Original Article

# Comparative study between Conventional nasal packing Versus Merocel packing in the Management of Epistaxis

**Tekendra Khanal[1], Sanjeev Kumar Thakur[2], Sanzida khatun[3]**

[1] Department Of Otorhinolaryngology, Civil Service Hospital Minbhawan Kathmandu, Nepal
[2] Department Of Otorhiniolaryngology, Nobel Medical College Teaching Hospital, Biratnagar, Morang, Nepal
[3] Department of Anatomy, Birat Medical College Teaching Hospital, Biratnagar, Nepal

## Article History

Received on: Jun 22, 2026
Acceptance on: Sep 30, 2026

## Online Access

**DOI:** https://doi.org/10.59338/cmj.126

## Correspondence

**Tekendra Khanal**
Department Of Otorhinolaryngology, Civil Service Hospital Minbhawan Kathmandu, Nepal
Email: khanalshishir11@gmail.com

## Abstract

**Introduction:** Epistaxis refers to bleeding from the nose. It is the most common otorhinolaryngological emergency. Different treatment options are used for epistaxis including Merocel packing and petroleum-infused gauze packing. The objective of the study is to evaluate the discomfort score during pack insertion, pack in situ and pack removal; and need for repacking after removal.

**Methods:** A prospective comparative cross-sectional study was carried out in 62 patients presenting with complain of epistaxis to Emergency and Inpatient Department of Otorhinolaryngology of Nobel Medical College Teaching Hospital, Biratnagar, Nepal. The time needed to arrest initial bleeding, and visual analog pain score during pack insertion, in situ and removal were recorded.

**Results:** The pain measured using visual analog scale VAS score of Merocel nasal pack during pack insertion, pack in situ and pack removal was found to significantly less (<0.001). There were 2 (6.5%) patients in conventional nasal pack and 6 (19.4%) in Merocel nasal pack group who required repacking. The nasal pack was removed after 48 hours.

**Conclusion:** Merocel packing was associated with significantly lower pain scores during insertion, while in situ and during removal. A higher proportion of patients required repacking after merocel packing than conventional packing however the small sample size limits definitive conclusion regarding difference in rebleeding.

**Keywords:** Epistaxis, nasal bleeding, nasal pack, pain, rebleeding, Visual Analog Scale

## Introduction

Epistaxis refers to bleeding from the nose. Each year 5 to 10 % of the population experiences an episode of epistaxis.[1] Its reported incidence is 30 per 100,000.[2] The lifetime prevalence of having epistaxis is about 60% and approximately 6% requires medical attention.[3-5] The complications are more common when the source of bleeding is posterior.[6-7] Most of the time, epistaxis is resolved on its own but severe epistaxis requires intranasal packing.[8-9]

There are multiple causes of epistaxis. The most frequent cause of epistaxis is trauma.[10] Several studies show relative increase in epistaxis episodes during cold & dry weather.[11-14] Massive bleeding need to be managed by nasal packing. Most common methods are Merocel packing and petroleum-infused gauze.[15-18] The purpose of this study was to offer a comparative evaluation of effectiveness of conventional nasal pack and Merocel nasal pack in the management of epistaxis.

## Methods

This prospective comparative cross-sectional study was conducted in the Department of Otorhinolaryngology,

© **The Author(s) 2026.** This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International (CC BY-NC)

Nobel Medical College and Teaching Hospital, Biratnagar, Nepal, over a period of one year, from 1 October 2021 to 30 September 2022. The study population comprised patients presenting with epistaxis to the Emergency Department and the Inpatient Department of Otorhinolaryngology at Nobel Medical College and Teaching Hospital. Ethical clearance was obtained from the Institutional Review Committee (IRC) of the institution prior to commencement of the study (Reference No. IRC-NMCTH 490/2021).

Patients aged 18–70 years presenting with anterior epistaxis that was not controlled by digital pressure and who provided informed consent to participate in the study were included. Patients with posterior epistaxis and those with postoperative nasal bleeding following nasal surgery were excluded from the study.

The sample size was calculated using the formula for testing difference of two proportions.

$n2p(1-p)(Z\alpha z1-\beta)2 /(p1-p2)^2$

where,

Population proportion that required repacking following conventional nasal pack (p1) =6.25%[1]

Population proportion that required repacking following Merocel nasal pack (p2) =18.75%[1]

p = (p1+p2)/2 = (6.25 + 18.75)/2 = 12.5%

Confidence interval at 95% (Zα)=1.96 Power of test at 80% (z1-β) =0.84%

Substituting the values in the formula:

$n2p(1-p)(Z\alpha z1-\beta)2 /(p1-p2)^2$

$=20.1250.875(1.96+0.84)^2/(0.0625-0.1875)^2$

=109.76

The derived sample is 110. However, due to availability of limited patients requiring nasal packing in the hospital, the sample size will be adjusted.

Thus, following formula will be used to adjust the sample size for small population.

Adjusted n = n/ {1+ (n/N)}

Where, n=110
N (subjects available for nasal pack in conventional and merocel group separately tentatively in previous one year) = 42

So, Adjusted n = 110/ {1+ (110/42)}

= 30.5

Therefore, the total sample size will be 2 X 31(in each group) = 62.

**Study Method:**

Eligible consecutive patients were allocated alternately to receive either conventional nasal packing or Merocel nasal packing. As alternate allocation rather than random randomization was used, the study was not considered a randomized controlled trial. All patients underwent a detailed history, general physical examination, and thorough otorhinolaryngological examination before nasal packing.

The time required to achieve initial hemostasis was recorded at 5-minute intervals until bleeding was controlled. Patients were monitored for rebleeding during the first 24 hours, after removal of the nasal pack, and during the subsequent one-week follow-up period. Patients who developed rebleeding after pack removal or recurrent epistaxis during follow-up were managed with repacking, and the need for repacking was recorded.

Pain and discomfort associated with nasal packing were assessed using a 10-point Visual Analog Scale (VAS), ranging from 0 to 10, where 0 represented no pain and 10 represented the worst imaginable pain. VAS scores were recorded at three time points: during pack insertion, while the pack was in situ, and during pack removal.

The primary outcome was pain and discomfort associated with nasal packing. Secondary outcomes included time to achieve hemostasis, frequency of rebleeding, and the need for repacking.

**Statistical analysis:**

Data collected as per proforma was entered in Microsoft excel and statistical analysis was done using statistical package for social science (SPSS version 21) wherever required. P value <0.05 was considered significant.

For descriptive statistics, frequency, percentage, mean and standard deviation was calculated along with graphical and tabular presentations.

For inferential statistics, independent t-test was applied to find out the significant association between conventional nasal packing versus Merocel nasal packing in the management of epistaxis and other selected independent variables at 95% confidence interval where level of significance was $p < 0.05$.

## Results

Among 62 patients presenting with epistaxis to department of otorhinolaryngology of Nobel Medical

College Teaching Hospital, 31 patients were treated with conventional nasal pack and 31 patients with Merocel nasal pack. According to the data obtained, the mean age of the patients was 45±15 years. When the age group wise distribution of the patients was obtained, highest number of patients i.e., 16 (25.8%) belonged to age group 51 - 60 years; followed by 15 (24.2%) in age group 18 – 30 years, 14 (22.6%) in age group 41-50 years, 11 (17.7%) in age group 61 – 70 years and 6 (9.7%) in age group 31 – 40 years.

When a gender wise distribution of patients was performed, a preponderance of males was noted among the total patients. There were 39 (62.9%) males and 23 (37.1%) females. The distribution of male and female in two groups treated with different approaches were: 20 (64.5%) males and 11 (35.5%) females in group treated with conventional nasal pack and 19 (61.3%) males and 12 (38.7%) females in group treated with Merocel nasal pack.

When the etiology of epistaxis among the study population was evaluated, it was found that highest number of patients presented with epistaxis because of trauma and hypertension. There were 19 (30.6%) patients who had trauma, 19 (30.6%) had hypertension, 13 (21.0%) had DNS, 5 (8.1%) had acute rhinosinusitis, 3 (4.8%) had bleeding disorder and 3 (4.8%) had idiopathic epistaxis. Baseline characteristic were reported for the overall study population, The available manuscript did not contain sufficient group age, etiology and comorbidity data to construct baseline comparison table. Therefore no unverified group level values have been added.

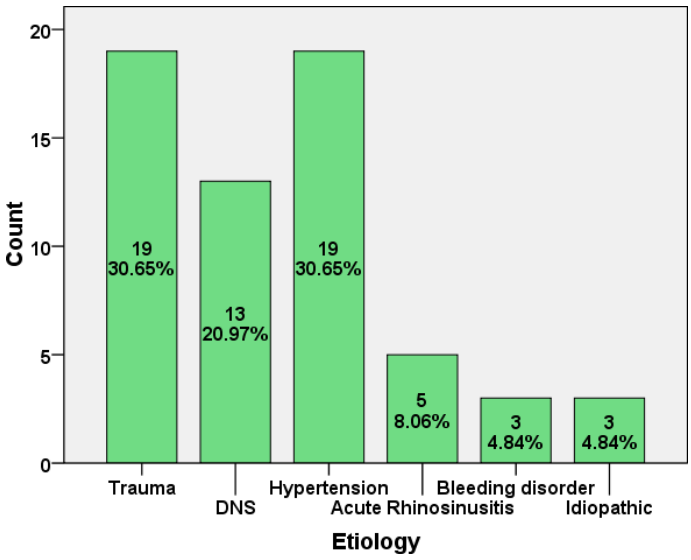



**Figure 1:** Bar diagram showing etiology wise distribution of patients

The pain score was evaluated through Visual Analogue Scale in both groups of patients. The mean discomfort score during pack insertion was 8.00 ± 1.155 among the conventional nasal pack group and 4.61 ± 1.358 among the Merocel nasal pack group. The difference of means of discomfort score during pack insertion was found to be statistically significant (<0.001) and 95% CI 2.75 to 4.03. The mean discomfort score during pack in situ was 4.06 ± 0.772 among the conventional nasal pack group and 2.35 ± 0.798 among the Merocel nasal pack group. The difference of means of discomfort score during pack in situ was found to be statistically significant (<0.001) 95%CI 1.31 to 2.11. The mean discomfort score during pack removal was 4.13 ± 0.991 among the conventional nasal pack group and 1.975 ± 0.706 among the Merocel nasal pack group. The difference of means of discomfort score during pack removal was found to be statistically significant (<0.001),95%CI 1.72to 2.59.

**Table 1:** Pain score measured using a Visual Analogue Scale during pack insertion

| Nasal Pack | N | Mean | Std. Deviation | P – value |
|---|---|---|---|---|
| Conventional | 31 | 8.00 | 1.155 | <0.001 |
| Merocel | 31 | 4.61 | 1.358 | |

**Table 2:** Pain score measured using a Visual Analogue Scale during pack in situ

| Nasal Pack | N | Mean | Std. Deviation | P – value |
|---|---|---|---|---|
| Conventional | 31 | 4.06 | 0.772 | <0.001 |
| Merocel | 31 | 2.35 | 0.798 | |

**Table 3:** Pain score measured using a Visual Analogue Scale during pack removal

| Nasal Pack | N | Mean | Std. Deviation | P – value |
|---|---|---|---|---|
| Conventional | 31 | 4.13 | 0.991 | <0.001 |
| Merocel | 31 | 1.97 | 0.706 | |

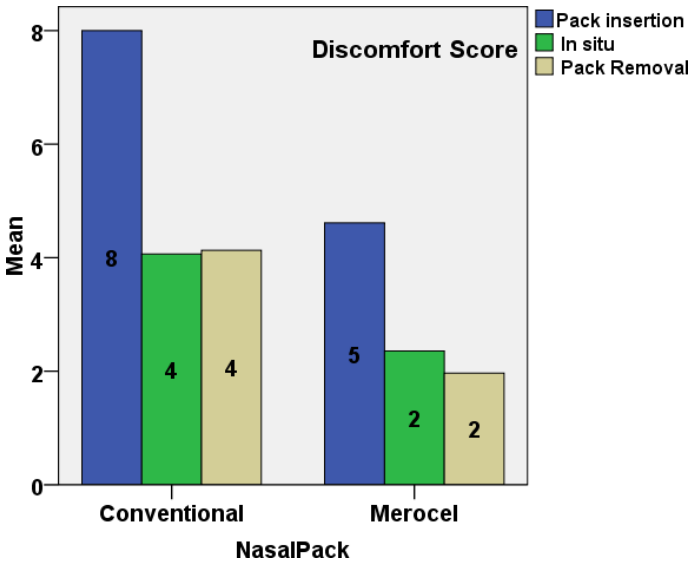



**Figure 2:** Bar diagram comparing means of VAS score for pain

The mean time to initial hemostasis was 10 ± 3 minutes for conventional nasal pack and 13 ± 2 minutes for Merocel group. The mean difference was 3 minutes (95% CI 1.70 to 4.30).When the pack was in situ, none of the patients presented with bleeding in conventional and Merocel nasal pack groups. The pack was removed after 48 hours. The patients who had rebleeding after pack removal were treated with repacking. There were 2 (6.5%) patients who required repacking in group treated with conventional nasal pack and 6 (19.4%) patients required repacking in group treated with Merocel nasal pack.

**Table 4:** Distribution of patients according to the requirement of repacking

| Nasal Pack | | | | |
|---|---|---|---|---|
| Repacking | Conventional | | Merocel | |
| | N | % | N | % |
| Required | 2 | 6.5% | 6 | 19.4% |
| Not required | 29 | 93.5% | 25 | 80.6% |

## Discussion

The aim of the present study was to compare the effectiveness of conventional nasal packing and Merocel nasal packing in the management of epistaxis. The effectiveness was measured by evaluating discomfort score during pack insertion, pack in situ & pack removal and by observing the need for repacking after removal of the pack after 72 hours. Associating factors such as etiology,and demographic factors like age, gender and were also recorded.

According to the data obtained, the mean age of the patients was 45±15 years. The highest number of patients [16 (25.8%)] was observed in age group 51 - 60 years; followed by 15 (24.2%) in age group 18 – 30 years, 14 (22.6%) in age group 41-50 years, 11 (17.7%) in age group 61 – 70 years and 6 (9.7%) in age group 31 – 40 years. These findings were similar to the findings in a study by Shanmugam VU et al which revealed that highest number of patients (37%) presenting with epistaxis were in fifth decade of their life and least number of patients (3%) were in second decade.1 A predominance of males (62.9%) was noted among the total patients presenting with epistaxis in this study. This finding was consistent with the findings of studies by Shanmugam et al, Mohan et al, Gilyoma JM and Parajuli et al, all of which showed predominance of males.[1,19,20,22]

In the current study, among the etiological factors of epistaxis, it was found that highest number of patients presented with epistaxis because of trauma and hypertension. There were 19 (30.6%) patients who had trauma, 19 (30.6%) had hypertension, 13 (21.0%) had DNS, 5 (8.1%) had acute rhinosinusitis, 3 (4.8%) had bleeding disorder and 3 (4.8%) had idiopathic epistaxis. Similar to these findings, most common etiological factors revealed by Shanmugam et al in their study were hypertension (46.88%) and trauma (37.5%).[1] Mohan et al, in their study, also reported that hypertension and trauma were commonest etiological factors for epistaxis.[19]In contrast to these findings, other studies have demonstrated that idiopathic epistaxis is a common finding.[20,22]Gilyoma JM and Chalya PL reported trauma (30%), idiopathic epistaxis (26.9%) and hypertension (17.3%) as common findings when etiological factors were evaluated.[20] Whereas, Parajuli R et al reported idiopathic epistaxis occurred in higher frequency (38.9%) in comparison to hypertension (27.38%) and trauma (15.47%).[22]

In this study, the discomfort score for pain was evaluated through Visual Analogue Scale in both groups of patients treated with conventional and Merocel nasal pack. The mean discomfort score during pack insertion was 8.00 ± 1.155 and 4.61 ± 1.358; during pack in situ was 4.06 ± 0.772 and 2.35 ± 0.798; during pack removal was 4.13 ± 0.991 and 1.975 ± 0.706 among the conventional and Merocel nasal pack groups. The differences of means of pain score were found to be statistically significant (<0.001). This demonstrated that pain and discomfort was greater in epistaxis management by conventional nasal packing in all phases of treatment than in Merocel nasal packing. In conformity to this statement, the findings of study by Shanmugam et al reported higher pain scores in patients treated with conventional nasal pack during pack insertion (mean score 7.1) and pack removal ( mean score 3.75) than in patients treated with Merocel nasal pack (mean

scores 3.5 and 1.25, respectively).[1] Similarly, the mean pain scores was slightly higher in patients treated with conventional nasal pack (4.97) than Merocel nasal pack (4.63) in findings of the study done by Mohan et al.[23]The study by Mattoo O et al also showed that pain associated with Merocel packing was minimal in comparison to medicated gauge pacing.[21]

In this study there were 2 (6.5%) patients who had bleeding after pack removal and required repacking among patients treated with conventional nasal pack and 6 (19.4%) patients required repacking in group treated with Merocel nasal pack. In consistence to these findings, another study reports 6.25% of the patients treated with conventional nasal packing required repacking and 18.75% of the patients treated with Merocel nasal packing required repacking.[1]Another study by Mattoo O et al also suggested that hemostatic effects were best observed with medicated gauze packing in comparison to Merocel packing.[21] Hence, conventional nasal pack is superior to Merocel nasal pack for controlling the bleeding in immediate and long-term courses.

## Limitations

The study was performed in a small number of patients because of limited number of patients presenting to the hospital.

Owing to the nature of such type of hospital-based study, it was not possible to estimate the prevalence of epistaxis.

## Conclusions

Merocel packing was associated with significantly lower pian scores during insertion, while in situ and during removal. A higher proportion of patients required repacking after merocel packing than conventional packing ,however the small sample size limits definitive conclusion regarding difference in rebleeding.

## References

1. Shanmugam VU, et al. A comparison of conventional nasal pack with Merocel nasal pack in the management of epistaxis. J Med Sci Clin Res. 2019;7(10):904-12. DOI: 10.18535/jmscr/v7i10.156

2. Moumoulidis I, Draper MR, Patel H, Jani P, Price T. A prospective randomised controlled trial comparing Merocel and Rapid Rhino nasal tampons in the treatment of epistaxis. Eur Arch Otorhinolaryngol. 2006;263(8):719-22. DOI: 10.1007/s00405-006-0047-5 PMID: 16685543

3. Murano T, Brucato-Duncan D, Ramdin C, Keller S. Prophylactic systemic antibiotics for anterior epistaxis treated with nasal packing in the ED. Am J Emerg Med. 2019;37(4):726-9. DOI: 10.1016/j.ajem.2018.12.056 PMID: 30600188

4. Murray S, Mendez A, Hopkins A, El-Hakim H, Jeffery CC, Côté DW. Management of persistent epistaxis using Floseal hemostatic matrix vs. traditional nasal packing: a prospective randomized control trial. J Otolaryngol Head Neck Surg. 2018;47(1):1-9. DOI: 10.1186/s40463-017-0248-5 PMID: 29310703 PMCID: PMC5759868

5. Tunkel DE, Anne S, Payne SC, Ishman SL, Rosenfeld RM, Abramson PJ, et al. Clinical practice guideline: nosebleed (epistaxis). Otolaryngol Head Neck Surg. 2020;162(1 Suppl). DOI: 10.1177/0194599819890327 PMID: 31910111

6. Singer AJ, Blanda M, Cronin K, LoGiudice-Khwaja M, Gulla J, Bradshaw J, et al. Comparison of nasal tampons for the treatment of epistaxis in the emergency department: a randomized controlled trial. Ann Emerg Med. 2005;45(2):134-9. DOI: 10.1016/j.annemergmed.2004.10.002 PMID: 15671968

7. Viehweg TL, Roberson JB, Hudson JW. Epistaxis: diagnosis and treatment. J Oral Maxillofac Surg. 2006;64(3):511-8. DOI: 10.1016/j.joms.2005.11.031 PMID: 16487816

8. Corbridge RJ, Djazaeri B, Hellier WP, Hadley J. A prospective randomized controlled trial comparing the use of Merocel nasal tampons and BIPP in the control of acute epistaxis. Clin Otolaryngol Allied Sci. 1995;20(4):305-7. DOI: 10.1111/j.1365-2273.1995.tb00047.x PMID: 8548959

9. Zahed R, Moharamzadeh P, AlizadehArasi S, Ghasemi A, Saeedi M. A new and rapid method for epistaxis treatment using injectable form of tranexamic acid topically: a randomized controlled trial. Am J Emerg Med. 2013;31(9):1389-92. DOI: 10.1016/j.ajem.2013.06.043 PMID: 23911102

10. Beck R, Sorge M, Schneider A, Dietz A. Current approaches to epistaxis treatment in primary and secondary care. Dtsch Arztebl Int. 2018;115(1-2):12. DOI: 10.3238/arztebl.2018.0012

11. Walker TW, Macfarlane TV, McGarry GW. The epidemiology and chronobiology of epistaxis: an investigation of Scottish hospital admissions 1995-2004. Clin Otolaryngol. 2007;32(5):361-5. DOI: 10.1111/j.1749-4486.2007.01530.x PMID: 17883556

12. McGarry GW, Gatehouse S, Vernham G. Idiopathic epistaxis, haemostasis and alcohol. Clin Otolaryngol Allied Sci. 1995;20(2):174-7. DOI: 10.1111/j.1365-2273.1995.tb00039.x PMID: 7634528

13. Danielides V, Kontogiannis N, Bartzokas A, Lolis C, Skevas A. The influence of meteorological factors on the frequency of epistaxis. Clin Otolaryngol Allied Sci. 2002;27(2):84-8. DOI: 10.1046/j.1365-2273.2002.00535.x PMID: 11994111

14. Nunez DA, McClymont LG, Evans RA. Epistaxis: a study of the relationship with weather. Clin Otolaryngol Allied Sci. 1990;15(1):49-51. DOI: 10.1111/j.1365-2273.1990.tb00432.x PMID: 2323080

15. Alshehri WM, Ahmed MW, Albathi A, Alqahtani B. Merocel-Surgicel wrap technique to manage diffuse epistaxis in patients with comorbidities. Int J Otolaryngol. 2020;2020:1-5. DOI: 10.1155/2020/8272914 PMID: 32280348 PMCID: PMC7125479

16. Barnes ML, Spielmann PM, White PS. Epistaxis: a contemporary evidence-based approach. Otolaryngol Clin North Am. 2012;45(5):1005-17. DOI: 10.1016/j.otc.2012.06.018 PMID: 22980681

17. Badran K, Arya AK. An innovative method of nasal chemical cautery in active anterior epistaxis. J Laryngol Otol. 2005;119(9):729-30. DOI: 10.1258/0022215054797989 PMID: 16156917

18. Morgan DJ, Kellerman R. Epistaxis: evaluation and treatment. Prim Care. 2014;41(1):63-73. DOI: 10.1016/j.pop.2013.10.007 PMID: 24439881

19. Mohan A, Ravishankar S, Gautham M, Annapurna S, Pinky D, Sarika SN. Anterior nasal packing in nasal surgeries and epistaxis: advantages of nasal tampon over conventional framycetin ribbon packs. Online J Otolaryngol. 2014;4(1):1-18.

20. Gilyoma JM, Chalya PL. Etiological profile and treatment outcome of epistaxis at a tertiary care hospital in Northwestern Tanzania: a prospective review of 104 cases. BMC Ear Nose Throat Disord. 2011;11:1-6. DOI: 10.1186/1472-6815-11-8 PMID: 21892930 PMCID: PMC3175172

21. Mattoo O, Muzaffar R, Mir A, Malik MA, Ahmed S, Pampori R. Comparing hemostatic and adhesion prevention effects of different types of nasal packings used post-septoplasty viz medicated gauze packing, glove finger packing and Merocel packing. Bangladesh J Otorhinolaryngol. 2012;18(2):129-32. DOI: 10.3329/bjo.v18i2.11989

22. Parajuli R. Evaluation of etiology and treatment methods for epistaxis: a review at a tertiary care hospital in central Nepal. Int J Otolaryngol. 2015;2015:283854. DOI: 10.1155/2015/283854 PMID: 26346242 PMCID: PMC454675