



Original Article

## Study of Comparison of Conventional Nasal Pack with Merocele Nasal Pack in the Management of Epistaxis

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### ABSTRACT

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**Background:** Epistaxis is a common and potentially alarming ENT emergency, frequently managed with nasal packing when initial conservative measures fail. Conventional nasal packing is widely used but is often associated with pain, discomfort, and mucosal complications. **Aim and Objectives:** This study aimed to compare conventional nasal packing and Merocel nasal packing in terms of effectiveness in controlling epistaxis, patient discomfort, hemodynamic changes, need for repacking, and mucosal healing. **Materials and Methods:** This hospital-based observational comparative study was conducted on 80 patients with anterior epistaxis not controlled by digital pressure. Patients were divided into two groups: Group A (conventional nasal packing) and Group B (Merocel packing). Pain was assessed using the Visual Analogue Scale (VAS), blood pressure was recorded at different intervals, and mucosal changes were evaluated using diagnostic nasal endoscopy on days 1, 7, and 14. **Results:** Patients in Group A experienced significantly higher pain scores during pack insertion and while the pack was in situ. Both systolic and diastolic blood pressure showed greater increases in Group A, indicating higher hemodynamic stress. Endoscopic findings revealed faster resolution of congestion and oedema in Group B, along with better mucosal healing. The need for repacking was higher in Group A, although both methods showed comparable hemostatic efficacy. **Conclusion:** Merocel nasal packing provides effective control of anterior epistaxis with significantly less pain, better hemodynamic stability, and improved mucosal healing compared to conventional packing, and should be preferred as the first-line treatment option.

**Keywords:** Epistaxis; Nasal Packing; Merocel; Conventional Nasal Pack; Visual Analogue Scale; Hemodynamic Changes; Mucosal Healing.

### INTRODUCTION

Epistaxis (“nasal bleeding” in Greek) is one of the most alarming symptoms and emergency situations which are being managed in the field of Otorhinolaryngology. <sup>[1]</sup> Epistaxis is normally classified into anterior or posterior, but it can also be classed as superior or inferior depending on the carotid supply. Anterior bleeds are responsible for about 80% of epistaxis. They occur at an anastomosis called Kiesselbach’s plexus on the lower part of the anterior septum known as Little’s area. <sup>[2]</sup> Usually, posterior bleeding is diagnosed after measures to control anterior bleeding have failed. Imaging such as X-rays or computed tomography have no role in the urgent or emergent management of active epistaxis. <sup>[3]</sup>

There is a wide variety of nasal packing techniques available. The most common are Merocel packing, inflatable balloons, rapid rhino and petroleum-infused gauze. In such cases, the patient’s coagulation profile, blood count, blood grouping, and cross matching should be investigated. <sup>[4]</sup>

The conventional nasal packing is ribbon gauze coated with vaseline or antibiotic cream, but the patient experiences pain and discomfort during insertion and removal. Absorbable materials are gel foam, oxycel or surgecel. <sup>[5]</sup> Pain during

insertion and removal, discomfort, mouth breathing, dry mouth, reduced sleep, and anxiety are the commonly reported problems after packing. [6] Merocel, one of the most common non- absorbable nasal packing materials, is a compressed, dehydrated sponge composed of hydroxylated polyvinyl acetate that can increase in size within the nasal cavity and compress a bleeding vessel through rehydration with normal saline. [7]

This study is crucial because it aims to directly compare these two methods in a clinical setting, focusing on their effectiveness in controlling bleeding, the level of patient discomfort experienced during insertion and removal, changes in blood pressure as an indirect measure of pain or stress, the extent of mucosal injury, and the necessity for re-packing.

### AIM & OBJECTIVES

1. To study the effectiveness of conventional nasal pack and merocele nasal pack for control of epistaxis.
2. To evaluate discomfort during nasal pack insertion and removal.
3. To analyse the blood pressure changes in conventional nasal pack and merocele nasal pack.
4. To understand the need for repacking and record the mucosal scoring in terms of congestion and oedema in conventional nasal pack and merocele nasal pack.

### MATERIAL AND METHODS

This hospital-based observational comparative study was conducted in the Department of Otorhinolaryngology (ENT), Muzaffarnagar Medical College and Hospital, Muzaffarnagar, over 18 months. A total of 80 patients with anterior epistaxis not controlled by digital pressure were included and divided into two groups: Group A (n=40) received conventional nasal packing with antibiotic-soaked ribbon gauze, while Group B (n=40) received Merocel nasal packing. After ethical approval and informed consent, detailed history, clinical examination, and diagnostic nasal endoscopy were performed. Baseline blood pressure was recorded. Nasal packing was done after clearance of clots and administration of local anaesthesia. Pain was assessed using the Visual Analogue Scale (VAS) during insertion, while in situ, and during removal. Blood pressure was recorded again after packing. Packs were kept for 48 hours, and rebleeding was noted after removal. Follow-up nasal endoscopy was performed on Day 1, 7, and 14 to assess mucosal changes using a standardized scoring system. Data were recorded in a Case Record Form and analyzed using SPSS version 30. Appropriate statistical tests were applied, and  $p < 0.05$  was considered significant.

#### Inclusion criteria:

- Anterior epistaxis
- Bleeding not controlled by digital pressure
- Both sexes
- All age groups
- Patients who provided informed consent to participate in the study.

#### Exclusion criteria:

- Posterior epistaxis
- Post-operative nasal surgery patients
- Patients who didn't give consent.

### RESULTS

The socio-demographic distribution of participants showed that the majority of patients in both groups belonged to the 50–60 years age group, accounting for 27.5% in Group A and 35% in Group B, indicating a higher prevalence of epistaxis in the older age population. In Group A, the next most common age group was 40–50 years (20%), followed by 30–40 years (17.5%), whereas in Group B, 20–30 years (17.5%) and 30–40 years (17.5%) contributed equally. With respect to gender, males predominated in Group A (60%), whereas Group B had equal distribution of males and females (50% each). The mean age of patients in Group A was 50.3 years, which was higher compared to 39.9 years in Group B, indicating that Group A consisted of relatively older patients overall. (Table 1)

At presentation, most patients in both groups had systolic BP between 140–160 mmHg, with higher mean values in Group A ( $p=0.0006$ ). After 5 minutes of packing, systolic BP increased further in Group A, whereas Group B remained relatively stable ( $p<0.001$ ). At the time of pack removal, Group A continued to show higher systolic BP compared to Group B ( $p=0.001$ ). Overall, Group A demonstrated consistently higher systolic BP at all intervals, indicating a greater hemodynamic response than Group B. (Table 2)

At presentation, diastolic BP was slightly higher in Group A compared to Group B, though the difference was not statistically significant ( $p=0.06$ ). Overall, Group A showed higher diastolic BP after packing and at removal, indicating greater hemodynamic response compared to Group B. (Table 3)

At the time of pack insertion, Group A experienced significantly higher pain compared to Group B, with more patients in the severe VAS range ( $p<0.001$ ). Overall, Group B was associated with less pain and better patient comfort, especially during insertion and while the pack was in situ. (Table 4)

At day 1, mucosal congestion was markedly higher in Group A, with a greater proportion of patients having severe congestion (score 2), while Group B had more patients with mild congestion. The mean congestion score was significantly higher in Group A ( $p<0.001$ ). Overall, Group B showed faster and more effective resolution of mucosal congestion compared to Group A. (Table 5)

At day 1, mucosal oedema was higher in Group A, with more patients having severe oedema, while Group B had a greater proportion with no oedema. The mean oedema score was significantly higher in Group A ( $p=0.013$ ). Overall, Group B demonstrated faster resolution of mucosal oedema, with both groups achieving comparable results by day 14. (Table 6)

The need for repacking was observed to be higher in Group A compared to Group B. A greater proportion of patients in Group A required additional intervention for control of bleeding, whereas most patients in Group B achieved adequate hemostasis with a single packing. (Figure 2)

**Table 1- Socio-demographic profile of participants:**

Variables	Group A (%)	Group B (%)
<b>Age group</b>		
0-10	01 (2.5%)	02 (5%)
10-20	00 (0%)	04 (10%)
20-30	02 (5%)	07 (17.5%)
30-40	07 (17.5%)	07 (17.5%)
40-50	08 (20%)	04 (10%)
50-60	11 (27.5%)	14 (35%)
60-70	05 (12.5%)	00 (0%)
70-80	05 (12.5%)	01 (2.5%)
80-90	01 (2.5%)	01 (2.5%)
<b>Gender</b>		
Male	24 (60%)	20 (50%)
Female	16 (40%)	20 (50%)

**Table 2- Comparison of Systolic BP at different time intervals in both groups:**

Systolic BP at the time of presentation (mm of Hg)	Group A (%)	Group B (%)	P Value
100-120	00 (0%)	01 (2.5%)	<b>0.0006</b>
120-140	02 (5%)	14 (35%)	
140-160	34 (85%)	23 (57.5%)	
160-180	04 (10%)	02 (5%)	
<b>Mean ± S.D.</b>	<b>148.45 ± 8.18</b>	<b>141.13 ± 9.99</b>	
<b>Systolic BP after 5 mins of pack insertion (mm of Hg)</b>			
100-120	00 (0%)	01 (2.5%)	<b>&lt;0.001</b>
120-140	02 (5%)	11 (27.5%)	
140-160	26 (65%)	27 (67.5%)	
160-180	12 (30%)	01 (2.5%)	
<b>Mean ± S.D.</b>	<b>153.5 ± 8.86</b>	<b>141.95 ± 10.33</b>	
<b>Systolic BP at the time of pack removal (mm of Hg)</b>			
100-120	00 (0%)	01 (2.5%)	<b>0.001</b>
120-140	03 (7.5%)	07 (17.5%)	
140-160	35 (87.5%)	32 (80%)	
160-180	02 (5%)	00 (0%)	
<b>Mean ± S.D.</b>	<b>145.85 ± 6.63</b>	<b>140.35 ± 8.10</b>	

**Table 3- Comparison of Diastolic BP at different time intervals in both groups:**

Diastolic BP at the time of presentation (mm of Hg)	Group A (%)	Group B (%)	P Value
60-70	05 (12.5%)	07 (17.5%)	0.06
70-80	11 (27.5%)	15 (37.5%)	
80-90	22 (55%)	18 (45%)	
90-100	02 (5%)	00 (0%)	
Mean ± S.D.	<b>78.35 ± 7.10</b>	<b>75.2 ± 7.75</b>	
<b>Diastolic BP after 5 mins of pack insertion (mm of Hg)</b>			
60-70	02 (5%)	07 (17.5%)	0.002
70-80	10 (25%)	14 (35%)	
80-90	21 (52.5%)	19 (47.5%)	
90-100	07 (17.5%)	00 (0%)	
Mean ± S.D.	<b>81.45 ± 7.63</b>	<b>75.73 ± 7.97</b>	
<b>Diastolic BP at the time of pack removal (mm of Hg)</b>			
60-70	03 (7.5%)	07 (17.5%)	0.004
70-80	04 (10%)	11 (27.5%)	
80-90	33 (82.5%)	22 (55%)	
Mean ± S.D.	<b>79.8 ± 5.30</b>	<b>75.8 ± 6.26</b>	
Mean ± S.D.	<b>145.85 ± 6.63</b>	<b>140.35 ± 8.10</b>	

**Table 4- Comparison of VAS Score at different time intervals in both groups:**

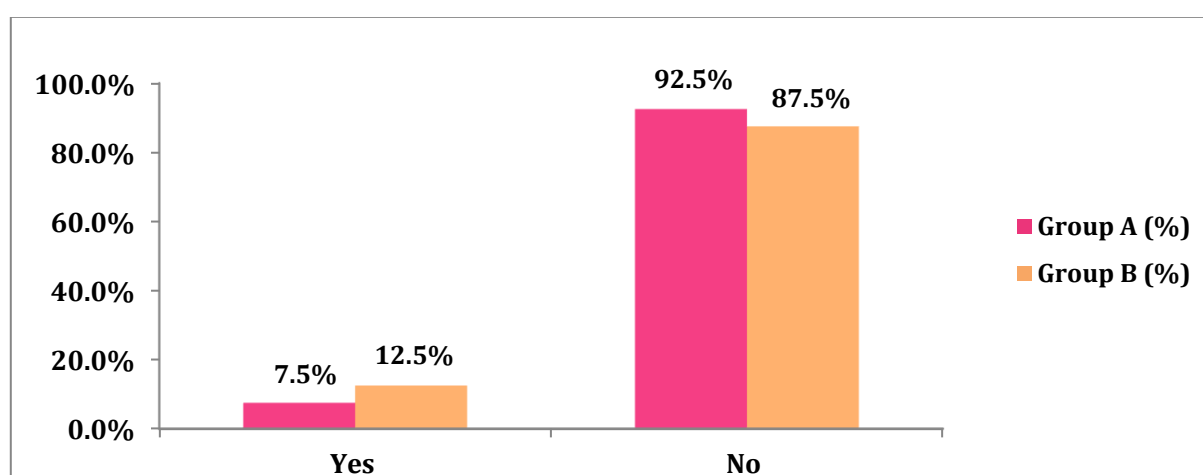
VAS at the time of pack insertion	Group A (%)	Group B (%)	p Value
2-4	00 (0%)	05 (12.5%)	<0.001
4-6	08 (20%)	09 (22.5%)	
6-8	15 (37.5%)	24 (60%)	
8-10	17 (42.5%)	02 (5%)	
Mean ± S.D.	<b>6.5 ± 1.48</b>	<b>5.28 ± 1.32</b>	
<b>VAS with pack in situ</b>			
0-2	00 (0%)	01 (2.5%)	0.001
2-4	07 (17.5%)	12 (30%)	
4-6	20 (50%)	26 (65%)	
6-8	13 (32.5%)	01 (2.5%)	
Mean ± S.D.	<b>4.3 ± 1.40</b>	<b>3.38 ± 1.08</b>	
<b>VAS at the time of pack removal</b>			
2-4	05 (12.5%)	07 (17.5%)	0.24
4-6	29 (72.5%)	30 (75%)	
6-8	06 (15%)	03 (7.5%)	
Mean ± S.D.	<b>4.15 ± 0.95</b>	<b>3.9 ± 0.90</b>	

**Table 5- Comparison of congestion on diagnostic nasal endoscopy (mucosal score) in both groups:**

Congestion	Group A (%)	Group B (%)	P Value
<b>At day 1</b>			
0	00 (0%)	00 (0%)	<0.001
1	13 (32.5%)	28 (70%)	
2	27 (67.5%)	12 (30%)	
Mean ± S.D.	<b>1.68 ± 0.47</b>	<b>1.3 ± 0.46</b>	
<b>At day 7</b>			
0	09 (22.5%)	20 (50%)	0.006
1	26 (65%)	19 (47.5%)	
2	05 (12.5%)	01 (2.5%)	
Mean ± S.D.	<b>0.9 ± 0.59</b>	<b>0.53 ± 0.55</b>	
<b>At day 14</b>			
0	31 (77.5%)	39 (97.5%)	0.006
1	09 (22.5%)	01 (2.5%)	
2	00 (0%)	00 (0%)	
Mean ± S.D.	<b>0.23 ± 0.42</b>	<b>0.03 ± 0.16</b>	

**Table 6- Comparison of oedema on diagnostic nasal endoscopy (mucosal score) in both groups:**

Oedema	Group A (%)	Group B (%)	P Value
<b>At day 1</b>			
0	03 (7.5%)	08 (20%)	<b>0.013</b>
1	20 (50%)	24 (60%)	
2	17 (42.5%)	08 (20%)	
<b>Mean ± S.D.</b>	<b>1.35 ± 0.62</b>	<b>1 ± 0.64</b>	
<b>At day 7</b>			
0	11 (27.5%)	31 (77.5%)	<b>&lt;0.001</b>
1	25 (62.5%)	09 (22.5%)	
2	04 (10%)	00 (0%)	
<b>Mean ± S.D.</b>	<b>0.83 ± 0.59</b>	<b>0.23 ± 0.42</b>	
<b>At day 14</b>			
0	36 (90%)	39 (97.5%)	0.19
1	04 (10%)	01 (2.5%)	
2	00 (0%)	00 (0%)	
<b>Mean ± S.D.</b>	<b>0.1 ± 0.3</b>	<b>0.03 ± 0.16</b>	



**Figure 1: Comparison of participants in both groups according to need for repacking:**

## DISCUSSION

The present study shows that patients requiring anterior nasal packing were predominantly middle-aged and elderly, with a higher mean age in Group A (50.3 years) compared to Group B (39.9 years). Rijal et al. (2024) reported that the majority of septoplasty patients requiring nasal packing were between 21–50 years, with a mean age of 43 years, closely approximating the age profile of Group B in the present study. [8] Bhattarai et al. (2023) found a mean age of 40.4 years in patients undergoing septoplasty with Merocel or conventional packs, again aligning closely with the Merocel group of the present study. [9] In the present study, males were 60% (n = 24) and females 40% (n = 16) in Group A, while Group B had equal distribution with 50% males (n = 20) and 50% females (n = 20). In Shanmugam et al. (2019), males predominated in their epistaxis cohort, supporting the commonly observed male preponderance in nasal bleeding presentations. [1]

Our study demonstrated a statistically significant difference in systolic blood pressure between the two groups at all-time points. At presentation, Group A had higher SBP compared to Group B (p=0.0006). Following pack insertion, Group A showed a marked increase in SBP, with significantly higher values than Group B (p<0.001). At pack removal, SBP remained higher in Group A (p=0.001). When compared with literature, Shanmugam et al. (2019) also observed BP rise after packing in both conventional and Merocel groups (e.g., SBP mean 140 to 152.25 in gauze group), though their rise did not reach statistical significance—likely due to smaller sample and different baseline characteristics. [1]

Our study showed that baseline diastolic blood pressure was comparable between the groups (p=0.06). At the time of pack removal, DBP remained significantly higher in Group A (p=0.004). In the literature, Shanmugam et al. (2019) similarly observed diastolic increases after packing (e.g., DBP mean 86.87 to 96.87 in gauze group), though not statistically significant—again suggesting that the magnitude and significance depend on sample size and baseline hemodynamic profiles. [1]

The present study showed that pain was consistently higher in Group A compared to Group B, particularly at pack insertion and while the pack was in situ. At insertion, Group A had significantly higher VAS scores ( $p < 0.001$ ), and this difference persisted during the in situ period ( $p = 0.001$ ), indicating better tolerability in Group B. Shanmugam et al. reported markedly higher discomfort with conventional packing than Merocel during insertion (mean 7.1875 vs 3.5625;  $p = 0.002$ ) and also during removal (mean 3.75 vs 1.25;  $p = 0.000$ ), supporting the concept that less traumatic materials improve patient comfort. [1]

Endoscopic evaluation showed faster and more complete resolution of congestion in Group B compared to Group A. By day 14, absence of congestion was seen in a higher proportion of Group B, with significantly lower mean mucosal scores ( $p = 0.006$ ). In Rapid Rhino vs Merocel work by Pradhan P et al (2020), crusting and scarring/synechiae differences were significant at follow-up intervals, showing that the pack material influences endoscopic healing trajectory. [10]

The present study showed that mucosal oedema was more severe and resolved more slowly in Group A. Shanmugam et al. (2019) reported significantly better mucosal scores early after pack removal (day 1 difference significant), with diminishing differences later, which is consistent with your day 14 convergence. [1] Study done by Pradhan P et al (2020) evaluating postoperative packs after sinus surgery also highlighted that mucosal injury correlates with later crusting/scarring outcomes, supporting the mechanistic link between early oedema/trauma and delayed complications. [10]

## CONCLUSION:

Both conventional and Merocel nasal packing were effective in controlling anterior epistaxis; however, Merocel showed superior outcomes. Conventional packing was associated with greater increases in systolic and diastolic blood pressure, indicating higher hemodynamic stress. Patients in the Merocel group experienced significantly less pain during insertion and while the pack was in situ. Endoscopic findings showed faster resolution of congestion and oedema, less crusting, and reduced synechiae formation with Merocel packing, suggesting better mucosal healing. Despite these advantages, both methods had comparable hemostatic efficacy. Overall, Merocel nasal packing is a safer, more comfortable, and more effective option, and should be preferred as the first-line treatment for anterior epistaxis.

**Limitations of the study:** The study had a relatively small sample size and was conducted at a single center, limiting generalizability. The non-randomized design may introduce selection bias, and baseline age differences between groups could have influenced outcomes. The follow-up period was short, preventing assessment of long-term effects. Additionally, pain assessment was subjective, and operator variability may have affected results.

## Relevance of the study

The present study is clinically relevant as it provides a direct comparison between conventional nasal packing and Merocel packing in the management of anterior epistaxis. It highlights that while both methods are effective in controlling bleeding, Merocel offers significant advantages in terms of patient comfort, hemodynamic stability, and faster mucosal healing. These findings are particularly important in routine ENT practice, especially for elderly and hypertensive patients who are more susceptible to complications. The study provides evidence-based guidance for clinicians to choose a safer, more effective, and patient-friendly nasal packing method, thereby improving overall patient outcomes and optimizing standard treatment protocols.

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**Authors Contribution:** The study was done under the continuous and expert guidance of Dr. Sandip M Parmar.

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