

Children's Mercy Kansas City

SHARE @ Children's Mercy

Research Month 2024

Research at Children's Mercy Month

5-2024

The use of Tranexamic Acid for control of post-tonsillectomy hemorrhage in the pediatric population

Adrian Williamson

Macaulay Ojeaga

Meghan Tracy

Jill M. Arganbright

Elie Khalifee

Let us know how access to this publication benefits you

Follow this and additional works at: https://scholarlyexchange.childrensmercy.org/research_month2024



THE USE OF TRANEXAMIC ACID FOR CONTROL OF POST-TONSILLECTOMY HEMORRHAGE IN THE PEDIATRIC POPULATION



Adrian Williamson MD¹, Macaulay Ojeaga, MD^{1,2}, Antonio Bon Nieves BS^{1,2}, Megan Tracy CCRC¹, Andrea Nguyen BS³, Jill M. Arganbright MD¹, and Elie Khalifee MD¹

1.Children's Mercy Hospital, Division of Otolaryngology, Kansas City, MO, USA
2.University of Kansas Medical Center, Department of Otolaryngology, Kansas City, KS, USA
3.Kansas City University College of Osteopathic Medicine, Kansas City, MO, USA

Abstract

Introduction: Tonsillectomy is a common surgical procedure, frequently performed to address recurrent tonsillitis, obstructive sleep apnea, and other related conditions. Despite its routine nature, post-tonsillectomy hemorrhage remains a significant concern. This abstract explores the role of Tranexamic Acid (TXA) in the management of post-tonsillectomy bleeding.

Methods: A retrospective chart review was performed on pediatric patients at a tertiary care facility who presented with postoperative tonsillectomy hemorrhage from March 2023-June 2023. Demographic data, sex assigned at birth, comorbid conditions, medication administration, and patient specific outcomes were collected for analysis.

Results: 41 consecutive patients were included in this study. The mean age for this preliminary data collection was 8.16 ± 4.18 years. Of the 41 patients, 32 received nebulized TXA while 9 did not. Of the patients that received nebulized TXA, 9 patients (28.1%) returned to the OR for control of bleeding while 23 patients (71.9%) had resolution of bleeding without surgical management. Of the patients who did not receive TXA, 4 patients (44.4%) returned to the OR for control of bleeding.

Conclusions: In this preliminary study, the use of nebulized TXA appears to be associated with a lower rate of return to the operating room for control of post-tonsillectomy bleeding in pediatric patients. While the sample size is limited, these initial findings suggest a potential benefit of TXA administration in reducing the need for surgical re-operation following tonsillectomy. Further research is needed to support these observations and establish the optimal dosing and administration protocols for TXA in this context.

Introduction

- While tonsillectomy is very common and safe surgery, post-tonsillectomy hemorrhage (PTH) can be a serious complication possibly requiring control in the operating room and transfusion.
- PTH can be categorized as primary, happening within the initial 24 hours after surgery, or secondary, occurring after this initial period.
- The rate of postoperative bleeding following tonsillectomy has been reported up to 11.9%.¹ Bleeding after tonsillectomy may result in readmission for observation or further surgery to control bleeding.
- Tranexamic acid (TXA) is a synthetic analog of lysine that functions as an antifibrinolytic by binding to plasminogen and inhibiting its conversion to plasmin. There are several different methods of TXA administration including nebulized, topical, intravenous and oral administration.
- Recent studies have shown that TXA may be a safe and effective modality to control PTH.²⁻⁴
- The goal of this study is to determine whether nebulized TXA is safe and effective in controlling PTH and decreasing the need for surgical hemostatic control.

Methods and Materials

- **Study Design:** A retrospective chart review was performed on pediatric patients in who received care for postoperative tonsillectomy hemorrhage at Children's Mercy Hospital from March 2023-June 2023.
 - Inclusion Criteria:
 - Patients presented to the emergency department with oropharyngeal hemorrhage after recent tonsillectomy with or without adenoidectomy
 - Exclusion Criteria:
 - Patients without oropharyngeal hemorrhage
 - Patient age > 21 years
- **Data collected:** Demographic data, sex assigned at birth, indication for tonsillectomy, comorbid conditions, administered medications, and patient specific outcomes were collected for analysis.
- **Statistical analysis:**
 - Fisher's exact test for categorical data.
 - Kruskal-Wallis Rank Test used for continuous numerical data comparisons.

Results

- 41 consecutive patients treated at Children's Mercy Hospital for oropharyngeal hemorrhage post-tonsillectomy were included in the study.
- No patients in this study had a history of coagulopathy
- There were no complications of TXA observed in this study.

	Did Not Receive TXA (n = 9)	Received TXA (n = 32)	Total (n = 41)	p-value
Sex assigned at birth				.454
Female	6 (66.7%)	15 (46.9%)	21 (51.2%)	
Male	3 (33.3%)	17 (53.1%)	20 (48.8%)	
Age				.659
Mean (SD)	8.313 (3.986)	8.113 (4.293)	8.157 (4.180)	
Range	2.559 - 15.416	3.099 - 17.929	2.559 - 17.929	
BMI Percentile				.682
Mean (SD)	71.906 (25.468)	65.080 (34.922)	66.578 (32.910)	
Range	31.590 - 99.800	2.850 - 99.990	2.850 - 99.990	
Race				.884
Black or African-American	1 (11.1%)	4 (12.5%)	5 (12.2%)	
Multiracial	0 (0.0%)	2 (6.2%)	2 (4.9%)	
White	8 (88.9%)	22 (68.8%)	30 (73.2%)	
Not reported	0 (0.0%)	4 (12.5%)	4 (9.8%)	
Ethnicity				.342
Hispanic or Latino	3 (33.3%)	5 (15.6%)	8 (19.5%)	
not Hispanic or Latino	6 (66.7%)	27 (84.4%)	33 (80.5%)	
ASA				.574
I	2 (22.2%)	4 (12.5%)	6 (14.6%)	
II	6 (66.7%)	24 (75.0%)	30 (73.2%)	
III	1 (11.1%)	4 (12.5%)	5 (12.2%)	
IV	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Indication for tonsillectomy				
Sleep disordered breathing	5 (55.6%)	17 (53.1%)	22 (53.7%)	>.999
Obstructive sleep apnea	1 (11.1%)	3 (9.4%)	4 (9.8%)	>.999
Recurrent strep tonsilitis	0 (0.0%)	3 (9.4%)	3 (7.3%)	>.999
Other	0 (0.0%)	1 (3.1%)	1 (2.4%)	>.999
Patient outcomes				
Returned to OR	4 (44.4%)	9 (28.1%)	13 (31.7%)	.429
Need for second readmission	0 (0.0%)	2 (6.2%)	2 (4.9%)	>.999

Table 1. Patient characteristics. P-values listed correspond to Fisher's exact test for categorical data and Kruskal-Wallis Rank Test used for continuous numerical data comparisons.

Discussion

- Administration of nebulized TXA appears to be associated with lower rate of return to the operating room however statistical significance was not present in this study likely secondary to the small sample size in this study.
- Nebulized TXA appears to be a safe management option for select patients with PTH as zero patients in this study experienced complications from TXA administration.

Conclusions

- Nebulized TXA may be considered in the hemodynamically stable patient who is presenting with PTH.
- Further research is needed to support these observations and establish the optimal dosing and administration protocols for TXA in this context.
- Future studies comparing the administration of nebulized, intravenous, and oral TXA administration are needed.

References

1. Dhaduk N, Rodgers A, Govindan A, Kalyoussef E. Post-Tonsillectomy Bleeding: A National Perspective. *Ann Otol Rhinol Laryngol.* 2021 Aug;130(8):941-947. doi: 10.1177/0003489420987438. Epub 2021 Jan 13. PMID: 33435723.
2. Erwin DZ, Heichel PD, Wright LM BS, Goldstein NA, McEvoy TP, Earley MA, Meyer AD. Post-tonsillectomy hemorrhage control with nebulized tranexamic acid: A retrospective cohort study. *Int J Pediatr Otorhinolaryngol.* 2021 Aug;147:110802. doi: 10.1016/j.ijporl.2021.110802. Epub 2021 Jun 12. PMID: 34146910.
3. Shin TJ, Hasnain F, Shay EO, Ye MJ, Matt BH, Elghouche AN. Treatment of post-tonsillectomy hemorrhage with nebulized tranexamic acid: A retrospective study. *Int J Pediatr Otorhinolaryngol.* 2023 Aug;171:111644. doi: 10.1016/j.ijporl.2023.111644. Epub 2023 Jul 6. PMID: 37423163.
4. Spencer R, Newby M, Hickman W, Williams N, Kellermeyer B. Efficacy of tranexamic acid (TXA) for post-tonsillectomy hemorrhage. *Am J Otolaryngol.* 2022 Sep-Oct;43(5):103582. doi: 10.1016/j.amjoto.2022.103582. Epub 2022 Aug 6. PMID: 35988367.