The Use of Tranexamic Acid in Hip Fracture Surgery *Aswinkumar Vasireddy, BSc (Hons) MBBS Dipl (Tr&Orth) FRCS (Tr&Orth); Christabel Agius; Elaine Cole; Mary Grace Mifsud*

Purpose: Our objective was to analyze the effect of IV tranexamic acid (TXA) on blood transfusion requirements in adult patients undergoing hip fracture surgery. A secondary aim was to evaluate the safety by assessing thromboembolic events.

Methods: Studies eligible for inclusion were randomized controlled trials that analyzed the use of IV TXA on blood transfusion requirement in hip fracture surgery. Titles and abstracts were screened and assessed for eligibility by 2 independent reviewers. Quality and risk of bias was assessed using the Grading of Recommendations Assessment, Development and Evaluation approach and the Cochrane risk-of-bias tool (RoB2). Meta-analysis with random and fixed effect models was performed. Risk ratio (RR) was calculated for dichotomous outcomes and estimated with a 95% confidence interval (CI). For continuous data, the risk difference (RD) was estimated with a 95% CI.

Results: A total of 13 trials involving 1194 patients were included. Pooled results showed that patients in the TXA group had significantly lower transfusion requirements (RR 0.50, 95% CI 0.30–0.84, P = 0.009). Similar findings were observed in the subcohort of patients with transfusion threshold of hemoglovin (Hb) <8 g/dL, (RR 0.42, 95% CI 0.31–0.56, P<0.0001). This risk reduction was not observed in the subcohort of patients with transfusion threshold of Hb 8.1–10 g/dL who received TXA (RR 0.77, 95% CI 0.51–1.18, P = 0.23) and no statistically significant differences were found for total thromboembolic events (RR 0.01, 95% CI –0.02 to 0.04, P = 0.47).

Conclusion: This meta-analysis demonstrated that IV TXA reduced blood transfusion rates and did not increase the risk of thromboembolic events.

	TXA	1	Contr	ol		Risk Ratio	Risk Ratio
Study or Subgroup						M-H, Random, 95% CI	M-H, Random, 95% CI
1.1.1 Blood Transfu	sion Requ	ireme	nts (Hb ·	<8g/dL	.)		
Chen 2019	15	88	31	88	8.5%	0.48 [0.28, 0.83]	
Emara 2014	1	20	7	20	3.9%	0.14 [0.02, 1.06]	
Haghighi 2016	1	18	6	20	3.9%	0.19 [0.02, 1.39]	
Luo 2019	7	44	17	46	7.7%	0.43 [0.20, 0.94]	
Mohib 2015	9	50	21	50	8.1%	0.43 [0.22, 0.84]	
Vijay 2013	7	45	18	45	7.7%	0.39 [0.18, 0.84]	
Watts 2017	12	69	18	69	8.1%	0.67 [0.35, 1.28]	
Zhou 2019	5	50	27	50	7.4%	0.19 [0.08, 0.44]	
Subtotal (95% CI)		384		388	55.3%	0.42 [0.31, 0.56]	•
Total events	57		145				
1.1.2 Blood Transfu Baruah 2016	30	30				g/al)	
Lei 2017	11	39	30 23	30 41 30	9.3% 8.4%	1.00 [0.94, 1.07] 0.50 [0.28, 0.89]	
Lei 2017 Tengberg 2016	11 27	39 33	23 33	41 39	8.4% 9.2%	0.50 [0.28, 0.89] 0.97 [0.78, 1.19]	
Lei 2017	11	39	23	41	8.4%	0.50 [0.28, 0.89]	
Lei 2017 Tengberg 2016 Tian 2018 Zufferey 2010	11 27 24	39 33 50 57	23 33 34	41 39 50 53	8.4% 9.2% 9.0% 8.9%	0.50 [0.28, 0.89] 0.97 [0.78, 1.19] 0.71 [0.50, 1.00] 0.70 [0.48, 1.01]	
Lei 2017 Tengberg 2016 Tian 2018 Zufferey 2010 Subtotal (95% CI)	11 27 24 24 116	39 33 50 57 209	23 33 34 32 152	41 39 50 53 213	8.4% 9.2% 9.0% 8.9% 44.7%	0.50 [0.28, 0.89] 0.97 [0.78, 1.19] 0.71 [0.50, 1.00] 0.70 [0.48, 1.01] 0.77 [0.51, 1.18]	
Lei 2017 Tengberg 2016 Tian 2018 Zufferey 2010 Subtotal (95% CI) Total events	11 27 24 24 24 116 = 0.20; Ch	39 33 50 57 209 $ni^2 = 62$	23 33 34 32 152 1.78, df =	41 39 50 53 213	8.4% 9.2% 9.0% 8.9% 44.7%	0.50 [0.28, 0.89] 0.97 [0.78, 1.19] 0.71 [0.50, 1.00] 0.70 [0.48, 1.01] 0.77 [0.51, 1.18]	+
Lei 2017 Tengberg 2016 Tian 2018 Zufferey 2010 Subtotal (95% CI) Total events Heterogeneity: Tau ²	11 27 24 24 24 116 = 0.20; Ch	39 33 50 57 209 $ni^2 = 62$	23 33 34 32 152 1.78, df =	41 39 50 53 213 = 4 (P <	8.4% 9.2% 9.0% 8.9% 44.7%	0.50 [0.28, 0.89] 0.97 [0.78, 1.19] 0.71 [0.50, 1.00] 0.70 [0.48, 1.01] 0.77 [0.51, 1.18]	+++++++++++++++++++++++++++++++++++++++
Lei 2017 Tengberg 2016 Tian 2018 Zufferey 2010 Subtotal (95% CI) Total events Heterogeneity: Tau ² Fest for overall effect	11 27 24 24 24 116 = 0.20; Ch	39 33 50 57 209 $ni^2 = 62$ 0 (P = 0)	23 33 34 32 152 1.78, df =	41 39 50 53 213 = 4 (P <	8.4% 9.2% 9.0% 8.9% 44.7%	0.50 [0.28, 0.89] 0.97 [0.78, 1.19] 0.71 [0.50, 1.00] 0.70 [0.48, 1.01] 0.77 [0.51, 1.18]	+ + +
Lei 2017 Tengberg 2016 Tian 2018 Zufferey 2010 Subtotal (95% CI) Total events Heterogeneity: Tau ² Test for overall effect Total (95% CI)	11 27 24 24 24 116 = 0.20; Ch tt: Z = 1.20 173	39335057209hi2 = 60 (P = 0593	23 33 34 32 152 1.78, df = 0.23) 297	41 39 50 53 213 = 4 (P < 601	8.4% 9.2% 9.0% 8.9% 44.7%	0.50 [0.28, 0.89] 0.97 [0.78, 1.19] 0.71 [0.50, 1.00] 0.70 [0.48, 1.01] 0.77 [0.51, 1.18] 1); I ² = 94% 0.50 [0.30, 0.84]	+ +
Lei 2017 Tengberg 2016 Tian 2018 Subtotal (95% CI) Total events Heterogeneity: Tau ² Test for overall effect Total (95% CI) Total events	$11 \\ 27 \\ 24 \\ 24 \\ 116 \\ = 0.20; Ch \\ t: Z = 1.20 \\ 173 \\ = 0.75; Ch \\ 173 \\ = 0.75; Ch \\ 100$	39 33 50 57 209 hi ² = 6: 0 (P = 0) 593 hi ² = 29	23 33 34 32 152 1.78, df = 0.23) 297 00.83, df	41 39 50 53 213 = 4 (P < 601	8.4% 9.2% 9.0% 8.9% 44.7%	0.50 [0.28, 0.89] 0.97 [0.78, 1.19] 0.71 [0.50, 1.00] 0.70 [0.48, 1.01] 0.77 [0.51, 1.18] 1); I ² = 94% 0.50 [0.30, 0.84]	0.01 0.1 1 10 11 Favours TXA Favours Control

FIGURE 2. Forest plot showing subgroup analysis for blood transfusion requirement.

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device they wish to use in clinical practice.