

To Compare the Effects of Conventional Nasal Packing and Packing with Merocel and Merocel with Ventilation Tube after Septoplasty

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ABSTRACT

Aim: A study was undertaken to compare merocel pack and merocel pack with ventilation tube with conventional nasal packing after septoplasty.

Study Design: Prospective comparative interventional study.

Setting: Tertiary referral hospital.

Subjects & Methods: Study was conducted on 60 patients. They were randomly divided into three groups of 20 patients each. Group A underwent septoplasty with insertion of merocel packs with ventilation tube, Group B underwent septoplasty with insertion of merocel packs without ventilation tube and Group C underwent septoplasty with insertion of antibiotic soaked conventional nasal packs. Comparison of pain, postoperative discomfort, bleeding and other problems was made between the three groups.

Results: Mean pain score at 24 hours was significantly less in group B as compared to group C. Group A and C showed no significant difference. On comparing the bleeding while packs in situ there was no statistically significant difference in three groups. There was statistically significant difference between group A & C and group B & C in bleeding during pack removal. But there was no significant difference in bleeding between group A and B. There was no statistically significant difference in mean pain scores at the time of pack removal in group A and group B. But there was statistically significant difference between group A & C and group B & C.

Conclusion: Merocel packs provide good hemostasis and they are associated with lesser pain in postoperative period. Pack removal is less painful and it is associated with less bleeding.

Key Words: Septoplasty; Nasal packing; merocel; merocel with ventilation tube.

Conflict of Interest: Author Mamta, Author Raman Wadhwa, Author Narender Singh, Author Anju Ghai and Chandni Sharma declare that they have no conflict of interest.

Ethical approval: "All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards."

"This article does not contain any studies with animals performed by any of the authors."

INTRODUCTION

The nasal septum, though primarily a support structure of the nose, is also important in the nasal physiology. Septum divides nasal chambers into two cavities, lends shape and support to middle vault, aids regulation of airflow through nose and helps to support the columella and nasal tip.¹ Nasal septal deviation is a frequent finding in the general population occurring in over 20% of the population. In 25% of these individuals, the irregularity is significant enough to produce meaningful resistance to airflow.² Septoplasty is one of the most common operations in otorhinolaryngology, alone or in combination with other procedures such as inferior turbino-plasty, endoscopic sinus surgery and rhinoplasty. Nasal packing is performed as a routine by many surgeons following nasal surgery. It is used primarily to control bleeding. It is also used for internal stabilization following operation on the cartilaginous/bony skeleton of the nose.³

The ideal nasal packs should be⁴(a) non-toxic(b) non allergenic(c) inert (no foreign body reactions)(d) non dislocating(e) easily placed(f) easily removed(g) painless (patient comfort).

Nasal packs (a)Apply pressure(b) Fill preformed spaces(c) Create moist environments to facilitate physiological processes (i.e. by occlusion)(d)Function as a barrierInduce physiological hemostatic and reparative processes
There are two main classes of nasal packs (a) Formed nasal packs and (b) The new generation of hemostatic/resorbable/ biodegradable packs (HT).⁴

AIMS AND OBJECTIVES

- (a) To evaluate the role of Merocel packs with ventilation tube.
- (b) To compare the results of Merocel packs and Merocel packs with ventilation tube with conventional nasal packing.

OBSERVATIONS

MATERIAL AND METHODS

Study was conducted on 60 patients in the age group of 18-50 years after obtaining their informed consent. The patients were randomly divided into three groups of 20 patients each. Group A (n=20) underwent septoplasty with insertion of Merocel packs with ventilation tube (8cmx1.5cmx3cm) on both sides, Group B (n=20) underwent septoplasty with insertion of Merocel packs without ventilation tube (8cmx1.5cmx2cm) on both sides and Group C (n=20) underwent septoplasty with insertion of antibiotic soaked conventional nasal packs in both nasal cavities.

INCLUSION CRITERIA:

Nasal septal deviation with nasal obstruction.

EXCLUSION CRITERIA:

Patients with features of sinusitis acute or chronic, patients with bleeding disorders, nasal polyps or any other nasal mass, history of previous septal surgery, any skin disease of external nasal pyramid.

Measurement of pain⁵ Patients were assessed for pain using VAS (Visual Analogue Scale). They were asked to determine the degree of pain and discomfort using a score of 1 to 10 depending on pain severity, where 0=no pain and 10= the most severe pain imaginable) after 24 hours, 48 hours and during pack removal.

Assessment of bleeding during 48 hours⁶ In all the three groups, patients were provided with cotton balls to clean the blood tinged soakage and were asked to keep these cotton balls for quantification. Each cotton ball was roughly the size of an average sized walnut.

Collected data were entered in MS Excel spreadsheet, coded appropriately and later cleaned for any possible errors. Analysis was carried out using SPSS (Statistical Package for Social Studies) for Windows version 17.0. Categorical data were presented as percentages (%). Pearson's chi square test was used to evaluate differences between groups for categorical variables. Normally distributed data were presented as means. One way ANOVA for independent samples was used for comparison between three different intervention groups. All the tests were performed at a 5% level of significance, thus an association was significant if p value was less than 0.05.

OBSERVATIONS

Age of the patients was in the range of 18 -50 years. Mean age in group A was 21.15 years, in group B was 22.30 years and in group C was 22.90 years which was comparable.

It was observed that maximum number of patients were in the younger age group (upto 25years), 85% in group A, 90% in group B and 75% patients in group C. There were 85% males and 15% females in group A, 90% males and 10% females in group B & 95% males and 5% females in group C.

All 60 patients (100%) had history of nasal obstruction, unilateral or bilateral.

On anterior rhinoscopy, septal deviation was in cartilaginous part in 65%, in bony part in 6.66% of total cases (n=60). Deviation in both cartilaginous and bony parts was seen in 28.3% of total cases.

At 24 hours and at 48 hours , the mean score for perception of pain was found to be 1.9 and 0.7 in group A respectively, 1.05 and 0.5 in group B while in group C the mean pain scores were 2.2 and 0.65 respectively (Table 1). At 24 hours, on comparing the pain scores statistically, group A and C showed no significant difference ($p=1.00$) but there was significant difference between group B and C ($p=0.008$). There was no significant difference between group A and B ($p=0.07$). At 48 hours, there was no statistically significant difference amongst three groups ($p=1.00$).

In group A, total number of cotton balls used were 42, in group B, 40 and in group C, 50 cotton balls were used. Their means were 2.1, 2 and 2.5 respectively (Table 2). On comparing the values statistically, group A and B, group A and C and group B and C showed no significant difference as the p values were 6.63, 2.71 and 6.63.

Slight swelling over face and nose in the postoperative period was present in 20% patients of group A and 50% patients of group C, but there was no swelling in patients of group B. On comparing group A and B, $p=0.035$, group A and C, $p=0.043$ and Group B and C, $p=0.000$, thus showing statistically significant difference among three groups.

In group A, 35% patients complained of watering of eyes while 20% patients in group B and 70% patients in group C complained of watering of eyes respectively. On comparing group A with group B, $p=0.288$, showing no statistically significant difference but on comparing group A with C, $p=0.027$ and group B with C, $p=0.001$, there was statistically significant difference.

In group B and group C, all patients (100%) were having difficulty during feeding while in group A, no patient had feeding difficulty in first 48 hours ($p=0.000$) showing statistically significant difference.

In Group B and C, all patients had blocked nose and there was no nasal breathing but in group A, patients were comfortable with presence of nasal breathing due to ventilation tube. There was statistically significant difference among three groups ($p=0.000$).

Packs were removed after 48 hours and nasal bleeding was assessed. (Table 3). No patient in any group required a local procedure or repacking. On comparing group A and B, there was no significant difference in any category. But there was statistically significant difference between group A & C and group B & C.

The mean pain scores at the time of pack removal in group A, group B and group C were 3.75, 3.6 and 4.65 respectively (Table 4). On comparing statistically group A and group B ($p=0.670$) showed no statistically significant difference but group A and C, ($p=0.000$) and group B and group C ($p=0.000$) showed statistically significant difference.

The mean pain scores at one week were 0.3 in group A, 0.25 in group B and 0.45 in group C. On comparing different groups there was no significant difference ($p=1.00$). At first follow up no patients in any group had complaint of nasal bleeding. No patient had vestibulitis. No patient of any group had septal hematoma and ulceration. In group A and B no patient had crust formation at first week. 30% patients had crust formation in the nasal cavities in group C. On comparing three groups, this difference was statistically significant with $p=0.001$.

At 4 weeks, statistically significant difference was observed among the 3 groups with regard to intranasal adhesions (synechiae) formation. In group C, 15% patients developed intranasal adhesions (synechiae) formation and they complained of nasal obstruction. In group B and C no patient had intranasal adhesions ($p=0.043$).

At 4 weeks, residual deformity was found to be present in one patient each in group A and B while in group C, 3 patients had residual deformity. There was no statistically significant difference ($p=0.418$). No patient of any group had septal perforation and crust formation at 4 weeks follow up.

All the patients in group A, group B and group C had a positive nasal patency test except 3 patients in group C who had reduced nasal patency (due to synechiae formation). Adhesions were released leading to restoration of normal breathing. Nasal patency test was done by cotton wool/spatula.

DISCUSSION

Nasal septal deviation is a frequent finding in the general population.² The major symptom of septal deviation is nasal obstruction.⁷ Surgical correction of this problem called septoplasty, is one of the most common operations in otorhinolaryngology, alone or in combination with other procedures such as inferior turbinoplasty, functional endoscopic sinus surgery and rhinoplasty.³

Anterior nasal packing is kept in nasal cavity mostly for 48 hours. In the postoperative period with packing, in addition to the adverse effects like nasal discharge, fullness and tightness sensation in nose, cardiovascular changes, hypoxia, infection, toxic shock syndrome.⁸ To lessen these adverse effects partially and/or to eliminate completely, there are a variety of materials used for nasal packing, starting from conventional gauze pack (lubricated with paraffin or antiseptic cream) and bismuth iodoform paraffin paste pack, nasal tampon (merocel) or some absorbable materials like oxicell or surgicell, glove finger, fibrin glue, pneumatic balloons, quilting suture have been used.⁹

Merocel standard nasal packing made by MedtronicXomed: These are available as with and without ventilation tube and in several models: merocel without string, merocel with string, merocelhemoX, merocel 2000 with string, merocel without string with airway, merocel with string with airway, merocelhemoX with airway, merocel 2000 with string with airway. Sizes available are: 4.5cm x1.5cm x2cm and 8cm x1.5cm x2cm and 10cm x1.5cm x2cm. 8 cm size is ideally suited for anterior nasal packing. 10 cm pack is used for both anterior and posterior nasal packing. 8 cm size was used in our study. The original formula in it is hydroxylated polyvinyl acetate sponge.

Several other types of merocel packs are now available e.g.

- (a) Merocel Baron Sinus-Pak: available in size 2.5x2cm with difference of width (1.2, 0.9 and 0.6cm) to accommodate various nasal anatomies.
- (b) Merocel Kennedy Sinus Pak: available in sizes 3.5x2 and 3.5x1.2cm with different widths (1.2, 0.9 and 0.6). Both these packs help prevent lateralization of the middle turbinate.
- (c) Merocel Epistaxis Nasal Packing: available in sizes 10x1.5x2.5cm and 5.5x1.5x2.5cm. Quick and effective method for treating anterior and posterior epistaxis.
- (d) Merocel Doyle Nasal Packing: available in size 8x1.5x3cm, 7.7x1.5x3.3cm and 5.5x1x2.5cm (for pediatric use) and with and without airway. It can be used in any type of nasal surgery.

Merocel provides septal support and reduce or prevent adhesions between the septum and lateral nasal wall following surgery. Its salient features are: highly absorbent (upto 20 times its weight in fluids), biocompatible, hemostatic, strong and nonshredding, soft and atraumatic when hydrated, durable and long lasting, can be trimmed, no chemical residues or starch, controlled pore size ranges 0.0001mm-0.2mm).¹⁰ Its swelling property allows sufficient adaptation to the individual anatomy. Rapid expansion provides gentle, evenly distributed pressure against the tissues to control bleeding, while platelets aggregate on the surface of pack to enhance clot formation.¹⁰ The use of Merocel nasal packs can control bleeding in cases of epistaxis in about 91.5% of cases.¹¹ Conventional antibiotic soaked gauze pack is 1 metre in length and 2.5 cm in width made from ribbon gauze. From time to time, studies have been conducted to assess the role of various nasal packs following septal surgeries but only conflicting results have been obtained so far. Hence, the present study was conducted in the Department of Otorhinolaryngology, Pt. B.D. Sharma PGIMS, Rohtak to evaluate and to compare the effects of conventional nasal packing and packing with merocel and merocel with ventilation tube after septoplasty.

Study was conducted on 60 patients with symptomatic deviated nasal septum in the age group of 18-50 years.

Maximum number of patients were in the younger age group i.e. up to 25 years, 17(85%) in group A, 18(90%) in group B and 15(75%) in group C. The overall mean age of the patients undergoing septal surgery was 21.05 years.

Nasal obstruction was the chief complaint in all the 60 patients (100%), nasal discharge in 15(25%), headache 15(25%) and history of sneezing was present in 12(20%) patients. On anterior rhinoscopy, 39(65%) patients were found to have cartilaginous deviation.

The mean pain scores at 24 hours and at 48 hours were found to be 1.9 and 0.7 in Group A patients respectively, 1.05 and 0.5 in Group B and 2.2 and 0.65 in Group C patients respectively. At 24 hours, there was significant difference between groups B and C ($p=0.008$ i.e. <0.05), group B was better i.e. Merocel without ventilation tube caused lesser pain during first 24 hours. Comparison of group A with C and with B showed no statistically significant difference. Merocel is supposed to be less abrasive and hence associated with less pain.¹² Merocel packs with ventilation tube were more painful probably due to more width. Though, at 48 hours, there was no statistically significant difference amongst three groups ($p=1.00$).

Joshi et al¹² conducted a study on 106 patients (61 males and 45 females) to compare merocel and Neosporin impregnated ribbon gauze (NIRG) following nasal surgeries. They found that mean pain scores with merocel in situ were 4.15 and with NIRG, mean pain scores were 6. Ribbon gauze pack was more painful.

A study done by Naik et al¹³ on 462 patients (318 patients of nasal surgeries and 90 patients of epistaxis) to compare nasal tampons and conventional framycetin ribbon packs, they found VAS scores were significantly higher in ribbon nasal packs (average VAS 4.97) than nasal tampons (merocel) (average VAS 4.63) while packs were in situ. 4(6.66%) bony and 17(28.3%) had both.

During first 48 hours, all the patients were assessed for nasal bleeding, swelling over face and nose, watering of eyes, nasal discharge and feeding difficulty. To assess the amount of bleeding in all the three groups, patients were provided with cotton balls to clean the blood tinged soilage and keep these cotton balls preserved for quantification. Each cotton ball was roughly the size of an average sized walnut. The no. of cotton balls were counted.

According to a study by Naiket al¹³ on 462 patients comparing conventional gauze pack and nasal tampon, they found 142 external dressings were changed in 318 patients with ribbon gauze packs during the 48 hours of packing while 69 dressings were changed in 144 patients in nasal tampon group. No significant difference in bleeding was seen in two groups.

Study by Joshi et al¹² showed no significant difference in bleeding while packs were in situ. They assessed bleeding by placing a standard dressing bolster. In almost all cases single bolster applied till the morning of the second postoperative day.

Dutta et al¹⁴ reported that the episodes of bleeding while pack in situ, within first 48 hours and forced for repacking were significantly more prevalent among nasal tampon group as compared to conventional gauze pack group. 70% patients in group C and 35% patients in group A complained of mild watering of eyes while in group B 20% patients had this complaint. On comparing group A with C and group B with C there were statistically significant differences with p values 0.027 and 0.001 respectively ($p < 0.05$) but there was no significant difference between group A and B. The presence of cotton gauze packing increases the likelihood of postoperative swelling and oedema.¹⁵

20% patients each in group A and group B had increased nasal discharge while in group C, 55% patients complained of nasal discharge. There was statistically significant difference between group A and C and group B and C ($p = 0.022$) ($p < 0.05$). There was no significant difference found between group A and B. Cotton gauze packing causes more irritation of nasal mucosa leading to increased discharge.

All patients (100%) in group B and C had complaints of absent nasal breathing and feeding difficulty while in group A no patient had this complaint revealing statistically significant difference ($p = 0.000$) ($p < 0.05$).

In group A, all patients were comfortable with no nasal obstruction. Nasal breathing was present in group A due to presence of ventilation tube in the merocel (in first 24 hours). In next 24 hours, ventilation tubes got blocked and they had to be flushed with normal saline and ventilation was restored. In principle, insertion of ventilation tubes permits breathing.

Joshi et al¹² reported that merocel packs were slightly more painful at the time of removal due to its stickiness in the nasal mucosa.

Illum et al¹⁶ found no significant difference in discomfort on pack removal amongst three packs i.e. merocel, fingerstall packs and hydrocortisone- terramycin gauze packs.

After pack removal, patients were observed for bleeding and an assessment criteria was used to quantify bleeding. In this criteria, 0 means no bleeding, 1 means bleeding < 3 minutes stopped without vasoconstrictor, 2 means bleeding < 3 minutes requiring a vasoconstrictor, 3 means bleeding \geq 3 minutes requiring a local procedure and 4 means severe bleeding requiring repacking for > 24 hours and/or surgery. According to this scale, 4 patients (20%) in group A, 2 patients (10%) in group B and 3 patients (15%) in group C had no bleeding. 11 (55%) patients in group A, 14 (70%) patients in group B and 5 (25%) patients in group C had bleeding for < 3 minutes which stopped without vasoconstrictor, 5 (25%) patients in group A, 4 (20%) patient in group B and 12 (60%) patients in group C had bleeding > 3 minutes which required vasoconstrictor. None of the patient in any group had severe bleeding requiring a local procedure, repacking or surgical intervention. The topical vasoconstrictor was needed in more number of patients in group C as compared to group A and B. There was statistically significant difference on comparing group A with C and group B with C ($p < 0.05$).

Assessment at 1 week showed crust formation in 6 patients (30%) in group C. while in group A and group B no patient had crust formation, revealing a statistically significant difference with p value 0.001 i.e. < 0.05 . Illum et al¹⁶ noted that there were less complaints of crusting with fingerstalls packing as compared to foam rubber and gauze packs. No patient of our study in any group had nasal bleeding, nasal discharge and vestibulitis at follow up at 1 week. No patient in any group had septal haematoma and ulceration. In our study, no patient of any group had crusting at 4 weeks follow up. Merocel nasal packs are purely synthetic product. If they are too wide or too long for a particular

patient, they can be trimmed to reduce the discomfort. Newer fabrications are coated with a thin plastic film to smoothen the surface and depending on pore size, to avoid the growth of granulation tissue.

Merocel packs provide good hemostasis after surgery and have better patient compliance because they are associated with lesser pain in postoperative period. There is lesser incidence of swelling over face, watering of eyes and nasal discharge while packs are in situ. Pack removal is less painful and it is associated with less bleeding. Besides offering freedom from adhesions, Merocel packing also avoids morbid pain that is associated with the procedure of releasing adhesions. Thus considering the advantages of Merocel packing, it should be used in all the patients undergoing nasal surgery. Merocel with ventilation tube provides better comfort to patient as there is presence of nasal breathing and there is no difficulty in feeding. For better performance, the free position of the posterior opening of the airway tubes should be confirmed either endoscopically or with digital palpation. Regular nasal irrigation through the airway tube is necessary to avoid crusting and blockage. Merocel packs provide good hemostasis after surgery and have better patient compliance because they are associated with lesser pain in postoperative period. There is lesser incidence of swelling over face, watering of eyes and nasal discharge while packs are in situ.

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TABLE -1

POSTOPERATIVE PAIN SCORES AT 24 HOURS AND AT 48 HOURS IN THREE GROUPS

Sr. No.	Group A		Group B		Group C	
	At 24 hrs.	At 48 hrs.	At 24 hrs.	At 48 hrs.	At 24 hrs.	At 48 hrs.
1	0	0	1	0	2	0
2	2	1	3	2	1	0
3	2	0	1	0	1	0
4	1	0	1	0	3	2
5	5	3	1	0	1	0
6	3	2	0	0	3	2
7	0	0	1	0	2	0
8	4	3	3	2	1	0
9	1	0	0	0	1	0
10	2	0	3	2	2	0
11	1	0	0	0	2	0
12	3	2	0	0	3	2
13	2	0	0	0	2	0
14	1	0	0	0	1	0
15	1	0	0	0	3	1
16	2	1	0	0	5	3
17	2	0	0	0	3	1
18	2	1	2	1	3	1
19	2	0	2	1	3	1
20	2	1	3	2	2	0
Mean	1.9	0.7	1.05	0.5	2.2	0.65

TABLE - 2

COMPARISON OF CASES ACCORDING TO COMPLAINT OF NASAL BLEEDING

Sr. No.	Group A	Group B	Group C
1.	1	2	3
2.	3	1	2
3.	3	2	4
4.	2	3	1
5.	2	3	4
6.	2	2	1
7.	2	3	3
8.	3	1	2
9.	2	2	3
10.	2	2	2
11.	2	2	2
12.	1	2	3
13.	3	2	2
14.	1	1	5
15.	2	2	2
16.	1	2	1
17.	2	2	3
18.	2	2	3
19.	3	2	2
20.	3	2	2
Total(C. balls)	42	40	50
Mean	2.1	2	2.5

TABLE- 3

ASSESSMENT CRITERIA FOR BLEEDING DURING PACK REMOVAL

Group	No/min. bleeding (0)	Anterior/Posterior bleeding <3min. without vasoconstrictor (1)	<3min. requiring vasoconstrictor (2)	>3min. requiring local procedure (3)	Severe bleeding requiring repacking (4)
Group A	4	11	5	0	0
Group B	2	14	4	0	0
Group C	3	5	12	0	0

TABLE- 4

SHOWING PAIN SCORES DURING PACK REMOVAL

Sr. no.	Group A	Group B	Group C
1	4	3	5
2	4	3	5
3	4	4	4
4	3	4	6
5	3	3	4
6	4	4	5
7	3	3	4
8	4	4	4
9	5	3	5
10	3	4	4
11	3	3	4
12	4	4	6
13	3	4	4
14	4	3	5
15	4	3	4
16	3	5	3
17	4	3	5
18	5	4	5
19	4	3	5
20	4	5	6
Total	75	72	93
Mean	3.75	3.6	4.65