Original Article

A Comparative Study of Gloved Versus Ungloved Merocel® as Nasal Pack after Septoplasty

J Kaur, M Singh, I Kaur, A Singh[1], S Goyal[2]

Department of ENT, GMC, [2]CHC, Patiala, Punjab, [1]Depatrment of ENT, GMCH, Chandigarh, India

Abstract

Introduction: Septoplasty or septal reconstruction is a corrective surgical procedure performed to straighten the nasal septum. It may be associated with numerous complications. To minimize these complications, both nasal cavities are frequently packed with different types of nasal packing. **Materials and Methods:** This prospective, observational, and comparative study was undertaken in the Department of ENT, Rajindra Hospital, Patiala, Punjab, India. A total of sixty patients fulfilling the inclusion criteria participated in the study. They were divided into two groups, Groups A and B. After septoplasty, the nasal cavity was packed with gloved Merocel® in Group A and ungloved Merocel® in control group (Group B). The efficacy and patient tolerance for both nasal packings were compared and assessed. The data collected were compiled and analyzed statistically. **Results:** In our study, it was demonstrated that gloved Merocel® produces less pain during pack insertion (P = 0.001) and produces less pain while insertion of pack *in situ* (P = 0.001) and during pack removal (P = 0.001). Saccharin transit time (STT) returned back to normal in gloved Merocel® group (P = 0.001) in most of patients (27) by the 2nd week, whereas STT in ungloved Merocel® group returned back to normal by the 4th week postoperatively. The differences in impairment in STT between the two groups were found to be statistically significant. There was no statistical significance between both groups for other parameters. **Conclusion:** Gloved Merocel® may be preferred over ungloved Merocel® as nasal packing following septoplasty since both types of packs had similar hemostatic, adhesion prevention properties and similar incidence in postoperative complications and gloved Merocel® produces less pain during its insertion, while it is *in situ*, during its removal with early recovery of nasal mucociliary clearance mechanism of nose.

Keywords: *Merocel®, nasal packing, septoplasty*

Date of Acceptance:
02-May-2018

Introduction

Nasal packs are widely used in the otorhinolaryngology practice, especially following nasal surgery and epistaxis. In addition to preventing nasal bleeding after nasal surgery, these packs have the potential to support the septal mucoperichondrial flaps and to minimize the risk of formation of septal hematomas and adhesions.[1] A number of different nasal packing materials are available for these purposes such as ribbon gauze with or without medication, absorbable biomaterials, telfa cellulose and foam, Merocel®, alginate, and nasal splints. The type of the nasal packing material used will depend on the preference and experience of the surgeon, the ease of insertion and removal, and–more importantly–any consideration of patient discomfort or pain, especially during removal. Ideally, nasal packs should be easy to insert and

Access this article online

Quick Response Code:

Website: www.njcponline.com

DOI: 10.4103/njcp.njcp_414_17

Address for correspondence: Dr. M Singh, Department of ENT, GMC, Patiala - 147 001, Punjab, India. E-mail: drmanjitsingh62@yahoo.com

How to cite this article: Kaur J, Singh M, Kaur I, Singh A, Goyal S. A comparative study of gloved versus ungloved merocel® as nasal pack after septoplasty. Niger J Clin Pract 2018;21:1391-5.

remove, with minimal discomfort, and they should also effectively prevent postoperative bleeding.[2,3] Postoperative pain is considered to be the most common morbidity associated with packings used in septoplasty. In addition, nasal pack may result in significant mucosal injury and loss of ciliary function. Many attempts, such as shortening the duration of packing and developing new packing material, have been made to minimize the morbidity associated with packing materials. The aim of this study was to investigate the effect of using Merocel® in glove finger over plain Merocel® as nasal pack after septoplasty.

Merocel® is the most popular commercial product and has a widespread use around the world. It is a kind of foam pack made of polyvinyl acetal and is packaged in a compressed, dehydrated state to allow ease of insertion. It requires rehydration with saline to activate it.[4] Merocel® has both solid and porous characteristics. The pore gets swollen, causes hemostasis, exerts equal pressure on both sides of septum, and keeps the septum straight following the surgery.[5,6] However, the most important disadvantage of plain Merocel® is the pain. This occurs during insertion of pack, while nasal pack is inside the nasal cavity, and during removal of the nasal pack.[7,8] It adheres to the bleeding site, incision site, and other raw areas over the septum. During its removal, the pack dislodges from the site of adherents, causing trauma. Trauma to the nasal mucosa, which results in altered mucociliary clearance, bleeding, increased crusting, inflammation, and synechia formation, was accounted when plain Merocel® was used.[4,7,9-11] These disadvantages may be overcome by using finger-gloved Merocel® instead of simple Merocel®.[7,9] The number of studies on the efficacy of Merocel® in glove finger during septoplasty is limited. This clinical trial was undertaken to compare the patients' tolerance and complications of the gloved and ungloved Merocel® packings after septoplasty. This study also compared the efficacy (hemostatic and adhesion prevention effects) of both types of nasal packings and effect of both types of nasal packing on mucociliary clearance mechanism of the nose.

Materials and Methods

A total of sixty patients meeting inclusion criteria were selected as stated herein.

Inclusion criteria for the study were as follows:

1. Patients undergoing septoplasty for symptomatic deviated nasal septum in the age range of 18–60 years
2. Patients' willingness to participate in the study
3. Patients without any previous history of nasal surgery
4. Patients without any rhinosinusitis or systemic disorders.

In patients belonging to Group A, nasal packing was done with gloved Merocel® (Merocel® 8 cm) after septoplasty and, in Group B, packing was done with ungloved Merocel®.

Surgery was performed under local anesthesia. Nasal cavity was prepared by putting packs soaked in 4% xylocaine and 1% epinephrine 10 min prior to surgery. After administering local infiltration of 2% xylocaine with adrenaline (1 in 1,000,000), a slightly curvilinear incision was made 2 mm–3 mm above the caudal end of septal cartilage on the convex side. In case of caudal dislocation, a transfixion or hemitransfixion incision was made. Mucoperichondrial/mucoperiosteal flaps were raised. The septal cartilage was separated from the vomer and ethmoid plates and the mucoperiosteal flap was raised on the opposite side. Maxillary crest was removed to realign the septal cartilage. To correct the bony septum, the deformed parts were removed. Gloved or ungloved Merocel® packs were inserted. The gloved Merocel® pack was prepared by inserting Merocel® into a powder-free glove finger and then packing the nasal cavity. Absorption of blood and secretions by Merocel® was promoted by incising four or five regions of the glove fingers with a scalpel. The free end of the glove finger was sutured together with silk of 2.0 to prevent the escape of the tampon from the nasal passages. Ungloved Merocel® is a plain Merocel® packing. The pack was removed on the 5th postoperative day. All patients received antibiotics, analgesics, and antihistamines for 5–7 days postoperatively.

Pain during insertion, discomfort caused by pack *in situ*, and pain while removal of pack were assessed by Visual Analog Scale (VAS) numbered from 0 to 10 (0 represents the least pain and discomfort, whereas 10 means the maximum pain and discomfort). Bleeding during pack removal was graded as follows: 0, no bleeding; 1, mild bleeding (controlled spontaneously without any intervention); 2, moderate bleeding (controlled by the insertion of ephedrine-soaked cottonoids); and 3, severe bleeding (controlled by repacking).

The patients were followed up weekly for 4 weeks after surgery. At each follow-up visit, nasal endoscopy was performed to look for inflammation, crusting, adhesion, and septal perforation, and saccharin transit time (STT) was recorded to assess the mucociliary clearance of nose.

Crusting was graded as follows: 0, no crusting; 1, minimal crusting; and 2, gross crusting.

Adhesions were graded as follows: 0, no adhesion, 1, mild (easy to detach); 2, moderate (hard to detach); and 3, severe (need synechiolysis). Inflammation was

graded as 0, no congestion; 1, congestion; 2, ulceration; and 3, granulations.

Mucociliary clearance was measured by STT. The STT was graded from 0 to 3, with 0, <20 min (normal range); 1, 20–30 min (mild prolongation); 2, 30–60 min (moderate prolongation); and 3, >60 min (severe prolongation).

Statistical analysis

Data related to categorical and ordinal variables such as patient gender, pain during insertion of pack, postoperative discomfort, pain during removal of pack, postoperative bleeding, synechia formation, septal hematoma, crustings, infection/inflammation of nasal mucosa, septal perforation, and mucociliary clearance were expressed as frequency and percentage. All statistical analyses were carried out with 5% significance and $P < 0.05$ was considered statistically significant.

Results

In this study, the age of the patients was in the range of 18–60 years in both groups. Majority of the patients were in the age group of 18–25 years in both groups. The mean age of the gloved Merocel® group was 30.40 ± 11.23 years and that of the ungloved Merocel® group was 31.20 ± 12.86. The mean VAS score for pain during the pack insertion for gloved Merocel® was 5.93 ± 1.76 and that for ungloved Merocel® was 8.00 ± 1.29 [Table 1]. There was a statistically significant difference between both the packs ($P = 0.001$). The mean VAS score for pain during pack *in situ* for gloved Merocel® was 3.07 ± 0.91 and that for ungloved Merocel® was 6.17 ± 1.37 [Table 2]. There was a statistically significant difference between both the packs ($P = 0.001$).

The mean VAS score for pain during pack removal for gloved Merocel® was 3.23 ± 1.28 and that for ungloved Merocel® was 7.63 ± 1.16 [Table 3]. There was a statistically significant difference between both the packs ($P = 0.001$). Mild bleeding was observed in 11 patients during the pack removal in Group A. In Group B, 14 patients had mild bleeding on pack removal. There was no statistically significant difference between the two groups ($P = 0.441$). No statistically significant difference was found between the groups in terms of inflammation, crusting, or adhesions.

During the first postoperative visit, all patients in ungloved group showed severe prolongation of STT and, in gloved Merocel® group, 21 patients showed mild prolongation, 6 patients showed moderate prolongation, and 3 patients showed severe prolongation [Table 4]. The results were statistically significant.

Table 1: Pain during insertion

Postop discomfort	Mean±SD	Std. error mean	Mean difference	*t*-test	*P*	Sign
Group A	5.93+1.76	0.32	2.07+0.47	5.192	0.001	HS
Group B	8.00+1.29	0.24				

Table 2: Postop discomfort

Postop discomfort	Mean±SD	Std. error mean	Mean difference	*t*-test	*P*	Sign
Group A	3.07+0.91	0.17	3.10+0.66	10.351	0.001	HS
Group B	6.17+1.37	0.25				

Table 3: Pain during removal

Pain during removal	Mean±SD	Std. error mean	Mean difference	*t*-test	*P*	Sign
Group A	3.234±1.28	0.23	4.40±0.12	13.968	0.001	HS
Group B	7.634±1.16	0.21				

Table 4: Saccharine transit time

Saccharine transit time	Group A		Group B		χ^2	*P*	Sign
	n	Percentage	*n*	Percentage			
0	0	0	0	0	0.00	1.00	NS
1	21	70	0	0	25.30	0.005	S
2	6	20	0	0	6.50	0.012	S
3	3	10	30	100	9.02	0.003	S
Total	30	100	30	100	0.00	1.00	NS

Table 5: Saccharine transit time

Saccharine transit time	Group A		Group B		χ^2	*P*	Sign
	n	Percentage	*n*	Percentage			
0	27	90	0	0	8.01	0.005	S
1	0	0	3	10	2.77	0.096	NS
2	0	0	0	0	0.00	1.00	NS
3	3	10	27	90	6.92	0.009	S
Total	30	100	30	100	2.02	0.056	NS

In the gloved Merocel® group, STT returned to normal in 27 patients in the 2nd week [Table 5], whereas in ungloved Merocel® group, 27 patients had severe prolongation of STT. The result was statistically significant. In the gloved Merocel® group, 29 patients showed return of STT to normal levels by week 4. In the ungloved group, 27 patients had STT in normal range by week 4. The results were statistically insignificant in both groups ($P = 0.888$).

Discussion

Nasal packing following septoplasty was found to be important for maintaining septum and also in preventing postoperative bleeding and septal hematoma formation.[12] Various nasal packing materials were used in the past for prevention of postoperative complications.[13] Nasal

packing-related morbidity such as pain during insertion, pain while pack is *in situ*, pain accompanying pack removal, increased risk of synechia formation following packing, infection/inflammation, crusting, septal perforation, and damage to the nasal mucosa have been reported.[7,9,10,14-16] Most of the packing-related morbidity can be overcome by the use of Merocel®.[17,18]

Merocel® was introduced as a nonabsorbable nasal pack in 1981 because of the various advantages and ideal properties of it when used as a nasal pack. Merocel® nasal pack is on the market for >30 years. This prospective study was carried out on Merocel® because very few studies have been conducted on how to reduce the morbidities caused by Merocel® nasal packing.

Using gloved finger over the nasal pack had been tried previously and proved to be effective in reducing pack-related pain. However, to the best of our knowledge, the use of gloved finger Merocel® in septoplasty has been tried in very few studies.

The solid and porous characteristics of Merocel® not only help in better hemostasis, but also cause more pain during insertion of nasal pack, pain while pack is inside the nasal cavity, and pain during removal of the pack.

The mean VAS score was higher for ungloved Merocel® group for all the three parameters, that is, pain during insertion of pack, *in situ*, and during removal of pack. These findings support the fact that use of Merocel®, due to its potential to adhere to mucosal surfaces, leads to pain during its removal. Our study results indicate that the use of a glove finger for application of Merocel® packing significantly reduces pain during pack removal. We attribute this to less adherence of the glove finger to the structures inside the nose. A study by Celebi *et al*.[9] examining the effect of duration of Merocel® in glove finger on postoperative morbidity concluded that keeping Merocel® inside a glove finger in place for 48 h notably reduces pain occurring during removal and prevents synechiae, bleeding, and septal hematoma without compromising patient comfort. The study conducted by Kim *et al*.[19] also showed significant difference (P = 0.029) in mean VAS scores in terms of pack removal between the two groups.

In our study, mild bleeding was observed in 11 patients during pack removal in Group A. In Group B, 14 patients had mild bleeding on pack removal, suggesting that glove finger-coated Merocel® plays a role in avoiding friction between Merocel® and surgical wound on pack removal, which reduces mucosal damage or bleeding amount.

In our study, STT returned back to normal in gloved Merocel® group (P = 0.001) in most of patients in 2 weeks, whereas that in ungloved Merocel® group returned back to normal in 4 weeks postoperatively. This indicates reduced damage of mucosa due to glove finger coating of Merocel®. Studies on a rabbit model also showed that use of Merocel® alone leads to greater degree of damage, including shorter epithelium and loss of cilia than Merocel® in glove finger.[20]

Conclusion

Gloved Merocel® may be preferred over ungloved Merocel® as nasal packing following septoplasty as both types of packs have similar hemostatic and adhesion prevention properties and similar incidence in postoperative complications. Gloved Merocel® produces less pain during its insertion, while it is *in situ*, and during its removal with early recovery of nasal mucociliary clearance mechanism of the nose. Thus, glove finger Merocel® can be used as an excellent packing material.

A few studies[21,22] advocate that insertion of nasal packing or septal splinting following septoplasty should be reserved for patients with increased risk of postsurgical complications. Herein, it is important to note that these studies were undertaken with a wide variety of packing materials and are not relevant/significant to the clinical results of Merocel® nasal packing.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Ardehali MM, Bastaninejad S. Use of nasal packs and intranasal septal splints following septoplasty. Int J Oral Maxillofac Surg 2009;38:1022-4.
2. Ozcan C, Vayisoglu Y, Kiliç S, Görür K. Comparison of rapid rhino and Merocel® nasal packs in endonasal septal surgery. J Otolaryngol Head Neck Surg 2008;37:826-31.
3. Bresnihan M, Mehigan B, Curran A. An evaluation of Merocel® and series 5000 nasal packs in patients following nasal surgery: A prospective randomised trial. Clin Otolaryngol 2007;32:352-5.
4. Dag I, Acar M, Sakallioglu O, Catli T, San T, Cingi C, *et al.* Influence of surface properties of Merocel® (polyvinyl acetal) and silicone nasal splints on biofilm formation. Eur Arch Otorhinolaryngol 2014;271:1519-24.
5. Deniz M, Ciftçi Z, Işık A, Demirel OB, Gültekin E. The impact of different nasal packings on postoperative complications. Am J Otolaryngol 2014;35:554-7.
6. Akbari E, Philpott CM, Ostry AJ, Clark A, Javer AR. A double-blind randomised controlled trial of gloved versus ungloved Merocel® middle meatal spacers for endoscopic sinus surgery. Rhinology 2012;50:306-10.
7. McIntosh D, Cowin A, Adams D, Wormald PJ. The effect of an expandable polyvinyl acetate (Merocel®) pack on the healing of

the nasal mucosa of sheep. Am J Rhinol 2005;19:577-81.
8. Çelik Ö, Boyaci Z, Ateşpare A, Develioğlu O, Karaca Ç, Çaglar E, *et al.* The effect of duration of Merocel® in glove finger with tetracaine solution on septoplasty morbidity. J Craniofac Surg 2013;24:1931-4.
9. Celebi S, Caglar E, Develioglu ON, Topak M, Yalcin E, Kulekci M, *et al.* The effect of the duration of Merocel® in a glove finger on postoperative morbidity. J Craniofac Surg 2013;24:1232-4.
10. Becker DG. Surgical Management of Nasal Obstruction: Facial Plastic Surgery Perspective. Philadelphia (PA): Saunders; 2009. p. 240.
11. Chandra RK, Conley DB, Kern RC. The effect of FloSeal on mucosal healing after endoscopic sinus surgery: A comparison with thrombin-soaked gelatin foam. Am J Rhinol 2003;17:51-5.
12. Illum P, Grymer L, Hilberg O. Nasal packing after septoplasty. Clin Otolaryngol Allied Sci 1992;17:158-62.
13. Acıoğlu E, Edizer DT, Yiğit Ö, Onur F, Alkan Z. Nasal septal packing: Which one? Eur Arch Otorhinolaryngol 2012;269:1777-81.
14. Miller RS, Steward DL, Tami TA, Sillars MJ, Seiden AM, Shete M, *et al.* The clinical effects of hyaluronic acid ester nasal dressing (MeroGel®) on intranasal wound healing after functional endoscopic sinus surgery. Otolaryngol Head Neck Surg 2003;128:862-9.
15. Hesham A, Ghali A. Rapid rhino versus Merocel® nasal packs in septal surgery. J Laryngol Otol 2011;125:1244-6.
16. Garth RJ, Brightwell AP. A comparison of packing materials used in nasal surgery. J Laryngol Otol 1994;108:564-6.
17. Merocel®-What is Merocel® Material? Available from: http://www.merocel.com/what-is-merocel-material/index.htm. [Last accessed on 2015 Jun 01].
18. Wang YP, Wang MC, Chen YC, Leu YS, Lin HC, Lee KS, *et al.* The effects of Vaseline gauze strip, Merocel®, and Nasopore on the formation of synechiae and excessive granulation tissue in the middle meatus and the incidence of major postoperative bleeding after endoscopic sinus surgery. J Chin Med Assoc 2011;74:16-21.
19. Kim DW, Lee EJ, Kim SW, Jeon SY. Advantages of glove finger-coated polyvinyl acetate pack in endoscopic sinus surgery. Am J Rhinol Allergy 2012;26:e147-9.
20. Titiz A, Zeyrek T, Ozcan M, Sabuncuoglu B, Yilmaz YF, Unal A, *et al.* The effects of Merocel® and glove finger tampon applications on the nasal septum mucosa of rabbits. Rhinology 2008;46:112-5.
21. Kim JS, Kwon SH. Is nonabsorbable nasal packing after septoplasty essential? A meta-analysis. Laryngoscope 2017;127:1026-31.
22. Dubin MR, Pletcher SD. Postoperative packing after septoplasty: Is it necessary? Otolaryngol Clin North Am 2009;42:279-85, viii-ix.