



Research Article

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Use of Topical Tranexamic Acid for the Treatment of Post-Tonsillectomy Bleeding Cases Report and Literature Review

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Abstract

Introduction: Tonsillectomy is the most widely performed procedure worldwide, with complications like bleeding which is divided into primary that occurs within 24 hours and secondary at any point more than 24 hours after surgery. Among the drugs used to reduce the risk of bleeding, we have tranexamic acid; its use topical has not been described for early or late tonsil bleeding.

Materials and Methods: The medical records with diagnosis of post-tonsillectomy hemorrhage that have been treated with topical tranexamic acid at the Carlos Andrade Marin Specialties Hospital and the Private Hospital of the city of Quito in the period 2018-2022 were analyzed. The study population was six adult patients.

Results: Topical tranexamic acid was administered; it was evident that with the first instillation the bleeding was controlled in the 83.3%, oral tolerance began from 12 hours after the scheme started; a patient failed and need emergency surgery.

Conclusion: Administration of topical tranexamic acid was successful in controlling post-tonsillectomy hemorrhage.

Introduction

Tonsillectomy is the most widely performed procedure worldwide. Current indications are hypertrophy of tonsils in sleep apnea or recurrent infections; however, it is not without complications, the most frequent being: bleeding, pain and even death. Bleeding is divided into primary that occurs within 24 hours and secondary at any point more than 24 hours after surgery [1].

Hemostasis is essential after removal of the tonsils; among the primary methods to achieve it are described: pressure, hemostatic agents, coagulation methods and catgut or vicryl sutures [1]. To prevent postoperative hemorrhage there are studies that suggest the use of tranexamic acid preoperative [2].

Non-steroidal analgesics (NSAIDs) such as ketorolac showed a higher rate of postoperative bleeding in adults (RR: 5.64) but not in children [3]; so also, steroids especially intravenous; they do not increase the risk of bleeding and decrease postoperative pain [4].

Among the drugs used to reduce the risk of bleeding, we have tranexamic acid (trans-4-amino-methyl-cyclohexane carboxylic acid), which reduces blood loss during surgery, improves the quality and safety of the surgical field [5]; This synthetic antifibrinolytic agent inhibits plasminogen to plasmin coverage on the fibrin surface, causing clot stabilization [6]. Its antifibrinolytic effect is reached between two and three hours after oral administration and immediately after intravenous administration, it has a half-life of approximately two hours [5] with bioavailability of 46% in oral intake. The most common adverse events are nausea, diarrhea, and abdominal colic. The side effects of its systematic use: thromboembolic events and seizures are rare and infrequent [5] and can cause color vision disorder; when administered intravenously, tranexamic acid is used at a dose of 10mg/kg, slow administration (1ml/min) is recommended to avoid significant hypotension.

Its utility in the control of post-surgical bleeding topically has not been evaluated suitably; therefore, we carry out this review of clinical cases. In which the following objectives are described: Estimate the effectiveness of topical tranexamic acid as a treatment

for post-tonsillectomy bleeding in adults. Assess the control of bleeding and need for subsequent surgery.

Materials And Methods

The medical records with diagnosis of post-tonsillectomy hemorrhage that have been treated with topical tranexamic acid at the Carlos Andrade Marin Specialties Hospital and the Private Hospital of the city of Quito in the period January 2018 to December 2022 were analyzed. The data has been compiled from the database of hospital discharges managed by the statistical department of these.

The inclusion criteria were patients diagnosed with post-tonsillectomy hemorrhage who have been treated with topical tranexamic acid and those who have been excluded: those who have not been treated with it.

Topical tranexamic acid was administered: 2.5ml instilled every 15 minutes for four occasions, and then every six hours for one day, oral tolerance began from 12 hours after the scheme started, if there was no control in the first hour, immediate surgical control was indicated.

During this period, 233 tonsillectomies were performed, 102 in adults, of which eight had bleeding (7.84%), six entered the study due to completing inclusion criteria.

Results

The entire population belonged to the male sex; their average age was 35.3 years. Regarding the bleeding site, 83.3% of the cases were on the right surgical bed, there were no bilateral ones.

The approaches that presented bleeding were cold technique with diathermy and coblation; 66,67% had late bleeding; being four by cold method, the bleeding was controlled with topical tranexamic acid in 83,33%. (Table 1), it was evident that with the first instillation; the bleeding was controlled, oral tolerance began from 12 hours after the scheme started; a patient failed and need emergency surgery.

Table 1: Description of surgical technique, bleeding time, treatment scheme and control of clinical cases.

<i>Variables</i>	<i>Indicators</i>	<i>Percentage (%)</i>
<i>Surgical technique</i>	Coblation	33,33% (2/6)
	Cold steel dissection with monopolar diathermy hemostasis	66,67% (4/6)
<i>Bleeding time</i>	Early	33,33% (2/6)
	Late	66,67 % (4/6)
<i>Hemorrhage control</i>	Yes	83.33% (5/6)
	No	16,67% (1/6)

Discussion

In the public literature, complications have decreased, [2] although bleeding remains the most feared, sometimes even fatal, if it is not treated early or appropriately. The estimated mortality rate due to tonsillectomy varies from 1: 7132 to 170,000, according

to the revised series [7]. Post-tonsillectomy haemorrhage occurs in 3% of pediatric patients and 6% in adults [8]; the factors that influence post-tonsillectomy bleeding (requiring reoperation) were male sex (OR=8.2), adulthood (OR=10.6) and experience of the surgeon under five years (OR=7.50) [1, 8].

Goldman in his review indicated that tonsillectomy complications occurred in 72.2% out of hospital and 28.80% in the operating room or in the initial hospitalization; only 15.3% was bleeding and the rest were related to medication and respiratory problems [9].

It is generally recognized that primary bleeding is caused by inadequate hemostasis during surgery and secondary bleeding by detachment of fibrous exudate generally after seven days, the general bleeding rate is around 4.5%: being for primary 0.2-2.2%

and 0.1-3.5% for secondary [1], correlating with our results.

In our sample, bleeding occurred with the cold technique with diathermy and coblation, numerous studies have tried to identify which tonsillectomy technique is associated with the lowest risk of bleeding, although none has been shown to have a clinically significant benefit [3, 10]. The relationship that the most used techniques have with bleeding and reoperation are described in Table 2; it is observed that the use of monopolar electro cautery is a risk factor for secondary bleeding [8].

Table 2: Relation of tonsillectomy techniques with bleeding and reoperation.

Tonsillectomy Technic	Risk of subsequent bleeding	Risk of secondary surgery
Cold steel dissection with ligatures and / or packaging	1.30%	1.00%
Cold steel dissection with hemostasis of bipolar diathermy or monopolar	2.7%-2.9%	0.7%-0.8%
Bipolar diathermy for dissection and hemostasis	4.60%	1.00%
Monopolar diathermy for dissection and hemostasis	6.60%	1.60%
Coblation for dissection and hemostasis	4.60%	1.80%

Zhou indicates in the study that The National Prospective Tonsillectomy Audit showed a higher rate of hemorrhage (4.03%) in patients who undergone tonsillectomy with coblation versus cold steel tonsillectomy (1.28%) without any hot technique [11]. Cetiner demonstrated that the application of suture of tonsil abutments to the muscular, significantly reduced the incidence rate of bleeding and the severity of it with a significant difference of 1.05% of bleeding in the case group vs 3.02% in the control group [12]; similar data were demonstrated by Wulu, since this facilitates healing of the tonsil fossa allowing crust formation [13, 14].

Koisumi reveals that the use of tranexamic acid in the day of surgery did not reduce post-tonsillectomy bleeding [15], in contrast; Kuo in his meta-analysis showed significant reduction in blood loss intra operative and in the rate of post-tonsillectomy bleeding with RR of 0.42 [16], similar data were demonstrated by Liu, being less effective when applied topically [17].

In addition, its action in nebulization in children has been described and appears to be a tolerable and effective option for secondary bleeding [18].

Spencer demonstrated that the use of tranexamic acid in any method of application avoided the need of cauterization in an operating room in 77.8% of patients ; but when it is used in topic administration there is no evidence of the dose necessary to reduce bleeding [19]. Robb's review [6, 10] shows that the use of tranexamic acid in oral rinses can be applied to control intraoperative bleeding, both in oral surgery and tonsillectomy, they do not decrease the frequency of post-surgical bleeding but reduce its quantity. However, there are no clear recommendations on the dose or the method of application [5, 16].

After the exposed reviews, there is still little evidence for its topical use to control bleeding after surgery; our scheme was 2.5ml every 15 minutes, obtaining a control success rate of 83.33%. We

were impressed that its effectiveness is very high after the first dose, if this fails; reoperation is the best option.

Conclusion

Post tonsillectomy hemorrhage is associated to adults and the use of hot technique. Topical tranexamic acid in our experience, it may be a potential option for the management of post-tonsillectomy primary and secondary bleeding, being safe, tolerable, and effective for its control, helping avoid a second surgery to control de bleeding. Although more studies are required to evaluate its definitive effectiveness and its optimal dosage.

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Conflict of Interest

No Conflict of Interest.

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