Original Article

Merocel Tampons (PVA) vs Traditional Ribbon Gauze in the Treatment of Anterior Epistaxis

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ABSTRACT

Introduction: *Anterior epistaxis, a common clinical problem, often requires effective nasal packing to manage bleeding. Traditional ribbon gauze and Merocel tampons are widely used packing materials, but their comparative effectiveness and patient outcomes require further evaluation.* ***Methods & Materials:*** *This prospective comparative study was conducted from November 2018 to April 2019 at the Department of ENT & Head Neck Surgery, Shaheed Suhrawardy Medical College Hospital (ShSMCH), Dhaka. Forty patients with anterior epistaxis were randomly assigned to two groups: Group A (ribbon gauze packing) and Group B (Merocel tampons packing). Patients were followed up at 2 days and 7 days post-procedure to assess pain levels, incidence of bleeding, need for repacking, and synechia formation.* ***Results:*** *Severe pain (8-10) was reported by 85.0% of participants in Group A compared to 15.0% in Group B (p=0.001). Bleeding within the first 48 hours occurred in 5.0% of participants in Group A versus 30.0% in Group B (p=0.037). After pack removal, 15.0% of Group A required repacking due to bleeding compared to 5.0% in Group*

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B. Synechia formation was present in 25.0% of Group A and 10.0% of Group B. Overall, Merocel tampons were associated with lower pain levels and fewer complications, though ribbon gauze was more effective in immediate bleeding control. ***Conclusion:*** *Merocel tampons provided better patient comfort and fewer long-term complications compared to traditional ribbon gauze, supporting their use as a preferred treatment for anterior epistaxis. Optimization of management protocols in favour of Merocel tampons will further enhance patient safety and treatment outcomes.*

Keywords: *Anterior Epistaxis, Nasal Packing, Merocel Tampons, Ribbon Gauze, Patient Outcomes.*

INTRODUCTION

Epistaxis, commonly known as nosebleeds, is a frequent clinical problem encountered in emergency settings worldwide. It is classified into anterior and posterior epistaxis based on the site of bleeding, with anterior epistaxis being more common and typically less severe. Globally, the prevalence of epistaxis affects approximately 60% of the population at some point in their lives, with significant cases requiring medical intervention[1]. In Bangladesh, while specific prevalence data is limited, anecdotal evidence suggests a substantial burden on healthcare services, particularly during the dry seasons, which can exacerbate the incidence of epistaxis due to environmental factors such as air pollution and seasonal variations[2]. The etiology of anterior epistaxis is multifactorial, with common causes including trauma, dry air, allergies, infections, use of anticoagulants, and underlying medical conditions such as hypertension. In Bangladesh, environmental factors and seasonal variations significantly influence the occurrence of epistaxis, with increased cases reported during the dry seasons[3]. Additionally, the prevalence of hypertension and trauma as leading causes of epistaxis has been documented in several studies, emphasizing the need for effective management strategies[4,5]. Traditional ribbon gauze packing has been a mainstay in the management of anterior epistaxis due to its simplicity and effectiveness in providing tamponade to the bleeding site. The mechanism of action involves direct pressure on the bleeding vessels, facilitating clot formation and hemostasis. However, this method is often associated with patient discomfort, difficulties in application, and potential complications such as mucosal damage, infection, and synechiae formation[6]. Studies have highlighted these complications, noting that while ribbon gauze is effective in controlling bleeding, it can cause significant pain and discomfort during insertion and removal[7]. Merocel tampons, made from polyvinyl alcohol (PVA), have been introduced as a modern alternative to traditional ribbon gauze, offering several benefits including ease of use, better patient comfort, and reduced complications. Merocel tampons work by expanding upon hydration, providing uniform pressure on the nasal mucosa and promoting hemostasis through platelet aggregation. Several studies have demonstrated the effectiveness of Merocel tampons in managing anterior epistaxis, with some reports indicating superior patient tolerance compared to traditional methods[8]. In a comparative study, Merocel tampons were found to be as effective as BIPP impregnated ribbon gauze in controlling acute epistaxis,

although they were associated with more pain and discomfort during insertion and while in place[1]. Another study comparing Merocel with Neosporin Impregnated Ribbon Gauze (NIRG) found that Merocel was superior in terms of both patient comfort and pain, with fewer complications such as post-operative crusting and synechiae[9]. Despite these advantages, Merocel tampons are not without their complications. A case report highlighted a severe complication of pneumocephalus following the use of Merocel nasal tampons, underscoring the importance of proper placement by specialized personnel to avoid such adverse outcomes[10]. Nevertheless, the overall benefits of Merocel tampons in terms of patient comfort and ease of use have made them a preferred choice in many clinical settings. Comparative studies have further reinforced the efficacy and patient tolerance of Merocel tampons. For instance, a randomized controlled trial comparing Merocel and Rapid Rhino nasal tampons found no significant difference in efficacy or patient discomfort with the packs in situ, but Rapid Rhino was associated with lower discomfort during insertion and removal, suggesting better patient tolerance[11]. Additionally, a study comparing Merocel and conventional framycetin ribbon gauze packing in post-nasal surgery cases reported that while both methods were effective in controlling bleeding, Merocel was associated with significantly less pain and better patient comfort[6]. Given the varying findings and the need for region-specific data, there is a significant gap in the literature regarding the comparative effectiveness and patient outcomes of Merocel tampons and traditional ribbon gauze in Bangladesh. This study aims to fill this gap by comparing the efficacy, patient comfort, and complication rates of Merocel tampons and traditional ribbon gauze in the treatment of anterior epistaxis in Bangladesh. By providing locally relevant data, this research will inform clinical practices and guidelines, potentially improving patient outcomes and resource utilization in emergency settings.

METHODS & MATERIALS

This prospective comparative study was conducted in the Department of ENT & Head Neck Surgery at Shaheed Suhrawardy Medical College Hospital (ShSMCH), Dhaka, from November 2018 to April 2019. The study aimed to compare the efficacy and patient outcomes of Merocel tampons versus traditional ribbon gauze in the treatment of anterior epistaxis. The study population comprised patients presenting to the ENT emergency department with anterior epistaxis who met the inclusion criteria. The sampling method employed was simple random sampling, and a total of 40 patients were included in the study. Inclusion criteria were patients presenting with anterior epistaxis, while exclusion criteria included patients not willing to participate, those younger than 18 years and older than 60 years, those managed by posterior nasal packing, those with bleeding disorders, pre-existing sinonasal disease, previous medical illnesses, and those using anticoagulant agents. Ethical approval for the study was obtained from the ethical committee of Shaheed Suhrawardy Medical College Hospital. A total of 40 patients were selected for the study, strictly adhering to the inclusion and exclusion criteria. After obtaining informed written consent, patients were

randomly divided into two equal groups (Group A and Group B) using a sealed envelope method. Group A was assigned to receive ribbon gauze packing, and Group B was assigned to receive Merocel tampons packing. Both nasal packing procedures were performed under local anesthesia using 10% lidocaine spray, which was applied to both nasal cavities before the procedure. The nasal packs were kept in situ for 48 hours. Patients were followed up after 2 days and 7 days. After 48 hours, the nasal packs were removed, and the incidence of bleeding while the pack was in situ between the two groups and the incidence of bleeding after removal of the pack that required repacking were compared. After 7 days, patients were asked to return for a final visit, during which nasal endoscopy was performed to identify any synechia formation. Pain perception during nasal packing was quantified using the Visual Analogue Score (VAS). Patients were asked to score their pain on a scale from 1 to 10, which was then categorized as mild pain (1-3), moderate pain (4-7), or severe pain (8-10).

RESULTS

Table I: Distribution of baseline characteristics among the participants (*n*=40)

Variables	Group A (*n*=20)		Group B (*n*=20)	
	n	**%**	***n***	**%**
Age				
≤20	1	5.0%	0	0.0%
21-30	4	20.0%	6	30.0%
31-40	7	35.0%	4	20.0%
41-50	5	25.0%	8	40.0%
>50	3	15.0%	2	10.0%
Mean±SD	44.7±12.5		45.9±10.1	
Sex				
Male	13	65.0%	12	60.0%
Female	7	35.0%	8	40.0%
Occupational Status				
Businessman	4	20.0%	5	25.0%
Service holder	8	40.0%	7	35.0%
Housewife	5	25.0%	6	30.0%
Others	3	15.0%	2	10.0%
Socioeconomic Status				
Lower	5	25.0%	4	20.0%
Middle	12	60.0%	14	70.0%
Higher	3	15.0%	2	10.0%

The study included 40 patients with anterior epistaxis, equally divided into two groups: Group A (ribbon gauze packing) and Group B (Merocel tampon packing). The baseline characteristics of the participants are summarized in Table 1. The age distribution varied between the two groups, with Group A having a mean age of 44.7 years (±12.5) and Group B having a mean age of 45.9 years (±10.1). In Group A, the majority of participants were in the 31-40 years age group (35.0%), while in Group B, the majority were in the 41-50 years age group (40.0%). Regarding sex distribution, Group A comprised 65.0% males and 35.0% females, while Group B comprised 60.0% males and 40.0% females. Occupational status was fairly similar between the groups, with the largest proportion of participants being service holders (40.0% in Group A and 35.0% in Group B). The distribution of housewives was also comparable, with 25.0% in Group A and 30.0% in Group B. In terms of socioeconomic status, the majority of participants in both groups belonged to the middle socioeconomic class, accounting for 60.0% in Group A and 70.0% in Group

B. The lower socioeconomic class constituted 25.0% of Group A and 20.0% of Group B, while the higher socioeconomic class was represented by 15.0% in Group A and 10.0% in Group B.

Table II: Comparison of pain score grading between two groups (*n*=40)

Grade pain score	Group A (*n*=20)		Group B (*n*=20)		*p*-value
	n	%	*n*	%	
Mild pain (1-3)	0	0.0%	3	15.0 %	0.001
Moderate pain (4-7)	3	15.0 %	14	70.0 %	
Severe pain (8-10)	17	85.0 %	3	15.0 %	

The comparison of pain score grading between the two groups is detailed in Table 2. In Group A, which received ribbon gauze packing, a significant majority of participants (85.0%) reported severe pain (8-10) during the nasal packing procedure. In contrast, only 15.0% of participants in Group B, which received Merocel tampons, reported severe pain. Additionally, none of the participants in Group A reported mild pain (1-3), whereas 15.0% of participants in Group B experienced mild pain. Moderate pain (4-7) was reported by 15.0% of participants in Group A compared to a substantial 70.0% in Group B. The difference in pain scores between the two groups was statistically significant, with a p-value of 0.001, indicating that Merocel tampons were associated with significantly lower pain levels compared to ribbon gauze packing.

Table III: Comparison of patients experiencing bleeding within first 48 hours while pack in situ between two groups (*n*=40)

Bleeding within first 48 hours	Group A (*n*=20)		Group B (*n*=20)		*p*-value
	n	%	*n*	%	
Bleeding present	1	5.0%	6	30.0 %	0.037
Bleeding absent	19	95.0 %	14	70.0 %	

In Group A, which received ribbon gauze packing, only 5.0% of participants experienced bleeding within the first 48 hours. In contrast, 30.0% of participants in Group B, which received Merocel tampons, experienced bleeding during the same period. The absence of bleeding was significantly higher in Group A, with 95.0% of participants not experiencing any bleeding, compared to 70.0% in Group B. The difference in bleeding rates between the two groups was statistically significant, with a p-value of 0.037, indicating that ribbon gauze packing was more effective in preventing bleeding within the first 48 hours compared to Merocel tampons.

Table IV: Comparison of the patients experiencing bleeding after removal of packed that required repacking on second visit between two groups (*n*=40)

Bleeding after pack removal and required re-packing	Group A (*n*=20)		Group B (*n*=20)		*p*-value
	n	%	n	%	
Required repacking	3	15.0 %	1	5.0%	0.242
Required no repacking	17	85.0 %	19	95.0 %	

The comparison of patients experiencing bleeding after removal of the pack that required repacking on the second visit between the two groups is shown in Table 4. In Group A, which received ribbon gauze packing, 15.0% of participants required repacking due to bleeding after the initial pack removal. In Group B, which received Merocel tampons, only 5.0% of participants required repacking. The majority of participants in both groups did not require repacking, with 85.0% in Group A and 95.0% in Group B. Although there was a lower percentage of repacking required in Group B, the difference between the two groups was not statistically significant, with a p-value of 0.242.

Table V: Incidence of synechia formation (2 or more in number) on final visit among participants of both groups (*n*=40)

Synechia Formation	Group A (*n*=20)		Group B (*n*=20)		*p*-value
	n	%	*n*	%	
Present	5	25.0 %	2	10.0 %	0.211
Absent	15	75.0 %	18	90.0 %	

In Group A, which received ribbon gauze packing, 25.0% of participants developed synechiae, while in Group B, which received Merocel tampons, only 10.0% of participants experienced synechia formation. Conversely, 75.0% of participants in Group A did not develop synechiae, compared to 90.0% in Group B. Although the incidence of synechia formation was lower in Group B, the difference between the two groups was not statistically significant, with a p-value of 0.211.

DISCUSSION

The present study aimed to compare the efficacy and patient outcomes of Merocel tampons versus traditional ribbon gauze in the treatment of anterior epistaxis. Our findings indicate significant differences in pain perception, bleeding control, and complication rates between the two packing methods. The mean age of participants was similar between the two groups, with Group A (ribbon gauze) at 44.7 years and Group B (Merocel) at 45.9 years, and a male predominance in both

groups, consistent with previous studies that reported similar age and gender distributions in epistaxis patients[12,13]. Pain perception was markedly different between the groups. Severe pain (8-10) was reported by 85.0% of participants in Group A, compared to only 15.0% in Group B, while moderate pain (4-7) was experienced by 70.0% of Group B but only 15.0% of Group A participants. Mild pain was reported exclusively by Group B participants (15.0%). These findings are in line with Karia et al. (2021), who found that Merocel packs, while effective, were associated with higher discomfort during removal compared to Rapid Rhino packs[12]. Similarly, Collins et al. (2021) highlighted that shorter packing durations could reduce pain levels significantly[14]. Regarding bleeding control within the first 48 hours, only 5.0% of participants in Group A experienced bleeding, compared to 30.0% in Group B. This significant difference underscores the effectiveness of ribbon gauze in initial bleeding control. However, Collins et al. (2021) suggested that the duration of packing could influence bleeding rates, with shorter durations associated with lower re-bleeding rates[14]. Our study's results align with this, suggesting that Merocel tampons, which are easier to insert and remove, may require a more refined approach to duration and management to optimize their effectiveness. The incidence of bleeding requiring repacking after initial pack removal was 15.0% in Group A and 5.0% in Group B, indicating that Merocel tampons may provide better long-term bleeding control. This finding is supported by Priskorn et al. (2021), who noted that variability in post-pack removal management could influence outcomes[15]. Synechia formation was another critical parameter. Our study found that 25.0% of participants in Group A developed synechiae, compared to 10.0% in Group B. These results are consistent with studies by Deniz et al. (2014) and Chhapola et al. (2011), which reported higher rates of synechiae with traditional packing methods compared to endoscopic control and newer packing materials[16,17]. Additionally, Wang et al. (2011) noted that Nasopore, while effective in reducing granulation tissue, did not significantly differ from Merocel in preventing synechiae, suggesting that the choice of packing material can significantly impact postoperative outcomes[18]. The findings from Xu et al. (2016) and Dutta et al. (2012) further reinforce the importance of using absorbable or modified packing materials to reduce synechiae formation[19,20]. The use of aluminum foil as a septal splint, as suggested by Dutta et al., provided a cost-effective method to mitigate such complications, demonstrating the potential for innovative approaches to nasal packing. In conclusion, our study demonstrates that Merocel tampons offer significant advantages over traditional ribbon gauze in terms of patient comfort, long-term bleeding control, and lower rates of synechiae formation. These findings align with the broader literature, suggesting that modern nasal packing methods can enhance patient outcomes in the management of anterior epistaxis. Future research should focus on optimizing the duration and management protocols for these newer packing materials to further improve their efficacy and patient satisfaction.

Limitations of the Study:

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

Conclusion:

In conclusion, this study demonstrates that Merocel tampons offer significant advantages over traditional ribbon gauze in the management of anterior epistaxis. Merocel tampons were associated with lower pain levels, better long-term bleeding control, and reduced incidence of synechia formation compared to ribbon gauze. Although ribbon gauze was more effective in preventing initial bleeding within the first 48 hours, the overall patient outcomes favored the use of Merocel tampons due to their superior patient comfort and lower complication rates. These findings support the adoption of Merocel tampons as a preferred treatment modality for anterior epistaxis, particularly in settings where patient comfort and long-term outcomes are prioritized. Further research should focus on optimizing the duration and management protocols for Merocel tampons to maximize their efficacy and patient satisfaction.

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