing group ($p < 0.05$; Table 3). Nose ache depend on nasal splint, open mouth sleeping and throat ache, sneezing and earache values of the 7-day silicone packing group were higher than those of the 3-day silicone packing group. ($p>0.05$)

RESULTS OF THE SILICONE AND POLYVINYL ACETATE PACKING GROUPS

Nasal Packing Complications

Synechia was not observed in all the groups during the 3-month examination. Early bleeding, late bleeding and perforation were not observed in either group. The rates of oedema and crusting were 22.2% and 59.3%, respectively (Table 2). The crusting rates were significantly higher in the polyvinyl acetate packing group than in the silicone group ($p<0.001$).

TABLE 2: Nasal packing complication rates.

	Nasal Packing			
	3-day silicone packing	7-day silicone packing	Polyvinyl acetate packing	p
Oedema	10 (%28.5)	9 (%25.7)	6 (%22.2)	0.853
Crusting	8 (%22.8)	2 (%5.7)	16 (%59.3)	0.000
Early epistaxis	2 (%5.7)	0	0	0.167
Late epistaxis	0	0	0	
Synechiae	0	0	0	
Total	35	35	27	97

*p value shows the results of Kruskal Wallis Test

TABLE 3: Nasal packing survey results of the 3- and 7-day silicone packing groups.

Nasal splint survey	3-day silicone packing (n=35) Median	Min	Max	Mean Rank	7-day silicone packing (n=35) Median	Min	Max	Mean Rank	P*
Feeling panic that I cannot get enough breath through my nose	0	0	3	36.10	0	0	2	34.90	0.715
Pain while removing the nasal splint	0	0	3	32.66	0	0	3	38.34	0.177
Amount of Postoperative bleeding	0	0	3	34.51	1	0	4	36.49	0.667
Amount of bleeding after removing the nasal splint	0	0	2	38.40	0	0	1	32.60	0.125
Head ache depend on nasal splint	0	0	4	36.94	0	0	4	34.06	0.495
Nose ache depend on nasal splint	0	0	3	33.94	0	0	4	37.06	0.486
Open mouth sleeping and throat ache	0	0	3	32.13	1	0	4	38.87	0.146
Sneezing	0	0	2	30.94	0	0	4	40.06	0.013
Earache	0	0	1	35.47	0	0	3	35.53	0.977

*p value shows the results of Mann Whitney U Test

Nasal Packing Survey Results (Table 4)

The values of 'I panic when I cannot properly breathe through my nose' of the silicone packing group (mean rank: 42.30) were significantly lower than those of the polyvinyl acetate packing group (mean: 66.37; $p < 0.05$). The values of 'removing the nasal packing is painful' of the silicone packing group (mean rank: 41.33) were significantly lower than those of the polyvinyl acetate packing group (mean: 68.89; $p < 0.05$). The values of 'the amount of bleeding after nasal packing removal' of the silicone packing group (mean rank: 39.19) were significantly lower than those of the polyvinyl acetate packing group (mean: 74.43; $p < 0.05$). The values of 'headache depends on nasal packing' of the silicone packing group (mean rank: 43.61) were significantly lower than those of the polyvinyl acetate packing group (mean: 62.96; $p < 0.05$). The values of 'nose ache depends on nasal packing' of the silicone packing group (mean rank: 41.27) were significantly lower than those of the polyvinyl acetate packing group (mean: 69.04; $p < 0.05$). The values of 'throat ache depend on open mouth sleeping ' of the silicone packing group (mean rank: 41.10) were significantly lower than those of the polyvinyl acetate packing group (mean: 69.48; $p < 0.05$). The values of 'sneezing' of the silicone pack-

TABLE 4: Nasal packing survey results of the patients who received silicone and polyvinyl acetate packing.

Nasal packing survey	Silicone packing (n=70) Median	Min	Max	Mean Rank	Polyvinyl acetate packing (n=27) Median	Min	Max	Mean Rank	p*
Feeling panic that I cannot get enough breath through my nose	0	0	3	42.30	1	0	3	66,37	0.000
Pain while removing the nasal splint	0	0	3	41.33	1	0	4	68.89	0.000
Amount of Postoperative bleeding	0	0	4	46.69	1	0	3	55.00	0.167
Amount of bleeding after removing the nasal splint	0	0	2	39.19	1	0	3	74.43	0.000
Head ache depend on nasal splint	0	0	4	43.61	1	0	3	62.96	0.001
Nose ache depend on nasal splint	0	0	4	41.27	1	0	4	69.04	0.000
Open mouth sleeping and throat ache	1	0	4	41.10	2	0	4	69.48	0.000
Sneezing	0	0	4	40.42	1	0	4	71.24	0.000
Earache	0	0	3	38.61	1	0	2	75.94	0.000

*p value shows the results of Mann Whitney U Test.

ing group (median: 0, mean rank: 40.42) were significantly lower than those of the polyvinyl acetate packing group (mean: 71.24; $p < 0.05$). The values of 'earache' of the silicone packing group (mean rank: 38.61) were significantly lower than those of the polyvinyl acetate packing group (mean: 75.94; $p<0.05$).

DISCUSSION

Nasal obstruction is a common symptom that can be corrected through septoplasty.[2] Anterior nasal packing is usually used after nasal surgery.[8] However, it has been reported that the use of only transseptal sutures after septoplasty may result in similar success and/or less discomfort to the patient without applying nasal packing material. [9-11] Various materials are available for nasal packing, and the type of nasal packing materials is chosen on the basis of a surgeon's preference and experience, ease of insertion and removal and patient discomfort or pain during packing removal.[7] Although nasal packing removal takes a short time, patients clearly remember this painful procedure because the nasal mucosa is highly sensitive to pain. Many studies have been conducted on how to make the procedure comfortable.[6] Polyvinyl acetate nasal packing is one of the most widely used nasal packing materials after septoplasty. Polyvinyl acetate nasal packing has been compared with other materials, and studies have concluded that polyvinyl acetate nasal packing tends to adhere to the mucosa.[7] However, silicone nasal packs have been found to be useful in postoperatively providing the necessary support for the nasal septum, maintaining the patency of nasal passages and maintaining mucociliary activity.[12-14] Silicone intranasal packs are more often used because they cause less morbidity than conventional nasal tampons do. Intranasal splints supply septal support and provide breathing through the nose via the integral airway after surgery.[1] Rubber or silicone intranasal splints are superior to other nasal packing materials in terms of maintaining the functions of the Eustachian tube, protecting the components of the mucociliary transport and providing the necessary support for the nasal dorsum.[12-15]

Patients who received nasal packing after septoplasty complained of headache and facial and nose pain. The removal of tampons may be more stressful than surgery, and some patients describe this procedure as the most painful experience of their lives.[2,16] Acioğlu et al. reported that they have more pain scores and more frequent bleeding than that of a Doyle Combo Splint during the removal of Merocel.[7] However, Aksoy et al. found no difference in complication rates between the removal of splints on day 1 or 5 postoperation.[1] They concluded that the prolonged retention of splints does not provide better results.[1] Likewise, Lubianca-Neto et al. revealed that the retention of nasal tampons for 24 or 48 h has no effect on the frequency of bleeding complications after tampon removal.[17]

Asaka et al. found lower pain scores when they kept the nasal packs for 2 or 3 days in the silicone plate group than in the gauze packing group.[2] However, they observed that patients did not feel pain during removal when silicone splints were kept for 2 weeks. Postoperative crusting is significantly reduced in the silicone splint group compared with that in the gauze packing group because of the protection of the septal mucosa by silicone splints.[2]

In our study, we did not observe postoperative synechia, late bleeding, septal abscess and haematoma in both groups. When the groups were compared after the removal of the packs, crusting was observed mostly in the polyvinyl acetate nasal packing group. Crusting was higher in the 3-day silicone packing group than in the 7-day silicone packing group. Similar to previous findings, our results were due to the trauma of the mucosa during the removal of the polyvinyl acetate nasal packing that adhered to the septal mucosa. The degree of oedema in the silicone packing group was higher than that in the polyvinyl acetate nasal packing group after the tampon was removed, but this finding was not statistically significant. Early bleeding was also observed in the silicone packing group, but this result was not statistically significant after 3 days. Our results implied that crushing and bleeding might be effectively prevented by not removing the silicone packs within a short time because it likely supported mucosal healing. Nose ache depend on nasal splint, open mouth sleeping and throat ache, sneezing and earache values of the 7-day silicone packing group were higher than those of the 3-day silicone packing group. The difference in these values may be due to the silicone packing re-

maining in the nose longer. In addition, 7-days silicone packing was generally used in patients undergoing open technical septoplasty. This may have resulted in higher pain and postoperative bleeding values. Sneezing in patients who had their silicone packs removed after 7 days were possibly related to an allergic reaction to silicone. This reaction might also explain the higher incidence of oedema on inferior turbinate if silicone was kept for a long time. The scores in the silicone group in all items were lower than those in the polyvinyl acetate packing group. This result suggested that silicone packs were more comfortable than polyvinyl acetate nasal packs, even though the former had some undesirable effects.

The effects of nasal tampons on the patients' comfort have been investigated limitedly with a few items in the literature, while the effects of nasal packing research have been considered in detail in this study. Thus, we can evaluate the effect of nasal tampons on patients' comfort more accurately with nasal packing survey.

CONCLUSION

Nasal silicone packs are suitable and comfortable for nasal surgery and have low complication rates. The use of nasal silicone packs for 3 or 7 days does not make a significant difference in terms of patient comfort. The nasal packing survey and complication values suggest that silicone packs may be preferred to polyvinyl acetate for nasal packing.

Ethics

The study was approved by the Ethics Committee of Bursa Yüksek Ihtisas Training and Research Hospital on 21.12.2016, no: 2011-KAEK-25 2016/22-05.

Informed Consent

This is a retrospective study, there is no need to take informed consent.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept:*Oğuzhan Dikici;* ***Design:****Oğuzhan Dikici;* ***Control/Supervision:*** *Oğuzhan Dikici,Osman Durgut, Fevzi Solmaz;* ***Data Collection and/or Processing:*** *Oğuzhan Dikici,Osman Durgut, Fevzi Solmaz;* ***Analysis and/or Interpretation:*** *Oğuzhan Dikici,Osman Durgut, Fevzi Solmaz;****Literature Review:*** *Oğuzhan Dikici,Osman Durgut, Fevzi Solmaz;****Writing the Article:*** *Oğuzhan Dikici,Osman Durgut, Fevzi Solmaz;****Critical Review:*** *Oğuzhan Dikici,Osman Durgut, Fevzi Solmaz;****References and Fundings:*** *Oğuzhan Dikici,Osman Durgut, Fevzi Solmaz;* ***Materials:*** *Oğuzhan Dikici,Osman Durgut, Fevzi Solmaz*

REFERENCES

1. Aksoy E, Serin GM, Polat S, Kaytaz A. Removing intranasal splints after septal surgery. J Craniofac Surg. 2011;22(3):1008-9.[Crossref] [PubMed]
2. Asaka D, Yoshikawa M, Okushi T, Nakayama T, Matsuwaki Y, Otori N, et al. Nasal splinting using silicone plates without gauze packing following septoplasty combined with inferior turbinate surgery. Auris Nasus Larynx. 2012;39(1):53-8.[Crossref] [PubMed]
3. Weber R, Hochapfel F, Draf W. Packing and stents in endonasal surgery. Rhinology. 2000;38(2):49-62.[PubMed]
4. Çelik Ö, Boyaci Z, Ateşpare A, Develioğlu O, Karaca ÇT, Çaglar E, et al. The effect of duration of merocel in glove finger with tetracaine solution on septoplasty morbidity. J Craniofac Surg. 2013;24(6):1931-4.[Crossref] [PubMed]
5. Weber R, Keerl R, Hochapfel F, Draf W, Toffel PH. Packing in endonasal surgery. Am J Otolaryngol. 2001;22(5):306-20. [Crossref] [PubMed]
6. Yilmazer C, Sener M, Yilmaz I, Erkan AN, Cagici CA, Donmez A, et al. Pre-emptive analgesia for removal of nasal packing: a double-blind placebo controlled study. Auris Nasus Larynx. 2007;34(4):471-5.[Crossref] [PubMed]
7. Acıoğlu E, Edizer DT, Yiğit Ö, Onur F, Alkan Z. Nasal septal packing: which one? Eur Arch Otorhinolaryngol. 2012;269(7):1777-81. [Crossref] [PubMed]
8. Bernardo MT, Alves S, Lima NB, Helena D, Condé A. [Septoplasty with or without postoperative nasal packing? Prospective study]. Braz J Otorhinolaryngol. 2013;79(4):471-4.[Crossref] [PubMed]
9. Bajaj Y, Kanatas AN, Carr S, Sethi N, Kelly G. Is nasal packing really required after septoplasty? Int J Clin Pract. 2009;63(5):757-9.[Crossref] [PubMed]
10. Kayahan B, Ozer S, Suslu AE, Ogretmenoglu O, Onerci M. The comparison of the quality of life and intranasal edema between the patients with or without nasal packing after septoplasty. Eur Arch Otorhinolaryngol. 2017;274(3):1551-5.[Crossref] [PubMed]
11. Günaydın RÖ, Aygenc E, Karakullukcu S, Fidan F, Celikkanat S. Nasal packing and transseptal suturing techniques: surgical and anaesthetic perspectives. Eur Arch Otorhinolaryngol. 2011;268(8):1151-6.[Crossref] [PubMed]
12. Ciftci Z, Kurc MA, Kaya AD, Varol Saracoglu G, Deniz M, Gultekin E. Do we really need to coat the novel silicone intranasal splints with antibiotics? Am J Otolaryngol. 2016;37(5):447-51.[Crossref] [PubMed]
13. Yilmaz MS, Guven M, Buyukarslan DG, Kaymaz R, Erkorkmaz U. Do silicone nasal septal splints with integral airway reduce postoperative eustachian tube dysfunction? Otolaryngol Head Neck Surg. 2012;146(1):141-5.[Crossref] [PubMed]
14. Colclasure JB, Graham SS. Support of unstable nasal fractures with silicone rubber wedge splints. Arch Otolaryngol. 1985;111(7):443-5.[Crossref] [PubMed]
15. Piatti G, Scotti A, Ambrosetti U. Nasal ciliary beat after insertion of septo-valvular splints. Otolaryngol Head Neck Surg. 2004;130(5):558-62. [Crossref] [PubMed]
16. Fairbanks DN. Complications of nasal packing. Otolaryngol Head Neck Surg. 1986;94(3):412-5.[Crossref] [PubMed]
17. Lubianca-Neto JF, Sant'anna GD, Mauri M, Arrarte JL, Brinckmann CA. Evaluation of time of nasal packing after nasal surgery: a randomized trial. Otolaryngol Head Neck Surg. 2000;122(6):899-901.[Crossref] [PubMed]