



Comparing Efficacy of Surgicel® Application with Nasal Packing in Epistaxis

Surgicel® kullanımının epistaksis kontrolünde nazal tampon ile karşılaştırılması

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Abstract

Aim: To evaluate the efficacy and tolerability of Surgicel® application with transseptal suturing in epistaxis.

Methods: Thirty-four patients who underwent therapy for epistaxis from Kiesselbach's area, between January 2015 and August 2016, were retrospectively analyzed. As a treatment modality, anterior nasal packing (Merocel® tampon with airway) was inserted to 18 patients, and transseptal suturing combined with the Surgicel® application was performed in 16 patients. The pain experienced during the procedure and compliance of the patients was evaluated using the NRS-11 morbidity scale that was administered during the control visits.

Results: No significant difference was identified between the two groups regarding the efficacy of bleeding control. Transseptal suturing combined with the Surgicel® application was tolerated better and had lower morbidity compared to nasal packing.

Conclusion: This study showed that transseptal suturing with the Surgicel® application is an effective and well-tolerated procedure in the treatment of anterior epistaxis.

Keywords: Nasal packing, epistaxis, nasal bleeding.

Öz

Amaç: Transseptal sutureasyon ile Surgicel® tatbikinin burun kanamasındaki etkinliğinin ve tolere edilebilirliğinin belirlenmesi.

Metod: Ocak 2015 ile Ağustos 2016 tarihleri arasında Kiesselbach bölgesinden kanaması tespit edilen ve tedavi edilen hastalar retrospektif olarak tarandı. Tedavide anterior nazal tampon (Merocel®) uygulanmış 18 hasta, transseptal sutureasyon ile Surgicel® tatbiki yapılmış olan 16 hasta çalışmaya dahil edildi. Hastaların kontrol ziyaretlerinde NRS-11 morbidite skalası kullanılarak elde edilmiş olan veriler, kişinin tecrübe ettiği ağrı ve yapılan işleme gösterdiği uyumu kıyaslamada kullanıldı.

Bulgular: İki grup arasında kanama rekürrensi açısından istatistiksel olarak anlamlı fark bulunmadı. Transseptal sutureasyon ile Surgicel® tatbikinin nazal tampona kıyasla daha iyi tolere edildiği ve düşük morbiditeye sahip olduğu görüldü.

Sonuç: Anterior epistaksiste transseptal sutureasyon ile Surgicel® tatbikinin etkili ve iyi tolere edilebilir alternatif bir prosedür olduğu görüldü.

Anahtar kelimeler: Nazal tampon, epistaksis, burun kanaması.

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Ethics Committee Approval: The study was approved by the local ethical authority.

Etik Kurul Onayı: Çalışma lokal etik komite tarafından onaylanmıştır.

Conflict of Interest: No conflict of interest was declared by the authors.

Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Financial Disclosure: The authors declared that this study has received no financial support.

Finansal Destek: Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

Geliş Tarihi / Received: 03.12.2018

Kabul Tarihi / Accepted: 04.01.2019

Yayın Tarihi / Published: 15.03.2019

This study was presented at the 13th International Otorhinolaryngology-Head and Neck Surgery Congress, 5-7 April, 2018, Ankara, Turkey.

Bu çalışma 5-7 Nisan 2018'de Ankara, Türkiye'de düzenlenen 13. Uluslararası Kulak Burun Boğaz ve Baş-Boyun Cerrahisi Kongresi'nde sunulmuştur.

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Introduction

Epistaxis is one of the most common otolaryngologic emergencies. Epistaxis affects up to 60% of the population in their lifetime, and 6% of these cases require additional therapies [1-5]. The optimal treatment option for epistaxis should provide bleeding control with minimal pain. The patient should be allowed to return to their daily routine in a short time and the treatment should be well tolerated [5]. Localization of the bleeding focus and cauterization is normally sufficient in most cases with anterior nasal bleeding [6-12]. In clinical practice, anterior nasal packing is indicated in cases when heavy bleeding interferes with the localization of the bleeding focus, or where chemical cauterization fails to achieve control, as well as in cases with traumatic anterior epistaxis [13-15].

Currently, various advanced local hemostatic agents are used in addition to conventional surgical bleeding control methods, including oxidized cellulose (Surgicel[®]). Surgicel[®] is applied in one or two layers, absorbing water from the application site and expanding to produce an artificial clot from forming cellulosic acid. It forms a gel upon contact with blood. Although the action mechanism has not yet completely understood, it produces a plug-like layer that stops the bleeding when it becomes hydrated on the surface of hemorrhagic vascular structures. Histological studies have shown that Surgicel[®] produces no inflammatory response other than connective tissue proliferation [16-19].

Transseptal suturing is commonly performed during septoplasty procedures to achieve hemostasis, and while some surgeons prefer to combine Surgicel[®] application with transseptal suturing in septoplasty procedures, there are limited studies into the combined use of these two methods in the treatment of anterior epistaxis [20-22]. It is known that Surgicel[®] application has been combined with transseptal suturing to control epistaxis, similar to that seen in septoplasty procedures. There are insufficient numbers of studies that compare the technique used in the present study, in which transseptal suturing and the Surgicel[®] application was combined with anterior nasal packing.

We perform this study to identify the efficacy and tolerability of Surgicel[®] application with transseptal suturing, and compare it with anterior nasal packing treatment.

Material and methods

This was a retrospectively designed observational study. The study was approved by the local ethics committee (Hacettepe University, GO17/127-37), and the study protocol adhered to the tenets of the Declaration at Helsinki. Written consent could not be taken due to the retrospective design of the study.

Fifty-eight patients who were admitted to the Department of Otorhinolaryngology at Hacettepe University between January 2015 and August 2016 with epistaxis (patients presenting to the department after the admission to the emergency room, and applied to the outpatient clinics directly) were evaluated. The medical charts of the patients were reviewed retrospectively, based on which, 49 patients with localized bleeding from the Kiesselbach's area on initial examination with anterior rhinoscopy. However, patients with postoperative bleeding, epistaxis related to a tumor, patients below the age of 18, pregnant women, patients with hereditary hemorrhagic telangiectasia, patients with nasal bleeding secondary to

anticoagulant use, and patients with inaccessible medical data were excluded. Therefore, a total of 34 patients that met these criteria were evaluated in this study.

Thirty-four patients were treated with nasal packing only (Group A) and Surgicel[®] application with transseptal suturing (Group B) were included in this study. Patients with nasal bleeding secondary to hypertension, and posttraumatic epistaxis were included also.

The control visit records (3, 5 and 14 days) of the patients that underwent treatment for epistaxis were reviewed to evaluate the recurrence status/efficacy of treatment, any complaints related to the treatment, and possible morbidities. In the control visits, if recurrent bleeding occurred recurrent bipolar cauterization and/or chemical cauterizations with silver nitrate sticks was performed to make coagulation and to control bleeding. In addition, a morbidity test (a numerical rating scale to assess self-reported pain intensity [NRS-11]) performed during the control visits was evaluated in the scope of this study [4].

Techniques used in anterior nasal packing (Group A)

One ml adrenalin and 1ml 10% lidocaine-impregnated swabs were placed in each patient's nasal cavity to achieve analgesia and decongestion for 5 minutes. A standard 8 cm-long Merocel nasal pack[®] (Medtronic, Turkey) was used for anterior nasal packing and the length of Merocel nasal pack[®] was reduced in some cases when required i.e. patients with posterior deviation. Anterior nasal pack was inserted via anterior rhinoscopy in the epistaxis side. Prophylactic antibiotics (amoxicillin/clavulanate 1000/125mg twice daily) were prescribed to all patients treated with nasal packing. The patients were asked to attend routine control visits to remove the nasal packing at 72 hours after the initial intervention. A second control visit was made five days after the initial intervention. Morbidity was evaluated using a patient-reported questionnaire about the level of pain during treatment on a scale of 0 to 10 (NRS-11), and the severity of most common complaints in the first two weeks rated on a scale of 0 to 5.

Techniques used in Surgicel[®] application with transseptal sturing (Group B)

1ml adrenalin, and 1ml 10% lidocaine-impregnated swabs, as topical anesthesia, were placed in each patient's nasal cavity to achieve analgesia and decongestion for 5 minutes. Then, 4 mL of lidocaine HCl 20 mg/ml and epinephrin 0.0125 mg/mL (Jetokain[®]) was injected bilaterally into the septal mucosa using a 27 G needle, in addition to topical anesthesia. After the placement of two layers of Surgicel[®] (Ethicon, Somerville, USA) into the anterior nasal mucosa, 4-0 coated VICRYL rapide suture[®] (Ethicon, Somerville, USA) were placed around the bleeding focus via primary suture, 3 times passing through the Surgicel[®] and septum. Bilateral Surgicel[®] was applied simultaneously to the patients with bilateral epistaxis. No antibiotics were administered for prophylaxis. The patients were asked to attend routine control visits for evaluations of the early outcomes of Surgicel[®] application with transseptal suturing at 72 hours after the initial intervention. A second control visit was made five days after the initial intervention. Morbidity was evaluated using a patient-reported questionnaire about the level of pain during treatment on a scale of 0 to 10 (NRS-11), and the severity of most common complaints in the first two weeks rated on a scale of 0 to 5.

Statistical Analysis

Major outcome was regarded as comparison of Surgicel[®] application with transseptal suturing with nasal packing regarding epistaxis recurrence rates (efficacy of

treatment), and the resulting morbidities including pain, headache, respiratory distress, epiphora, nasal congestion, and minor bleeding.

Statistical analysis was carried out using SPSS version 22.0 (SPSS Inc. Chicago, IL, USA) software. For the comparison of normally distributed numeric variable's independent groups Student-T test was used, to compare not normally distributed variables we used Man Whitney U- test and for the comparison of categorical data Chi Square test was used.

Table 1. Demographic features of the patients.

Variable	Group A (n=18)	Group B (n=16)	P
Male [‡]	14 (77.8%)	11 (68.8%)	0.700
Age (year) [§]	60.5 (26-76)	64 (16-79)	0.640
Hypertension [‡]	11 (61.1%)	10 (62.5%)	0.930

‡: n (%), §: mean ± standard deviation, ¶: median (min-max)

Table 2. Pain scores and recurrent bleeding comparison between both treatment options.

	STS	ANP	p
Number of patients	16	18	
Mean NRS-11 score at initial treatment	3.06 ± 1.28	5.01±1.02	0.001
Percentage of major recurrent nasal bleeding (n)	0%	22.2% (3)	0.105
Percentage of minor recurrent nasal bleeding (n)	38.9% (7)	50% (8)	0.510

(STS: Surgicel® application with transseptal suture, ANP: anterior nasal packing)

Results

Thirty four patients were included in the study; 25 male patients, 9 female patients were evaluated, mean age was 58±14 years, and the incidence of hypertension was 62%. Eighteen patients were treated with anterior nasal packing (Group A), 16 patients were treated by Surgicel® application with transseptal suturing (Group B). Patient demographics in these two groups are shown in Table 1.

In this follow up period, no recurrent bleeding occurred within the patients treated by Surgicel® application with transseptal suturing, although eight patients experienced minor bleeding that resolved itself spontaneously (50%). Of the 18 patients who were treated with anterior nasal packing, seven of them (39%) experienced minor bleeding that resolved spontaneously, and four patients (22.2%) experienced recurrent nasal bleeding (Table 2). Four patients were admitted to the emergency outpatient clinic due to recurrent nasal bleeding within 24 hours of the removal of the anterior nasal tampon, and bipolar cauterization (one patient) and chemical cauterizations with silver nitrate sticks (three patients) was performed on this patient. This intervention needed recurrent bleedings were admitted as major bleedings (Table 2). The recurrence rate for epistaxis was slightly higher in patients who were treated with anterior nasal packing when compared to the patients treated with Surgicel® application with transseptal suturing.

According to the NRS-11 scale evaluation performed at patients' first control visit, all the patients in both procedure groups had pain complaint. According to NRS-11, the mean level of pain during the procedure was significantly higher in the anterior nasal tampon group and this difference was statistically significant (p=0.001) (Table 2). When the morbidities of each procedure in the first three days after treatment were compared, the anterior nasal tampon was significantly more discomforting, while Surgicel® application with transseptal suturing was tolerated better regarding nasal congestion, epiphora, breathing

difficulty, headache/pain, and these were statistically significant (p=0.001) (Table 3).

Table 3. Level of discomfort, according to treatment options was measured with NRS-11 at control visits after 72 hours of treatment.

Median score at NRS-11	Group A [§]	Group B [§]	p
Pain/headache	3 (2-5)	0 (0-2)	0.001
Respiratory distress	2 (0-5)	0 (0-0)	0.002
Epiphora	2 (0-4)	0 (0-0)	0.002
Nasal congestion	3 (1-5)	0 (0-0)	0.003

§: median (min-max)

Discussion

Most patients with anterior epistaxis are treated successfully with silver nitrate cauterization or anterior nasal packing. In most instances, the focus of bleeding is detectable in an anterior rhinoscopy and allows cauterization via silver nitrate application [23]. There are studies supporting the success of silver nitrate cauterization when the bleeding focus is detected [2, 8-10, 24], although silver nitrate application cannot be recommended in all cases with anterior nasal bleeding [23]. Heavy nasal bleeding and bleeding from an extensive area may not allow silver nitrate cauterization, and so other treatment options should be considered. Nasal packing is commonly used in the treatment of nasal bleeding, as a considerably effective and simple treatment method. Its ready availability and short application time have rendered this option the first file therapy; however, nasal packing could be uncomfortable and may lead to various complications and side effects [25, 26]. Some complications, such as Eustachian tube dysfunction during application, epiphora, pain and vasovagal reactions are mild and self-limiting, whereas devastating complications may also occur, such as sinusitis, orbital infections, toxic shock syndrome, infective endocarditis, septal abscess, inferior concha and nasal alar necrosis. More importantly, nasal packing has been shown to impair cardiovascular functions and may cause hypoxia, hypercapnia and bradycardia [27]. No complications occurred related to anterior nasal packing in our study patients, although the level of discomfort was higher in the nasal packing group, and the difference was statistically significant. The reported failure rates for nasal packing are as high as 52%, and recurrent nasal bleeding reaches a rate of 70% in patients with bleeding disorders [25]. In the patients in the present study, the rate of recurrent nasal bleeding with anterior nasal packing was 22.2 percent within a two-week follow-up period, and this low rate of recurrence can be attributed to the short follow-up period and bias in the patient randomization. No recurrence was observed in patients who were treated with transseptal suturing combined with the Surgicel® application. It can be assumed that; additional to transseptal suturing, the efficacy of Surgicel® is an additive affect for maintaining the hemostasis and as discussed previously in the literature due to this cumulative affect [28], no recurrent bleeding was observed in this group.

In recent years, various hemostatic agents have been used in the treatment of nasal bleeding. For example, Surgicel® (oxidized regenerated cellulose) and FloSeal have seen success in promoting clot stabilization [19, 29, 30]. Hemostatic agents alone are effective in only 65% patients with epistaxis [12]. The present study evaluated transseptal suturing combined with the Surgicel® application as an alternative to nasal packing in the treatment of anterior epistaxis, and this study noted a success rate of 85% and no recurrence during the follow-up. Even though these results are found statistically insignificant, this may be due

to our low number of patients. Further studies conducted with larger patient groups may give more reliable results regarding this subject. The use of sutures in the Little's area and the use of a transseptal suturing technique have been covered in two previous studies [22, 31], and in both, a suturing technique was used in cases where nasal packing and/or bipolar cauterization failed to achieve control. This technique can be used in patients with bilateral epistaxis, as bilateral cauterization is associated with the risk of septal perforation.

In our study, we combined transseptal sutures with the application of Surgicel®. Therefore, it is impossible to evaluate the individual contributions of these techniques to hemostasis. Further studies regarding this subject may be designed to compare these techniques, where some patients are treated with transseptal suturing or Surgicel® application only, making the comparison possible.

The procedural pain was significantly less common in the transseptal suturing group, which may be attributed to the administration of infiltration anesthesia in addition to topical anesthesia before suturing. Patients' complaints related to the therapy were significantly lower when compared to the nasal packing group. On the other hand, we should highlight that, this method has some notable disadvantages, being more time consuming and the requirement for local anesthetic infiltration and expertise.

One of the biggest limitations of this study is patient numbers that are involved in the study. Our study can be improved with bigger patient numbers in treatment groups. Also, we have used the NRS-11 scale to determine the pain levels, but more effective visual analog scales are described in the literature, and these can be used to get more reliable results for evaluating the morbidity of the procedures.

In conclusion, the optimal treatment option for epistaxis should provide bleeding control with minimal morbidity. Surgicel® application with transseptal suturing could be considered an alternative treatment for nasal packing, in cases of anterior septal epistaxis. Transseptal suturing combined with the Surgicel® application was tolerated better and had lower morbidity compared to nasal packing. We recommend the use of this technique in patients with bleeding from a wide area, patients with bilateral anterior septal nasal bleeding, those with traumatic anterior bleeding and in cases in which chemical cauterization has failed to achieve success.

References

- Pallin D, Chng Y, McKay M, Emond J, Pelletier A, Camargo C. Epidemiology of epistaxis in US emergency departments 1992 to 2001. *Ann Emerg Med*. 2005;46:77-81.
- Whichweg T, Roberson J, Hudson J. Epistaxis: diagnosis and treatment. *J Oral Maxillofac Surg*. 2006; 64:511-8.
- Ha J, Hodge J, Lewis R. Comparison of nasendoscopic-assisted cautery versus packing for the treatment of epistaxis. *ANZ J Surg*. 2011;81:336-9.
- Bahreini M, Jalili M, Morafi-Lakeh M. A comparison of three self-reported pain scales in adults with acute pain. *J Pain*. 2013;14:1653-62.
- Duncan I, Fourie P, Ic Grange C, Van der Walt H. Endovascular treatment of intractable epistaxis results of a 4 year local audit. *S Afr Med J*. 2004;94:373-8.
- McGarry G, Moulton C. The first aid management of epistaxis by accident and emergency department staff. *Arc of Emerg Med*. 1993;10:290-300.
- Farneti P, Pasquini E, Sciarretta V, Macri G, Gramellini G, Pirodda A. Comparison of Local Sclerotherapy With Lauromacrogol Versus Nasal Packing in the Treatment of Anterior Epistaxis. *Clin Exp Otorhinolaryngol*. 2016; 9:131-5.
- Kucik CJ, Clenney T. Management of epistaxis. *Am Fam Physician*. 2005;71:305-11.
- Morgan DJ, Kellerman R. Epistaxis: evaluation and treatment. *Prim Care*. 2014;41:63-73.
- Toner JG, Walby AP. Comparison of electro and chemical cautery in the treatment of anterior epistaxis. *J Laryngol Otol*. 1990;104:617-8.
- Stangerup SE, Dommerby H, Lau T. Hot water irrigation as a treatment of posterior epistaxis? *Rhinology*. 1996;34:18-20.
- Meric A, Korkut AY, Kahya V, Gedikli O. Prospective, randomized, controlled clinical trial of Ankaferd Blood Stopper in patients with acute anterior epistaxis. *Eur Arch Otorhinolaryngol*. 2010; 267:1377-81.
- Certal V, Silva H, Santos T, Correia A, Carvalho C. Trans-septal suturing technique in septoplasty: a systematic review and meta-analysis. *Rhinology*. 2012;50:236-45.
- Zayyan E, Bajin MD, Aytemir K, Yilmaz T. The effects on cardiac functions and arterial blood gases of totally occluding nasal packs and nasal packs with airway. *Laryngoscope*. 2010;120:2325-30.
- Dubin MR, Pletcher SD. Postoperative packing after septoplasty: is it necessary? *Otolaryngol Clin North Am*. 2009;42:279-85.
- Al-Shaikh S, Muddaiah A, Lee RJ, Bhutta MF. Oxidised cellulose powder for haemostasis following sinus surgery: a pilot randomised trial. *J Laryngol Otol*. 2014;128:709-13.
- Valentine R, Wormald PJ, Sindwani R. Advances in absorbable biomaterials and nasal packing. *Otolaryngol Clin North Am*. 2009;42:813-28.
- Lewis KM, Spazierer D, Urban MD, Lin L, Redl H, Goppelt A. Comparison of regenerated and non-regenerated oxidized cellulose hemostatic agents. *Eur Surg*. 2013;45:213-20.
- Bhatnagar RK, Berry S. Selective Surgicel® packing for the treatment of posterior epistaxis. *Ear Nose Throat J*. 2004;83:633-4.
- Günaydin RÖ, Aygenc E, Karakullukcu S, Fidan F, Celikkanat S. Nasal packing and transseptal suturing techniques: surgical and anaesthetic perspectives. *Eur Arch Otorhinolaryngol*. 2011;268:1151-6.
- Certal V, Silva H, Santos T, Correia A, Carvalho C. Trans-septal suturing technique in septoplasty: a systematic review and meta-analysis. *Rhinology*. 2012;50:236-45.
- Wysocki J, Niszczota CS. Use of trans-septal mattress suture of Little's area for anterior epistaxis. *J Laryngol Otol*. 2011;125:399-401.
- Newton E, Lasso A, Petrcich W, Kilty S.J. An outcomes analysis of anterior epistaxis management in the emergency department. *J Otolaryngol Head Neck Surg*. 2016;45:24.
- Gallo S, Moi R, Minni A, Simonelli M, DeVincentiis M. Otorhinolaryngology emergency unitcare: the experience of a large university hospital in Italy. *ENT J*. 2000;79: 155-60.
- Traboulsi H, Alam E, Hadi U. Changing Trends in the Management of Epistaxis. *Int J Otolaryngol*. 2015; 2015:263987.
- Hady MR, Kodeira KZ, Nasef AH. The effect of nasal packing on arterial blood gases and acid-base balance and its clinical importance. *J Laryngol Otol*. 1983;97:599-604.
- Schaitkin B, Strauss M, Houck J R. Epistaxis: medical versus surgical therapy: a comparison of efficacy, complications, and economic considerations. *Laryngoscope*. 1987;97:1392-96.
- Aslan G, Güvenç MG, Sapçi T, Candan S. Use of nasal bivalve septal teflon splint for the treatment of recurrent epistaxis in patients undergoing anticoagulant therapy. *Rhinology*. 2009;47:141-3.
- Huggins S. Control of hemorrhage in otorhinolaryngologic surgery with oxidized regenerated cellulose. *Eye Ear Nose Throat Mon*. 1969;48:420-3.
- Mathiasen RA, Cruz RM. Prospective, randomized, controlled clinical trial of a novel matrix hemostatic sealant in patients with acute anterior epistaxis. *Laryngoscope*. 2005;115: 899-902.
- ZhengHua Z, Gang F, BingWei Z, JiaWen C. Suturing of Little's area of the nasal septum for epistaxis. *J Laryngol Otol*. 2009;123:787-8.