Original Article

Efficacy of Topical Xylometazoline Versus Topical Tranexamic Acid In The Treatment Of Anterior Epistaxis

Nimra Imtiaz[1], Haitham Akaash[2], Sadia Chaudhry[3], Amna Javaid[4], Sundas Masood[5], Adia Bushra Piracha[6]

Abstract

Objective: The objective of this study was to compare the efficacy of topical xylometazoline and topical tranexamic acid in achieving bleeding control in patients presenting with anterior epistaxis in the emergency department.

Method: After getting approval from the ethical review board, this RCT was conducted at Rawalpindi Teaching Hospital from 2nd February 2024 to 1st February 2025. A total of 80 patients (more than 18 years of age) with spontaneous anterior epistaxis were included in the study using non-probability consecutive sampling. They were randomly assigned to two equal groups (n = 40 each). One group received topical xylometazoline (0.1%), which was put on a cotton pledget and inserted into the affected nostril, while the other group received topical tranexamic acid (500 mg in 5 mL) using the same technique. The pledgets remained in place for 10 minutes. The primary outcome was to note the time to achieve haemostasis, which was categorised into 4 intervals: 5-10 minutes, 11-20 minutes, 21-30 minutes, or more than 30 minutes. If the bleeding had not stopped within 30 minutes, it would mean treatment failure, and the patient would be managed via cautery or nasal packing. The secondary outcome was to note the incidence of rebleeding within 48 hours.

Results: In the tranexamic acid group, 45% of patients achieved haemostasis within 5–10 minutes, whereas only 23% of patients achieved haemostasis in the xylometazoline group in the same period, indicating a statistically significant difference (p = 0.019). An additional 45% of the patients in the tranexamic acid group achieved haemostasis within 11–20 minutes, whereas only 18% in the xylometazoline group stopped bleeding within the same timeframe. In the 21–30-minute category, 15% of the patients treated with tranexamic acid achieved haemostasis compared to 25% in the xylometazoline group. Regarding the secondary outcome of rebleeding within 8 hours,43% of patients in the tranexamic acid group experienced recurrence of bleeding compared to 50% in the xylometazoline group (p = 0.23).

Conclusion: These findings suggest that topical TXA is significantly more effective in achieving rapid haemostasis than xylometazoline and is associated with a lower failure rate. However, both agents exhibited similar rebleeding rates within 48 h.

Keywords: Epistaxis; Tranexamic acid; Administration, Topical; Hemostasis; Vasoconstrictor agents; Antifibrinolytic agents.

Introduction

Epistaxis, commonly known as a nosebleed, frequently occurs in emergency and primary care settings. While approximately 60% of individuals experience epistaxis at some point in their lives, only approximately 6% require medical intervention.[1] Anterior epistaxis typically originates from the Kiesselbach plexus and accounts for nearly 90% of all cases.[2] effective management of anterior epistaxis is crucial for preventing complications and reducing healthcare costs. Traditional interventions for controlling anterior epistaxis include direct compression, chemical or electrical cauterisation, and nasal packing.[3,4] While generally effective, these methods can be painful and often require hospital admission. They also reduce patient comfort and increase resource utilisation.[5] In recent years, there has been increased interest in developing therapeutic strategies that are both effective and more pain-free for such patients. Topical vasoconstrictors are widely used to control nosebleeds because of their rapid action in inducing vasoconstriction of the nasal mucosa, thereby reducing blood flow and promoting haemostasis. One such example is Xylometazoline 0.1%.[6] However, their efficacy varies depending on the severity of bleeding and individual patient factors.[6] Tranexamic acid (TXA) is an antifibrinolytic agent. It has also emerged as a possible therapeutic option for managing anterior epistaxis. It works by inhibiting the conversion of plasminogen to plasmin, thereby stabilising formed clots and preventing further fibrinolysis.[7] Its use in epistaxis management offers a non-invasive approach. It also has the potential for faster and more sustained bleeding control. Several studies have evaluated the effectiveness of TXA compared with other treatments.[8] In a double-blind randomised clinical trial, Hashemi et al. compared topical TXA combined with phenylephrine and lidocaine to a control group that received phenylephrine and lidocaine alone. The results showed that topical TXA significantly reduced the need for nasal packing, emergency department stay, and 24-hour rebleeding rates.[8]
Zahed et al. further demonstrated the potential of TNA in a randomised controlled trial by comparing it with anterior nasal packing in patients who were on antiplatelet therapy. Bleeding stopped within 10 min in 73% of patients who received TNA, compared to only 29% of those who were managed with anterior nasal packing. TNA also reduced the need for additional interventions and improved patient comfort.[9]

Contributions:
NI HA SC - Conception, Design
NI AJ ABP - Acquisition, Analysis, Interpretation
NI AJ SM ABP - Drafting
NI HA SC SM - Critical Review

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

Conflicts of Interest: None
Financial Support: None to report
Potential Competing Interests: None to report

Institutional Review Board Approval
1440
24-08-2023
Hayyatabad Medical Complex

Review began 08/07/2025
Review ended 31/12/2025
Published 31/03/2026

How to cite this article: Imtiaz N, Akaash H, Chaudhry S, Javaid A, Masood S, Piracha AB. Efficacy of Topical Xylometazoline Versus Topical Tranexamic Acid In The Treatment Of Anterior Epistaxis. JRMC. 2026 Mar. 31;30(1).

https://doi.org/10.37939/jrmc.v30i1.2973

A meta-analysis by Gottlieb et al. also confirmed that topical tranexamic acid was associated with significantly lower rebleeding rates and a decreased need for invasive procedures when compared to standard nasal packing techniques.[10] These findings highlight that the use of tranexamic acid provides effective bleeding control during acute epistaxis episodes, with the advantage of lowering recurrence rates. This results in better patient recovery along with fewer medical visits.

While some studies have suggested superior outcomes with topical xylometazoline over tranexamic acid in managing anterior epistaxis, emerging evidence supports the effectiveness of topical tranexamic acid as a safe and reliable first-line option for achieving haemostasis.[11] However, further large-scale randomised controlled trials are necessary to establish the standardised use and long-term safety of tranexamic acid across diverse patient populations. As treatment strategies for anterior epistaxis continue to evolve, increasing attention has been directed toward alternative therapeutic options, such as topical tranexamic acid. Additionally, the clinical application of tranexamic acid may enhance patient comfort by minimising the need for invasive procedures and reducing ongoing healthcare utilisation due to recurrent anterior epistaxis.[6]

The objective of this study was to compare the efficacy of topical xylometazoline and topical tranexamic acid in achieving haemostasis in patients with anterior epistaxis. It aimed to assess the time required to stop bleeding, the incidence of rebleeding within 48 h, and the overall effectiveness of each agent.

Materials And Methods

After approval by the Ethics Review Board, this randomised controlled trial was conducted at Rawalpindi Teaching Hospital from February 2, 2024, to February 1, 2025. Eighty patients presenting with spontaneous anterior epistaxis were enrolled using non-probability consecutive sampling. Patients aged ≥ 18 years of either sex presenting with spontaneous anterior epistaxis were included in the study. Individuals with a history of hypertension were also eligible, provided that their blood pressure was well controlled, defined as a reading of < 140/90 mmHg while on stable antihypertensive medication, and were included in the study.

Patients with posterior epistaxis, a history of recent nasal trauma or nasal surgery, or the presence of nasal malignancy were excluded from the study. Individuals with known bleeding disorders requiring systemic treatment or those taking anticoagulant or antiplatelet medications were also excluded. Patients with uncontrolled hypertension, defined as a blood pressure of ≥ 140/90 mmHg despite treatment or a known hypertensive crisis, were not included in the study. The study. The sample size was calculated using the OpenEpi online calculator (95% confidence, 80% power).

Written informed consent was obtained from all eligible participants. Baseline demographic data, including age and sex, were recorded. The medical evaluation included specific questions about hypertension status, history of bleeding disorders, and current use of anticoagulants or antiplatelet drugs.

Patients were randomly assigned to two equal groups (n=40 each) using a computer-generated randomisation sequence.

Group A underwent treatment with topical xylometazoline (0.1%) applied to a cotton pledget inserted into the nasal cavity.

Group B received topical tranexamic acid (500 mg in 5 mL) using the same method.

The duration for which pledgets remained in place in each patient was 10 minutes. Patients were instructed to avoid blowing their noses for two hours after treatment.

Hemostasis was assessed at the following time intervals:

- 5–10 minutes
- 11–20 minutes
- 21–30 minutes
- More than 30 minutes (treatment failure).

After treatment failure, if haemostasis was not achieved within 30 minutes, the patients received standard hospital care through either nasal packing or cauterisation. Follow-up for rebleeding was performed via telephone contact or outpatient visits within 48 hours of the initial treatment.

Data was analysed using SPSS version 26. The continuous variables were presented in the form of mean or standard deviation. The categorical variables were presented in the form of frequencies and percentages. The chi-square test was used to compare categorical outcomes between two groups. A p-value of <0.05 was considered statistically significant.

Results

A total of 80 patients were enrolled in this study, with 40 patients assigned to each of the topical tranexamic acid and topical xylometazoline groups. (Table 1)

The mean age of the participants in the tranexamic acid group was 51.4 ± 18.6 years. In contrast, the participants in the xylometazoline group had a mean age of 51.0 ± 17.0 years (p = 0.933), indicating no statistically significant difference between the two groups in terms of age distribution.

With respect to sex distribution, 55% of the patients in the tranexamic acid group were men, and 45% were women, whereas the xylometazoline group included 50% men and 50% women (p = 0.643).

The prevalence of HTN was slightly higher in the TAH group (63%) than in the xylometazoline group (50%), although the difference was not statistically significant (p = 0.11).

Regarding the primary outcome of time to haemostasis (Table 2), 45% of patients in the tranexamic acid group achieved bleeding cessation within 5–10 minutes, compared to 23% in the xylometazoline group (p = 0.019). An additional 45% of the patients in the tranexamic acid group stopped bleeding within 11–20 minutes, whereas only 18% in the xylometazoline group achieved haemostasis in the same timeframe. In the 21–30-minute category, 15% of the tranexamic acid group and 25% of the xylometazoline group patients attained haemostasis. Notably, 45% of patients in the xylometazoline group failed to achieve haemostasis, compared to only 15% in the tranexamic acid group.

The secondary outcome of rebleeding within 48 h was observed in 43% of patients in the tranexamic acid group and 50% in the xylometazoline group (p = 0.23) (Figure 1). Although the rate of rebleeding was lower in the tranexamic acid group, the difference was not statistically significant.

These findings suggest that tranexamic acid is more effective in achieving rapid haemostasis than xylometazoline and is associated with fewer cases of persistent bleeding. However, both agents demonstrated similar rates of rebleeding within 48 h.

Table 1: Demographic and clinical profile

Variables	Tranexamic acid (n=40)	Xylometazoline (n=40)	P value
Age (Years)	51.4±18.6	51.0±17.0	0.933
Gender			0.643
Male	22 (55%)	20 (50%)	
Female	18 (45%)	20 (50%)	
History of Hypertension	25 (63%)	20 (50%)	0.11

Table 2: Duration at which homeostasis is achieved

Duration during which epistaxis stopped	Tranexamic acid (n=40)	Xylometazoline (n=40)	P value
5-10 minutes	14 (45%)	9 (23%)	0.019
11-20 minutes	14 (45%)	7 (18%)	
21-30 minutes	6 (15%)	10 (25%)	
Did not stop	6 (15%)	14 (45%)	

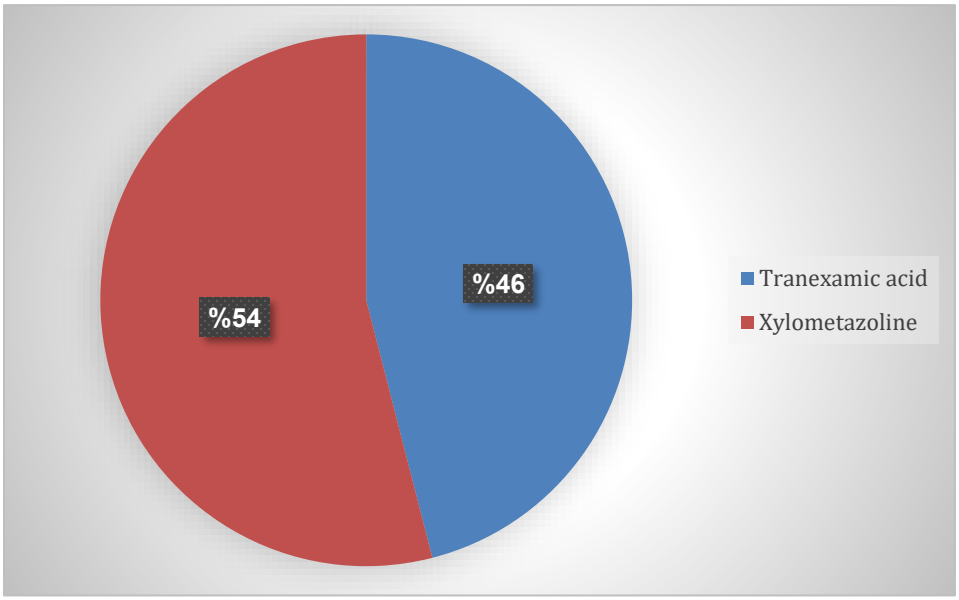

Figure 1: Rebleeding Occurrence within 48 hours:

Discussion

The research comparing topical tranexamic acid (TXA) and topical xylometazoline in the treatment of anterior epistaxis is gaining clinical relevance as practitioners search for faster and more comfortable solutions for patients. In this randomised controlled trial, 80 participants were equally divided into two treatment groups receiving either TXA or xylometazoline. The mean age in both groups was approximately 51 years.

The gender distribution in this study revealed a slight male predominance in both groups, consistent with the general trend that epistaxis is more common in men.[12,13] The balanced inclusion of both sexes in both treatment groups supports the applicability of the results to a broad patient population.

Although the data showed that patients in the tranexamic acid group had a higher frequency of hypertension (63%) than in the xylometazoline group (50 %), this difference was not statistically significant.

Patients who received TXA achieved haemostasis within 5–10 min in 45% of cases, whereas patients who received xylometazoline alone achieved this outcome in 23% of cases ($p = 0.019$), suggesting a faster and more reliable onset of action for TXA. This rapid effect supports earlier studies (eg, Hosseinialhashemi et al), which demonstrated a significantly faster rate of haemostasis with TXA. Specifically, only 50% of patients in the TXA group required nasal packing compared to 64.2% in the control group. Moreover, a smaller proportion (9.2%) of patients treated with TXA remained in the emergency department for more than 2 h, compared to 20.8% in the control group. Additionally, the 24-h rebleeding rate was 15% in the TXA group versus 30% in the control group.[8] The study by Whitworth et al. validated this quick haemostatic effect by showing that TXA produced bleeding cessation in 78% of patients in 10 min, while xylometazoline succeeded in only 35% of treated patients.[14]

The antifibrinolytic action of TEx stabilises blood clots by inhibiting plasminogen activation, contributing to its efficacy in controlling active nasal bleeding.[15]

Failure to achieve haemostasis within 30 minutes occurred in only 15% of patients in the tranexamic acid group, in contrast to 45% in the xylometazoline group. This further supports the superior clinical efficacy of tranexamic acid in the treatment of anterior epistaxis. These findings are consistent with the results reported by Birmingham et al., in which tranexamic acid reduced the need for additional invasive interventions, such as nasal packing or cauterisation.[16]

Although the rebleeding rate within 48 h was lower in the tranexamic acid group (43%) than in the xylometazoline group (50%), this difference was not statistically significant. Nevertheless, tranexamic acid can provide faster initial haemostasis, leading to increased patient comfort, reduced need for prolonged observation, and decreased emergency department resource utilisation.[17,18]

Conclusions

This study demonstrates that topical tranexamic acid is more effective than xylometazoline in achieving rapid bleeding control in patients presenting with anterior epistaxis. Despite similar rebleeding rates, tranexamic acid offers a significant clinical advantage in acute bleeding control. These findings support the consideration of tranexamic acid as a first-line agent for anterior epistaxis. Further large-scale multicentre studies are recommended to validate these results and to assess the long-term safety and efficacy of topical tranexamic acid in diverse patient populations.

Author Information

1,4,6. Post Graduate Trainee, Rawalpindi Medical University 2,5. Assistant Professor, ENT, Rawalpindi Medical University 3. Professor, ENT, Rawalpindi Medical University.
Corresponding author: Dr. Nimra Imtiaz usmannimra47@gmail.com

References

1. Sharifi A, Hwang PH, Zojaji M, Ghaedsharaf S, Samadizadeh S, Ghaffari ME, Qian ZJ. Environmental factors and the incidence of pediatric epistaxis: A systematic review with meta-analysis. International Journal of Pediatric Otorhinolaryngology. 2024 Nov 1;186:112152. https://doi.org/10.1016/j.ijporl.2024.112152
2. Hamlett KE, Yaneza MM, Grimmond N. Epistaxis. Surgery (Oxford). 2021 Sep 1;39(9):577-90. https://doi.org/10.1016/j.mpsur.2021.08.002
3. Ikram T, Asim MU, Masood S, Fatima A, Akash H, Shahan Z. Efficacy of chemical and electrical cautery in management of Anterior Epistaxis. Journal of Rawalpindi Medical College. 2022 Jun 30;26(2-S1). https://doi.org/10.37939/jrmc.v1i1.1807
4. Mylonas S, Skoulakis C, Nikolaidis V, Hajiioannou J. Epistaxis treatment options: literature review. Indian Journal of Otolaryngology and Head & Neck Surgery. 2023 Sep;75(3):2235-44. https://doi.org/10.1007/s12070-023-03824-z
5. Tran QK, Barnett J, O'Connell F, D'Anza B, Pourmand A. Nasal packing in the emergency department: a practical review for emergency providers. Open Access Emergency Medicine. 2021 Dec 2:527-33. https://doi.org/10.2147/OAEM.S247017
6. Janapala RN, Tran QK, Patel J, Mehta E, Pourmand A. Efficacy of topical tranexamic acid in epistaxis: a systematic review and meta-analysis. The American journal of emergency medicine. 2022 Jan 1;51:169-75. https://doi.org/10.1016/j.ajem.2021.10.043
7. Prudovsky I, Kacer D, Zucco VV, Palmeri M, Falank C, Kramer R, et al. Tranexamic acid: beyond antifibrinolysis. Transfusion. 2022 Aug;62:S301-12. https://doi.org/10.1111/trf.16976
8. Hosseinialhashemi M, Jahangiri R, Faramarzi A, Asmarian N, Sajedianfard S, Kherad M, Soltaniesmaeili A, Babaei A. Intranasal topical application of tranexamic acid in atraumatic anterior epistaxis: a double-blind randomized clinical trial. Annals of Emergency Medicine. 2022 Sep 1;80(3):182-8. https://doi.org/10.1016/j.annemergmed.2022.04.010
9. Zahed R, Mousavi Jazayeri MH, Naderi A, Naderpour Z, Saeedi M. Topical tranexamic acid compared with anterior nasal packing for treatment of epistaxis in patients taking antiplatelet drugs: randomized controlled trial. Academic Emergency Medicine. 2018 Mar;25(3):261-6. https://doi.org/10.1111/acem.13345
10. Gottlieb M, DeMott JM, Peksa GD. Topical tranexamic acid for the treatment of acute epistaxis: a systematic review and meta-analysis. Annals of Pharmacotherapy. 2019 Jun;53(6):652-7. https://doi.org/10.1177/1060028018820625
11. Ali M, Khurshied S, Hussain A, Khurshid A. Efficacy of topical tranexamic acid compared with topical xylometazoline in management of patients with epistaxis taking antiplatelet drugs. Insights-Journal of Health and Rehabilitation. 2025 May 24;3(3 (Health & Allied)):294-300. https://doi.org/10.71000/rc3t2537
12. Li HY, Luo T, Li L, Liu Y, Zhai X, Wang XD. Etiology and clinical characteristics of primary epistaxis. Annals of Translational Medicine. 2023 Jan 31;11(2):96. https://doi.org/10.21037/atm-22-6590
13. Ukawat L, Gupta A, Jain K. Demographic profile and etiology of epistaxis. Indian Journal of Otolaryngology and Head & Neck Surgery. 2024 Aug;76(4):3172-5. https://doi.org/10.1007/s12070-024-04638-3
14. Whitworth K, Johnson J, Wisniewski S, Schrader M. Comparative effectiveness of topically administered tranexamic acid versus topical oxymetazoline spray for achieving hemostasis in epistaxis. The Journal of emergency medicine. 2020 Feb 1;58(2):211-6. https://doi.org/10.1016/j.jemermed.2019.11.038
15. Colomina MJ, Contreras L, Guilabert P, Koo M, Sabate A. Clinical use of tranexamic acid: evidences and controversies. Brazilian Journal of Anesthesiology (English Edition). 2022 Nov 1;72(6):795-812. https://doi.org/10.1016/j.bjane.2021.08.022
16. Birmingham AR, Mah ND, Ran R, Hansen M. Topical tranexamic acid for the treatment of acute epistaxis in the emergency department. The American journal of emergency medicine. 2018 Jul 1;36(7):1242-5. https://doi.org/10.1016/j.ajem.2018.03.039
17. Shahidi N, Mortazavi M, Dorosti A, Movassaghi R. Use of tranexamic acid for controlling epistaxis in the patients referring to the emergency department: Single-blind randomized clinical trial. Trauma Monthly. 2021 Dec 1;26(6):305-10. https://doi.org/10.30491/tm.2021.284360.1288
18. Davis S, Nawab A, van Nispen C, Pourmand A. The role of tranexamic acid in the management of an acutely hemorrhaging patient. Hospital Pharmacy. 2021 Aug;56(4):350-8. https://doi.org/10.1177/0018578720906613