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ORIGINAL ARTICLE

Topical tranexamic acid compared with anterior nasal packing treatment of epistaxis in patients taking antiplatelet drugs.

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ABSTRACT… Objective: To evaluate the effectiveness of anterior nasal packing and topical tranexamic acid in treating epistaxis in patients on antiplatelet medications. **Study Design:** Randomized Controlled Trail. **Setting:** Emergency Department of Ziauddin University Hospital, Karachi. **Period:** 21-5-2024 to 5-5-2025. **Methods:** Those patients who presented with anterior epistaxis were randomised by using the lottery method to receive anterior nasal packing (ANP) or topical application of tranexamic acid (TXA), with 30 patients in each group. In the case group, patients were treated with topical tranexamic acid, while in the control group, patients were treated with ANP. The Statistical Package for Social Sciences (SPSS version 25) was utilized for interpretation of collected data. **Results:** Of the 60 epistaxis patients, majority of epistaxis patients were male (55.0%, n=33), and the remaining were female (45.0%, n=27), with an average age of 59.2 ± 8.3 years. Mean cessation time of bleeding in epistaxis patients was 7.1 ± 3.4 min in the case (TXA) group and 13.4 ± 4.9 min in the control (ANP) group (p-value < 0.001). Length of stay in ED in epistaxis patients was significantly lower in the case (TXA) group as compared to the control (ANP) group (p-value=0.042). Rebleeding in epistaxis patients occurred in 10.0% (n=3) in the case (TXA) group and 40.0% (n=12) in the control (ANP) group (p-value=0.007). Treatment in epistaxis patients was satisfactory in 90.0% (n=27) in the case (TXA) group and 66.7% (n=20) in the control (ANP) group (p-value=0.028). **Conclusion:** The use of topical tranexamic acid instead of anterior nasal packing for the treatment of epistaxis in patients who were on antiplatelet drugs is associated with significantly shorter duration of bleeding control, fewer rebleeding episodes, decreased length of ED stay, and greater satisfaction.

Key words: Bleeding, Epistaxis, Emergency, Antiplatelet Drugs, Nosebleed.

INTRODUCTION

The term epistaxis, commonly known as nosebleed, is used for any type of nasal bleeding. Epistaxis is the most frequent ear, nose, and throat (ENT) emergency, which is examined in the emergency department (ED) or primary healthcare clinic. Most cases of epistaxis are minor and clinically insignificant, but they can sometimes be severe, potentially fatal, and indicative of a more serious illness.[1,2] There are two types of epistaxis: anterior, which occurs more frequently but does not require medical intervention, and posterior, which is less common but requires medical intervention. According to reports, anterior epistaxis is responsible for 80% to 90%, while posterior epistaxis accounts for 10% to 20% of total epistaxis. Epistaxis affects more than 60% of the population at least once in their lives, 6% of whom require medical intervention. According to estimates, epistaxis accounts for 0.3% to 0.5% of ED visits, comprising one-third of all ENT emergency admissions. Epistaxis is most common in children of ≤10 years and adults of ≥70 years, leading to ED visits.[3,4]

Epistaxis is usually sudden and idiopathic with unknown etiology. The etiology of 70% to 80% of cases of epistaxis is unclear, despite the fact that it can be caused by bleeding diseases, trauma, hypertension, surgery, inherited hemorrhagic telangiectasia, and the use of antiplatelet and anticoagulant drugs.[5,6] The etiologic factors of epistaxis can be classified as local (e.g., deviated septum, trauma), systemic (e.g., alcoholism,

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hypertension), environmental (e.g., dryness, allergies), and medications (e.g., aspirin, clopidogrel, warfarin, cocaine).[7,8] Antiplatelet agents, primarily aspirin and clopidogrel, are frequently prescribed to treat or prevent a variety of cardiovascular disorders. Although the risk of epistaxis is not significantly different among those using clopidogrel or aspirin, managing epistaxis is more challenging for those taking antiplatelet agents.[9]

Epistaxis is usually self-limiting, although it can be fatal, especially in elderly patients or patients with underlying disorders.[10] Currently, management of epistaxis includes nasal squeezing, using ice pack, use of vasoconstrictor agents, electrical or chemical (silver nitrate) cauterization and nasal packing with nasal tampons or ribbon gauze.[10,11] Nasal packing is the most common procedure performed in epistaxis management. Anterior nasal packing (ANP) is typically done after the administration of anesthetic medications (e.g., lidocaine) and a vasoconstrictor (e.g., epinephrine), which can lead to mucosal shrinkage and facilitate the insertion of pledgets coated with petroleum jelly or ointments and inflatable balloons or packs. ANP is also associated with several limitations, such as discomfort during placement, prolonged stay, discomfort or rebleeding during removal, and the need for analgesics and prophylactic antibiotics.[12,13]

Therefore, there is always a need for new approaches in the management of epistaxis. Several topically applied hemostatic medications, such as aminocaproic acid and tranexamic acid have been commonly administered to manage epistaxis. Of these, tranexamic acid is administered topically, orally, and as a topical gel; however, the utilization of systemic tranexamic acid in thromboembolic cases is contraindicated. Topical application of the drug is preferable to reduce systemic absorption. Thus, the use of tranexamic acid as a topical therapy for acute epistaxis is becoming more common in the ED.[14,15] Therefore, we have evaluated the efficacy of the topical application of an injectable form of tranexamic acid compared with anterior nasal packing for the treatment of epistaxis in patients taking antiplatelet medications such as aspirin, clopidogrel, or both who present to the ED.

METHODS

A randomized controlled trail research on anterior epistaxis patients was conducted on emergency department of Ziauddin University Hospital, Karachi. A total of 60 patients visiting the emergency department with epistaxis were consecutively enrolled during the period of eleven months from 21-5-2024 to 5-5-2025. The research includes patients with the following characteristics: (1) patients with either gender, (2) patients aged ≥ 40 years, (3) patients with acute, new or recurrent, ongoing anterior epistaxis, (4) patients who are currently using antiplatelet drugs (for example, aspirin, clopidogrel or both drugs), (5) patients who received anterior nasal packing (ANP) or topical application of tranexamic acid, and (6) patients with persistent bleeding who need further management after 15-20 minutes of compression of both nostrils with the patient's thumb and index finger. The research excludes patients with the following characteristics: (1) patients aged < 40 years, (2) patients with traumatic epistaxis, (3) patients with current anticoagulant drug use, (4) patients with inherited bleeding disorders, and (5) patients who are not interested in participating in the study.

Before starting this RCT research, permission was taken from Ziauddin University Karachi's Research Committee via letter no: 8520324 BVEM to 21-5-2024. Details of the research were disclosed to patients before inclusion in the trial, and signed informed consent was obtained. Patients who met the study's inclusion criteria were enrolled and interviewed for demographics (gender and age), epistaxis details (duration of bleeding, mechanism of bleeding, previous history of epistaxis, previous history of ED visits, and previous history of hospital admission with epistaxis), and outcome (Length of stay in ED, follow-up, and treatment outcome satisfactory or unsatisfactory). Those patients who presented with anterior epistaxis were randomised by using the lottery method to receive anterior nasal packing (ANP) or topical application of

tranexamic acid (TXA), with 30 patients in each group. In the case group, patients were treated with topical tranexamic acid, while in the control group, patients were treated with ANP.

Epistaxis was confirmed on presence of acute hemorrhage from the nostril, nasal cavity, or nasopharynx. Anterior Nasal Bleed was confirmed on presence of bleeding originate toward the front of the nose and cause blood to flow out through the nostrils. The SPSS was used for interpretation of collected data. Independent sample t test and chi-square test was utilized with significant p-value of ≤ 0.05 for comparing case and control groups.

RESULTS

Of the 60 epistaxis patients, half of the patients were managed with topical tranexamic acid, while half were managed with anterior nasal packing. The majority of epistaxis patients were male (55.0%, n=33), and the remaining were female (45.0%, n=27) [Figure-1], with an average age of 59.2 ± 8.3 years. There was no significant difference in gender (p-value=0.795) and mean age (p-value=0.247) of epistaxis patients in case (TXA) and control (ANP) groups Table-I.

Similarly, there were also no significant differences in epistaxis details in case (TXA) and control (ANP) groups, such as mean duration of bleeding (p-value=0.909), previous history of epistaxis (p-value=0.598), previous history of ED visits (p-value=0.781), and previous history of hospital admission with epistaxis (p-value=0.554) Table-II.

There were significant differences in outcomes between the case (TXA) and control (ANP) groups. Mean cessation time of bleeding in epistaxis patients was 7.1 ± 3.4 min in the case (TXA) group and 13.4 ± 4.9 min in the control (ANP) group (p-value < 0.001). Length of stay in ED in epistaxis patients was significantly lower in the case (TXA) group as compared to the control (ANP) group (p-value=0.042). Rebleeding in epistaxis patients occurred in 10.0% (n=3) in the case (TXA) group and 40.0% (n=12) in the control (ANP) group (p-value=0.007). Treatment in epistaxis patients was satisfactory in 90.0% (n=27) in the case (TXA) group and 66.7% (n=20) in the control (ANP) group (p-value=0.028) Table-III.

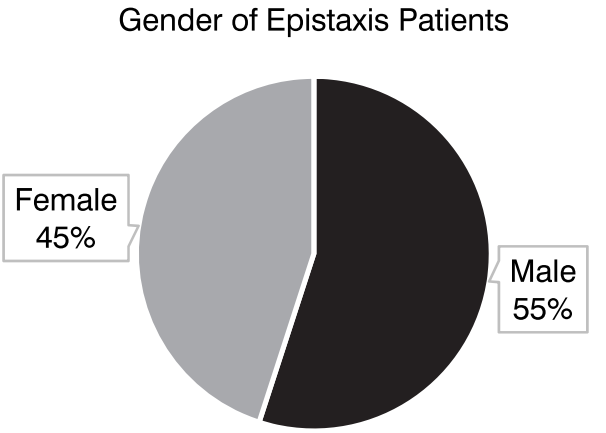

Figure-1. Gender of epistaxis patients

Variables		Case	Controls	P-Value
Gender	Male	16 (53.3%)	17 (56.7%)	0.795
	Female	14 (46.7%)	13 (43.3%)	
Age (Years)	Mean ± SD	60.5 ± 8.3 (45-80)	58.0 ± 8.3 (45-80)	0.247
	≤60	17 (56.7%)	21 (70.0%)	0.284
	>60	13 (43.3%)	9 (30.0%)	

Case: Topical Tranexamic Acid (TXA)
Controls: Anterior Nasal Packing (ANP)

Table-I. Demographics in case and controls (n=60)

DISCUSSION

In this randomised controlled trial study, sixty patients of epistaxis who visited the ED and also met other study criteria were enrolled. Patients who presented with anterior epistaxis were divided into two groups using a lottery method, with 30 patients in each group. In the case group, patients were treated with topical tranexamic acid, while in the control group, patients were treated with ANP. According to the study results, the use of topical TXA instead of ANP for the management of epistaxis is associated with significantly shorter duration of bleeding control, shorter length of stay in the ED, fewer rebleeding episodes, and greater satisfaction.

Variables		Case	Controls	P-Value
Duration of Bleeding (Min)	Mean ± SD	12.0 ± 3.4 (6-18)	11.9 ± 3.4 (5-18)	0.909
	≤10	11 (36.7%)	10 (33.3%)	0.787
	>10	19 (63.3%)	20 (66.7%)	
Mechanism of Bleeding	Spontaneous	30 (100.0%)	30 (100.0%)	---
Previous History of Epistaxis	Yes	13 (43.3%)	11 (36.7%)	0.598
	No	17 (56.7%)	19 (63.3%)	
Previous History of ED Visits	Yes	10 (33.3%)	9 (30.0%)	0.781
	No	20 (66.7%)	21 (70.0%)	
Previous History of Hospital Admission with Epistaxis	Yes	2 (6.7%)	1 (3.3%)	0.554
	No	28 (93.3%)	29 (96.7%)	

Case: Topical Tranexamic Acid (TXA)
Controls: Anterior Nasal Packing (ANP)

Table-II. Epistaxis details in case and controls (n=60)

Variables		Case	Controls	P-Value
Bleeding Cessation Time (Minutes)	Mean ± SD	7.1 ± 3.4 (2-15)	13.4 ± 4.9 (2-20)	<0.001
	≤5	7 (23.3%)	2 (6.7%)	<0.001*
	6-10	19 (63.3%)	4 (13.3%)	
	11-15	4 (13.3%)	10 (33.3%)	
	>15	0 (0.0%)	14 (46.7%)	
Length of Stay in ED (Hours)	<2	9 (30.0%)	3 (10.0%)	0.042*
	2	15 (50.0%)	13 (43.3%)	
	>2	6 (20.0%)	14 (46.7%)	
Rebleeding	Yes	3 (10.0%)	12 (40.0%)	0.007*
	<24 Hours	2 (66.7%)	9 (75.0%)	
	>24 Hours	1 (33.3%)	3 (25.0%)	
	No	27 (90.0%)	18 (60.0%)	
Treatment Outcome	Satisfactory	27 (90.0%)	20 (66.7%)	0.028*
	Unsatisfactory	3 (10.0%)	10 (33.3%)	

Case: Topical Tranexamic Acid (TXA)
Controls: Anterior Nasal Packing (ANP)
* Statistically Significant P-Value

Table-III. Outcome in case and controls (n=60)

In this study, the majority of epistaxis patients were male (55.0%, n=33), and the remaining were female (45.0%, n=27), with an average age of 59.2 ± 8.3 years. There was no significant difference in gender (p-value=0.795) and mean age (p-value=0.247) of epistaxis patients in case (TXA) and control (ANP) groups. The study findings indicated that a large proportion of male patients and the elderly suffer from epistaxis, with an average age of 60. Similar results were observed in studies conducted by various other researchers. Hosseinialhashemi et al. reports that 52.5% of epistaxis patients were male with an average age of 52 years.[15] Adhikari et al. reports that 66.0% of epistaxis patients were male and approximately 49.0% of them were in age group of ≥ 50 years.[16] Zahed et al. reports that 56% of epistaxis patients were male with an average age of 60 years.[17] The males mostly suffer from epistaxis because they worked outside the home and are more exposed to dry weather and environments than females, who mostly work at

home. Similarly, elders are also more exposed to dry weather because of atrophied mucosa in the nasal cavity and wide nasal cavities.[15-18]

In this study, mean cessation time of bleeding in epistaxis patients was significantly low in the case (TXA) group as compared to the control (ANP) group (p-value < 0.001). Mean cessation time of bleeding in epistaxis patients was 7.1 ± 3.4 min in the case (TXA) group and 13.4 ± 4.9 min in the control (ANP) group. Adhikari et al. reported that the mean cessation time of bleeding in epistaxis patients was 3.86 minutes in the TXA nasal pack group and 4.35 minutes in the normal saline nasal pack group.[19] Birmingham et al. reported that cessation time of bleeding was significantly lower in the TXA group than in the ANP groups (p-value < 0.001). Bleeding cessation time was < 10 minutes in 71.0% of epistaxis patients in the TXA group and 31.2% of epistaxis patients in the ANP group.[20] Amini et al. also reported that the mean cessation time of bleeding in epistaxis patients was 6.70 minutes in the TXA group and 11.50 minutes in the ANP group.[21] According to the similar study findings, the mean blood cessation time was significantly low in the TXA group in epistaxis patients.

In this study, length of stay in ED in epistaxis patients was significantly lower in the case (TXA) group as compared to the control (ANP) group (p-value=0.042). Length of stay was ≤ 2 hours in 80.0% (n=24) epistaxis patients in the case (TXA) group and 53.3% (n=16) epistaxis patients in the control (ANP) group. Hosseinialhashemi et al. report that the length of stay was > 2 hours in 9.2% of epistaxis patients in the TXA group and 20.8% in the ANP group.[15] Zahed et al. report that length of stay was ≤ 2 hours in 97% of epistaxis patients in the TXA group and 13.0% of epistaxis patients in the ANP group (p-value < 0.001).[17] Amini et al. also reported that length of stay was < 2 hours in 90.0% of epistaxis patients in the TXA group and 16.0% of epistaxis patients in the ANP group (p-value < 0.001).[21] According to the similar study findings, the length of stay in ED was significantly low in the TXA group in epistaxis patients.

In this study, rebleeding in epistaxis patients was significantly lower in the case (TXA) group as compared to the control (ANP) group (p-value=0.007). Rebleeding in epistaxis patients occurred in 10.0% (n=3) in the case (TXA) group and 40.0% (n=12) in the control (ANP) group. Similar studies also report that rebleeding was lower in the TXA group than in the ANP group. Hosseinialhashemi et al. report that the bleeding occurred in 15.0% of epistaxis patients in the TXA group and 30.0% of epistaxis patients in the ANP group within 24 hours.[15] Zahed et al. report that rebleeding occurred in 5.0% of epistaxis patients in the TXA group and 10.0% of epistaxis patients in the ANP group within 24 hours.[17] Amini et al. also reported that rebleeding occurred in 6.0% of epistaxis patients in the TXA group and 20.0% of epistaxis patients in the ANP group within 72 hours.[21] According to the similar study findings, the rebleeding was significantly low in the TXA group in epistaxis patients.

In this study, treatment in epistaxis patients was significantly satisfactory in the case (TXA) group as compared to the control (ANP) group (p-value=0.028). Treatment in epistaxis patients was satisfactory in 90.0% (n=27) in the case (TXA) group and 66.7% (n=20) in the control (ANP) group. Amini et al. reported that success rate in epistaxis patients was 94.0% in the TXA group and 80.0% in the ANP group (p-value=0.037).[21] Akkan et al. report that success rate in epistaxis patients was 91.1% in TXA group, 93.3% in nasal packing group and 71.1% in saline group.[22] According to the similar study findings, the success rate was significantly high in the TXA group in epistaxis patients.

There are some limitations to this randomized controlled trial study. First, the small sample size may result in biased conclusions and limit the implications of the study results to a small proportion of the population. Second, the exclusion of posterior epistaxis patients from the study restricts the researcher from explaining the role of topical TXA in the management of posterior epistaxis. Third, the study includes epistaxis patients taking antiplatelet drugs, which also restricts the implications of the study

results to a general population. Last, the study was conducted in a single ED, so it should be repeated in multiple EDs with a large sample size.

CONCLUSION

The use of topical tranexamic acid instead of anterior nasal packing for the treatment of epistaxis in patients who were on antiplatelet drugs is associated with significantly shorter duration of bleeding control, fewer rebleeding episodes, decreased length of ED stay, and greater satisfaction.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Bella Virk:** Topic selection, data collection.
2	**Khalid Khan:** Study design.
3	**Sana Nawaz:** Data entry.
4	**Azka Jalil:** Literature review.
5	**Mahnoor Arif:** Analysis.
6	**Maaz Obaid:** Study design, data entry.