Journal of Chitwan Medical College 2024;14(48):59-63
Available online at: www.jcmc.com.np

ORIGINAL RESEARCH ARTICLE

COMPARISON OF TRANEXAMIC ACID SOAKED MEROCEL AND SALINE WATER SOAKED MEROCEL IN CONTROL OF EPISTAXIS

Mukesh Kumar Sah[1], Amit Jha[2,*], Payal Mandal[2], Ram Kumar Pradhan[3]
[1]Senior Resident, Head and Neck Surgery, Tata Memorial Center, Mumbai, India
[2]Department of ENT, Chitwan Medical College, Bharatpur, Nepal
[3]Deptartment of ENT, National Medical College, Birgunj, Nepal

Received: 16 Apr, 2024
Accepted: 2 Jun, 2024
Published: 17 Jun, 2024

Key words: Epistaxis; Nasal tampon;Tranexamic acid.

***Correspondence to:** Amit Jha, Dept. of ENT, Chitwan Medical College, Bharatpur, Nepal.
Email: amitjha086@gmail.com

DOI:https://doi.org/10.54530/jcmc.1513

Citation

Sah MK, Jha A, Mandal P, Pradhan RK. Comparison of tranexamic acid soaked merocel with saline water soaked merocel in control of epistaxis. Journal of Chitwan Medical College.2024;14(48):59-63.

Peer Reviewed

ABSTRACT

Background: Management of epistaxis usually requires nasal packing. Merocel nasal tampon is one of the commonly used materials for packing. The nasal tampon swells and fills the nasal cavity and applies pressure over the bleeding point after applying water or water based solution over it, after placing it inside the nasal cavity. Tranexemic acid (a water based solution) may have additional benefit in epistaxis control by exerting its local hemostatic effect. This study compared control rate of epistaxis after the application of tranexemic acid solution versus control rate of epistaxis after application of saline water over the merocel nasal tampon.

Methods: This comparative observational study was conducted from June 2020 to December 2022 at National Medical College Teaching Hospital (NMCTH), Nepal. Seventy patients with epistaxis; 35 in tranexamic acid soaked merocel nasal pack group and 35 in saline soaked merocel nasal pack group were enrolled after informed consent. Success in control of epistaxis was compared between these two groups.

Results: Successful control of epistaxis was achieved in greater number of cases in tranexemic acid soaked merocel group (85.7%) versus saline soaked merocel group (68.6%), but statistically not significant (P value 0.077). The length of hospital stay was significantly shorter in tranexemic acid group (P value 0.037).

Conclusions: Merocel is an effective material used in anterior nasal packing for control of epistaxis. Tranexemic acid injection to expand the merocel pack does not provide additional advantage in control of bleeding, however, it shortens the duration of the hospital stay.

INTRODUCTION

Epistaxis is defined as bleeding from the nasal cavity. It is a frequently encountered emergency by Ear, Nose and Throat (ENT) surgeons. The prevalence of epistaxis is not known, because most episodes are self-limited, with fewer than 10% reporting at medical facilities.[1–3]Approximately three-quarters of them require nasal packing.[4-6] About 70% to 80% of cases are idiopathic; other causes are trauma, infection, drugs, tumor and coagulopathies.[7]

Nasal packing still remains the first line management in controlling epistaxis at most centers because of its availability, efficacy and ease of use.[8-14]Nasal packing works directlyby pressure effect over bleeding surface and tiny vessels. Their ease of insertion and removal; and minimal discomfort to the patient makes them suitable for use in the emergency.[9]Tranexamic acid (TXA) is an anti-fibrinolytic that stabilizes blood clots by competitively inhibiting the binding of plasminogen to fibrin, thus preventing fibrinolysis. This anti-fibrinolytic effect is routinely used to reduce excessive bleeding and to prevent re-bleeding in many clinical situations.[15,16] It can be administered orally or intravenously, or applied topically. The topical application of tranexamic acid for the reduction of bleeding has been used in a variety of clinical and research settings with good evidence of its efficacy and safety.[15]Tranexamic acid may therefore can be used in the management of epistaxis as an adjunct to usual therapies. It may have roles in stopping nasal bleeding and preventing repeat episodes.[17]

Merocel,a nasal pack that is supplied as tampon and is expanded using any water-based solution after its insertion into the nasal cavity can also be expanded by injecting tranexamic acid (TXA) into it instead of water. In this way, TXA may remain in contact with nasal mucosa over a longer period of time and can exert its topical effect in bleeding control. Replacing water with TXA in merocel expansion may have additional benefit in terms of lesser need of second procedure, minimizing hospital stay and reduction of episodes of rebleeding. No published literature has compared this.

We aimed to compare tranexamic acid soaked merocel and saline water soaked merocel in control of epistaxis.

METHODS

This single-center prospective comparative study was conducted in the department of Ear, Nose, Throat and Head & Neck surgery (ENT-HNS) at National Medical College Teaching Hospital (NMCTH), Birgunj, Nepal; from June 2020 to December 2022. The institutional review board approved the protocol used in the study. Sample size was calculated using sample size formula for the comparison of two proportions as shown below:

$n = [\{p_1(1-p_1) + p_2(1-p_2)\} \div (p_1-p_2)^2] \times f(\alpha, \beta)$

where,

n = the required sample size in each group

p_1 = success rate in control group

p_2 = success rate in test group

f (α, β) = a constant 13 (for power of 95% and α = 0.05)

From a similar study,[18] we have p_1=0.31 and p_2= 0.71.

On substituting the values in the formula, we get n = 34.1 in each group. Hence, 35 cases in each group was included in the study.

Patients included in the study were aged 16 years or above presenting with anterior epistaxis, which could not be controlled by digital pressure, oxymetazoline (0.05%) cotton pack for ten minutes or chemical cautery, or the site of bleeding was difficult to identify and cauterize by anterior rhinoscopy.

- Refusal or unableto give consent for enrollment in the study
- Posterior epistaxis needing posterior nasal packing as immediate procedure
- Patients undergoing current anticoagulation therapy
- Known allergy to tranexamic acid.
- No telephone or unwilling to be contacted by telephone
- Known nasopharyngeal, nasal cavity or paranasal malignancy
- Known bleeding disorder

All patients were treated on the principle of intention to treat. Standard routine treatment measures were taken to control epistaxis before considering for the merocel nasal packing. No serious adverse effects of topical application of TXA in management of epistaxis is reported in the published literature.

Patients were randomized on the basis of lottery drawn by assisting nurse of which both the patient and the attending doctor remained unaware of. The lottery box contained 35 TXA group and 35 water group chits uniquely coded.

Each case of epistaxis was evaluated by ENT resident doctor, after suctioning and anterior rhinoscopy and the standard routine bleeding control measures were taken. Bleeding that persisted after simple first aid measures, followed by standardized topical vasoconstrictor therapy were planned for merocel packing. Meanwhile, patient and the attendants were explained about the study and verbal consent was obtained for the enrollment in the study. The attending doctor anaesthetized the nasal cavity before inserting the pack by the application of two metered doses (15 mg) of Lignocaine hydrochloride 15% in each nasal cavity. Insertion was performed blindly parallel to the nasal floor after evacuation of any clots. The Merocel 8 cm nasal tampon was lubricated with fusigen (fusidic acid) cream prior to insertion. Once in position, the merocel pack was activated by 5 ml of either TXA or saline water depending on lottery drawn by assisting nurse. Both the bleeding and non-bleeding sides werepacked.If this treatment failed to control the bleeding, this was noted and an alternative intervention instituted (e.g. BIPP pack or theatre for surgical procedure). After packing and patient being stabilized in the ENT emergency procedure room, patients were admitted to an ENT ward where written consent was obtained. Routine hematological investigations were carried out. Oral antibiotics (co-amoxiclav) were given routinely till discharge. The pack was removed after 48 hours of packing, and monitored for next 24 hours before discharge. Oxymetazoline drop 0.05% 2 drops thrice a day and local application of fusigen cream twice a day for three days were advised to all patient at discharge.All data collected were noted in the performa. A phone interview was made ten days after the discharge to inquire the event of rebleeding if any and recorded.

Outcome measures

- Success in complete control of bleeding within 10 minutes of packing
- Bleeding during first 48 hours that required repacking
- Need for repacking after pack removal on second day
- Need of another procedure for control of bleeding
- Number of days of hospital stay
- Rebleeding within 10 days of discharge
- Adverse events any, including thrombotic complications

Data were analyzed using Statistical Package for the Social Sciences software (SPSS, version 24). All statistical comparisons were performed between the TXA soaked merocel nasal pack and saline water soaked merocel nasal pack groups. Descriptive statistics were obtained for both the group of patients. Study variables were compared using $\chi 2$ tests, Fisher exact tests, and independent-samples 2-tailed t tests. *P* value less than 0.05 was considered significant.

RESULTS

Seventy patients were included in the study; thirty-five in each group. Various parameters of epistaxis controlwere compared between these two groups.Mean age of the patients was 47.5 years; Ranging 16-74 years with standard deviation of 14.4 years. Thirty-two female and thirty-eight male patients participated in the study. Their distribution in TXA and saline water group did not vary significantly (Table 1).

Table 1: Age and gender wise distribution of patients

Variables	Frequency (%)
Age group	16-74 years
Mean Age±SD (yrs)	47.5±14.4
Gender	
Male	38 (54.28%)
Female	32 (45.72%)

Laterality of the nasal bleeding at presentation also did not vary significantly between the groups (Table 2). Five cases in TXA group failed to control the epistaxis within 10 minutes of merocel nasal packing. Control was not achieved in the eleven cases where water soaked merocel pack was used. However, this difference was not statistically significant (Table 2). In TXA soaked merocel pack group, one patient suffered re-bleeding in the ward after initial control at presentation and subsequently required Bismuth Iodine Paraffin Paste (BIPP) soaked gauge pack for the control. Two patients suffered similarly in water soaked merocel group. Again, this difference was not significant with p value = 0.500 (Table 2).

Removal of merocel pack was done after 48 hours. One from the TXA group required repacking with BIPP gauge. Three patients among saline water soaked merocel group had rebleeding after pack removal. Among these three, one had already been packed with BIPP within 48 hours and underwent BIPP gauge packing for the second time. This patient subsequently required the surgical intervention in the form of Endoscopic cauterization of sphenopalatine artery under general anesthesia. However, this difference in rebleeding after pack removal also did not vary significantly in the two groups (Table 2). None of the patients in TXA group required surgical intervention for the bleeding control. Of saline water soaked merocel packing group, two patients underwent Endoscopic sphenopalatine artery cauterization (ESPAC) for the control of bleeding. One of these two had two times failed BIPP gauge packing.

Of the discharged patients, one patient in the TXA group had rebleeding on the seventh day after the discharge and was managed with topical and oral medicines elsewhere, not requiring packing. Two among water group also had minor rebleeding after discharge, controlled with topical oxymetazoline drops. This difference between two groups also did not attain the statistical significance (Table 2).

Table 2: Comparison between two groups based on various parameters

Variables	TXA n(%)	Saline water n(%)	p-value
Gender			
Male	18 (51.4)	20 (51.7)	0.405
Female	17 (48.6)	15 (42.9)	
Side of epistaxis			
Right	14 (40)	18 (51.4)	0.236
Left	21 (60)	17 (48.6)	
Success in control of epistaxis by Merocel pack			
Yes	5 (14.3)	11 (31.4)	0.077
No	30 (85.7)	24 (68.6)	
Rebleeding within 48 hours after merocel pack			
Yes	I (2.9)	2 (5.7)	0.5
No	34 (97.1)	33 (94.3)	
Requirement of another packing after Merocel pack removal			
Yes	I (2.9)	3 (8.6)	0.307
No	34 (97.1)	32 (91.4)	
Rebleeding within ten days follow up after discharge			
Yes	I (2.9)	2 (5.7)	0.5
No	34 (97.1)	33 (94.3)	

Table 3: Number of days of hospital stay

Group	N	Mean	Std. Deviation	Std. Error Mean	p value*
TXA	35	3.114	0.4038	0.0682	0.037
Saline water	35	3.371	1.4366	0.2428	

*t test

Mean number of days of hospital admission in TXA group was 3.1 days and 3.4 days in water soaked merocel group. This difference was statistically significant (p value = 0.037) as shown in (Table 3). None of the patient in either group showed any adverse effects like thromboembolism or stroke.

DISCUSSION

Our study tried to combine the pressure effect of merocel and antifibrinolytic effect of topical TXA to obtain added benefit in control of bleeding, by replacing saline/water with TXA solution

for expanding the merocel.

We had to extend our study duration to two and half years to get the desired number of cases, which was initially planned for two years. Corona pandemic causing travel restriction might have led to decreased number of patients at our center. Patient's age ranged between 16 years to 74 years which is the common age group for idiopathic anterior epistaxis. Gender wise, occurrence of epistaxis was similar, with slight male preponderance.

All calculations were made taking initial number of cases (35 patients) in each group. Our study showed higher initial bleeding control rate and less rebleeding rate in the patients whom TXA soaked merocel nasal packing was used compared to those in whom merocel soaked in the water was used. However, these differences were not statistically significant. Only significant difference was found in the mean days of hospital admission. It was found to be less in the TXA soaked merocel nasal packing group compared to water soaked merocel nasal packing group (p = 0.037).

We did not find any similar study to compare our results with. So, we tried to discuss our results with closely related two studies. First, a randomized controlled trial (RCT) by Zahed et al. which compared the efficacy of topical application of the injectable form of tranexamic acid (TXA)to anterior nasal packing (ANP) for the treatment of epistaxis.[18]Second, a randomized controlled trial by Clinkard and Barbic that compared the use of tranexamic acid–coated and tetracycline-coated anterior nasal tampons in patients with anterior epistaxis.[19]

Our study showed better bleeding control rate with merocel nasal packing, both with and without use of TXA (85.7 % and 68.6 % respectively; not differing significantly, *P=0.077*).While study by Zahed et al.[18](success rates were 73% and 29%, respectively) and study by Clinkard and Barbic[19](success rates were 71% and 31%, respectively), both found significantly better control by using TXA compared to without TXA group; both having p value < 0.001.

Rebleeding rate within 48 hours after initial control was less in our study (2.9 % in TXA group and 5.7 % in water group, p value 0.500) which is slightly better to the outcomes of RCT by Zahed et al.[18] (Rebleeding rate within 24 hours was 5% in the TXA group and 10% in the ANP group without TXA, p = 0.299) and another RCT by Clinkard and Barbic[19] (Re-bleeding occurred in 4.7% of the TXA group, compared to 12.8% of the standard treatment group).

Rebleeding after discharge in our 10 days observation did not vary in two groups; 2.9 % in TXA group and 5.7 % in water group with no significant difference (*p value* =0.500). While Zahed et al[18] found Rebleeding at 1 week 5% in the TXA group and 21% in the ANP group (percent difference = –16%; 95% CI = –28% to –4%; p = 0.007).

This study also has limitation. First of all, the number of cases in the study is small hence studies with larger number of cases needs to be done to strengthen its internal validity.Being a unique study, direct comparison with other studies could not be done.

CONCLUSION

Merocel is an effective material used in anterior nasal packing for control of epistaxis. Use of tranexamic acid injection to expand the merocel pack does not provide additional advantage in initial control of bleeding, minimizing rebleeding rate, requirement of another nasal pack and requirement of surgery. However use of tranexamic acid shortens the duration of the hospital stay.

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

REFERENCES:

1. Pallin DJ, Chng Y-M, McKay MP, Emond JA, Pelletier AJ, Camargo CAJ. Epidemiology of epistaxis in US emergency departments, 1992 to 2001. Ann Emerg Med. 2005;46(1):77-81. [DOI]
2. Gifford TO, Orlandi RR. Epistaxis. Otolaryngol Clin North Am. 2008;41(3):525-536, viii. [DOI]
3. Schlosser RJ. Clinical practice. Epistaxis. N Engl J Med. 2009;360(8):784-789. [DOI]
4. Kotecha B, Fowler S, Harkness P, Walmsley J, Brown P, Topham J. Management of epistaxis: a national survey. Ann R Coll Surg Engl. 1996;78(5):444-446.
1. Padgham N. Epistaxis: anatomical and clinical correlates. J Laryngol Otol. 1990;104(4):308-311. [DOI]
2. Koh E, Frazzini VI, Kagetsu NJ. Epistaxis: vascular anatomy, origins, and endovascular treatment. AJR Am J Roentgenol. 2000;174(3):845-851. [DOI]
3. Leong SCL, Roe RJ, Karkanevatos A. No frills management of epistaxis. Emerg Med J. 2005;22(7):470-472. [DOI]
4. Evans AS, Young D, Adamson R. Is the nasal tampon a suitable treatment for epistaxis in Accident & Emergency? A comparison of outcomes for ENT and A&E packed patients. J Laryngol Otol. 2004;118(1):12-14. [DOI]
5. 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):305-307. [DOI]
6. Kasperek ZA, Pollock GF. Epistaxis: An Overview. Emerg Med Clin North Am. 2013;31(2):443-454. [DOI]
7. Kucik CJ, Clenney T. Management of epistaxis. Am Fam Physician. 2005;71(2):305-311.
8. Villwock JA, Jones K. Recent Trends in Epistaxis Management in the United States: 2008-2010. JAMA Otolaryngol Neck Surg. 2013;139(12):1279-1284. [DOI]
9. Frazee TA, Hauser MS. Nonsurgical management of epistaxis. J oral Maxillofac Surg Off J Am Assoc Oral Maxillofac Surg. 2000;58(4):419-424. [DOI]

10. Douglas R, Wormald P-J. Update on epistaxis. CurrOpinOtolaryngol Head Neck Surg. 2007;15(3):180-183. [DOI]

11. Ker K, Edwards P, Perel P, Shakur H, Roberts I. Effect of tranexamic acid on surgical bleeding: systematic review and cumulative meta-analysis. BMJ. 2012;344:e3054. [DOI]

12. Roberts I, Shakur H, Coats T, et al. The CRASH-2 trial: a randomised controlled trial and economic evaluation of the effects of tranexamic acid on death, vascular occlusive events and transfusion requirement in bleeding trauma patients. Health Technol Assess. 2013;17(10):1-79. [DOI]

13. Joseph J, Martinez-Devesa P, Bellorini J, Burton MJ. Tranexamic acid for patients with nasal haemorrhage (epistaxis). Cochrane database Syst Rev. 2018;12(12):CD004328-CD004328. [DOI]

14. 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. AcadEmerg Med Off J Soc AcadEmerg Med. 2018;25(3):261-266. [DOI]

15. Clinkard D, Barbic D. Tranexamic Acid for Epistaxis--A Promising Treatment That Deserves Further Study. CJEM. 2016;18(1):72-73. [DOI]