

Does Use of Tranexamic Acid Reduce Blood Loss in Pediatric Patients Undergoing Pelvic Osteotomy?

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INTRODUCTION

Dysplastic hips in children often require reconstructive hip surgeries in the form of femoral and/or pelvic osteotomies, which can result in marked blood loss due to the high vascularity of the bone and inability to use tourniquets. This increases the likelihood of blood transfusion and associated risks. Thus, measures to decrease blood loss are necessary.

Tranexamic acid (TXA) is a plasminolytic inhibitor that is effective in reducing blood loss in adults undergoing total hip arthroplasty. Although TXA is used in pediatric spinal and craniocystostomy surgeries, there are no studies evaluating the use of TXA in pediatric femoral and pelvic osteotomies.

In this study, we evaluated the efficacy of TXA in decreasing blood loss in pediatric patients undergoing pelvic and femoral osteotomies, theorizing that the use of TXA would reduce associated blood loss and need for transfusions.

METHODS

We conducted a retrospective chart review of children <18 years with a diagnosis of hip dysplasia, hip dislocation and/or hip subluxation who had 2 or more pelvic or femoral osteotomies between Jan 1, 2011 and Jan 31, 2017. We identified 116 patients who met the inclusion criteria; 51 received standardized doses of TXA (100 mg/kg bolus + 10/mg/kg/hr infusion).

Our primary outcome was percent blood loss (EBL/estimated blood volume by weight). Our secondary outcome was need for transfusion. Bivariate analysis was used to examine outcomes/variables between TXA groups, stratified by number of osteotomies.

RESULTS

Variable	No TXA (N=51)		TXA (N=65)		p-value
	Mean	Std Dev	Mean	SD	
AGE (years)	6.52	3.45	6.64	3.07	0.914
Weight (kg)	24.55	11.25	23.01	10.38	0.190
Height (cm)	118.17	19.73	115.61	18.82	0.177
Gender F/M (%F)	28/23 (54.9%)		22/43 (34%)		0.023
Preop Hb	12.5	1.47	12.31	1.05	0.430
PostOp Hb POD-1	10.13	1.86	9.94	1.75	0.591
PostOp Hb POD-2	9.58	1.48	9.93	1.69	0.285
PostOp Hb POD-3	9.66	1.51	9.76	1.71	0.765
# of Osteotomies	2.39	0.67	2.72	0.9	0.063

Table 1. Demographic, Hb, and No. of Osteotomy Variables

Variable	No TXA (N=51)		TXA (N=65)		p-value
	Mean	Std Dev	Mean	SD	
Intraoperative blood loss					
% Blood Loss	12.48	6.85	12.62	6.88	0.923
EBL Total	226.27	160.42	226.23	214.42	0.540
Total (intraoperative + postoperative) PRBC replacement and Hb changes					
PRBC Volume Replaced	175.78	195.57	122.25	206.15	0.063
Change in Hb POD2-Preop	-3.01	2.11	-2.40	1.99	0.150
Patients who needed postop transfusion (%)	27 (53%)		21 (33%)		0.030

Table 2. No TXA vs TXA – Intraop Blood Loss, PRBC replacement, Hb changes

- TXA decreased need for blood transfusions perioperatively (p=0.030) although it did not decrease the % blood loss (p=0.923)

Variable	No TXA			TXA			p-value within each strata			
	# Osteotomies	2 (N=36)	3 (N=10)	4 (N=5)	2 (N=37)	3 (N=8)	4 (N=19)	2	3	4
% Blood Loss		11.6±7.3	14.0±5.4	15.6±5.18	11.6±7.2	13.3±4.7	14.3±7.1	0.98	0.77	0.58
PRBC Volume Replaced		182.9±186.4	150.0±212.1	176.0±226.2	130.1±234.0	192.5±226.3	84.3±132.3	0.06	0.49	0.61
Change in Hb POD2-Preop		-2.4±2.1	-4.2±1.8	-3.9±1.4	-2.4±1.9	-1.3±3.2	-2.8±1.3	0.99	0.03	0.12
% Who Needed Transfusion		58.3%	40%	40%	30.1%	50%	31.6%	0.02	0.67	0.72

Table 3. No TXA vs TXA – Outcomes comparison in children stratified by osteotomies

- Children who did not receive TXA had a trend for increased % blood loss compared to those who received TXA
- In children with 2 pelvic osteotomies who did not receive TXA, incidence of transfusions was higher (58.3% vs 30.6%; p=0.017)

Stratified Data by Number of Osteotomies:

- We found that children having >2 osteotomies had significantly higher % blood loss compared to 2 osteotomies (11.6±7.2% vs. 14.2±6.0%, **p=0.023**).
- Additionally, children with >2 osteotomies had a greater decrease in hemoglobin, from pre-op to post-op values (-4.1±1.7 vs. -2.4 ± 2.1; **p=0.013**).

CONCLUSIONS

- The use of TXA resulted in decreased need for blood transfusions in children undergoing pelvic osteotomies.
- Our results are limited by small sample size per strata.
- Prospective studies in larger cohorts are warranted to optimize TXA dosing with possible genetic screening for efficacy.

REFERENCES

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