

Tranexamic acid is safe and effective for orthopaedic oncology patients: a retrospective review of 599 patients undergoing lower-extremity endoprosthetic reconstruction

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INTRODUCTION: The use of tranexamic acid (TXA) remains controversial for orthopaedic oncology patients, given concerns for increased risk of thromboembolic complications in patients with active oncologic disease undergoing major surgery.

METHODS: This is a retrospective, single center study of 599 patients undergoing lower extremity endoprosthetic reconstruction for oncological indications between 2000-2024. TXA was administered to 28% of patients (165/599) (Table 1). Estimated blood loss (EBL), transfusion of packed red blood cells (pRBCs), and thromboembolic complications at 90 days (deep vein thrombosis (DVT), pulmonary embolism (PE), or death) were compared between patients who did and did not receive TXA. All patients had 90-day follow-up or had an event of interest before 90 days.

RESULTS: TXA was associated with lower EBL (426 ± 312 ml vs 577 ± 482 ml; $p=0.0003$) (Table 2). TXA did not decrease the rate of intraoperative pRBCs transfusion (OR [95% CI]: 0.90 [0.60-1.3]; $p=0.62$), but patients who received TXA required fewer total units of pRBCs (1.9 ± 1.0 units vs 2.6 ± 2.2 units; $p=0.03$). TXA decreased the rate of pRBCs transfusion over the first three post-operative days (OR [95% CI]: 0.49 [0.31-0.77]; $p=0.002$). TXA was not associated with 90-day postoperative risk of DVT (OR [95% CI]: 1.77 [0.63-4.75]; $p=0.38$), PE (OR [95% CI]: 2.29 [0.75-6.26]; $p=0.20$), or all-cause mortality (OR [95% CI]: 1.07 [0.6-1.9]; $p=0.87$).

DISCUSSION AND CONCLUSION: In a large cohort of patients undergoing lower extremity endoprosthetic reconstruction for oncological indications, administration of TXA was associated with decreased EBL and transfusion rate, with no increase in the risk of thromboembolic complications.

Table 1. Patient, tumor, and surgical characteristics.

	All n = 599 (100%)	TXA n = 165 (28%)	No TXA n = 434 (72%)	p-value*
Patient Factors				
Age, y, mean (SD)	53.2 (20.6)	53.9 (21.7)	52.9 (20.0)	0.24
Sex, n (%)				0.36
Male	297 (50)	77 (47)	220 (51)	
Female	302 (50)	88 (53)	212 (49)	
BMI, kg/m ² , mean (SD)	28.0 (7.1)	27.7 (7.4)	28.2 (6.9)	0.47
Smoking Status, n (%)				0.05
Current	78 (13)	13 (8)	65 (15)	
Former	149 (25)	47 (28)	102 (24)	
Never	372 (62)	105 (64)	267 (62)	
Diabetes, n (%)	64 (14)	17 (10)	47 (11)	0.11
Tumor Factors				
Diagnosis, n (%)				0.85
Primary Bone Sarcoma	212 (35)	53 (32)	157 (36)	
Primary Soft Tissue Sarcoma	16 (3)	5 (3)	11 (3)	
Metastatic Bone Disease	209 (35)	60 (36)	149 (34)	
Benign Aggressive Bone Tumor	27 (5)	10 (6)	17 (4)	
Lymphoma/Leukemia	6 (1)	1 (1)	5 (1)	
Multiple Myeloma	19 (3)	5 (3)	14 (3)	
Complication of prior cancer surgery	106 (18)	29 (18)	77 (18)	
Other oncological indication	4 (1)	2 (1)	2 (0)	
Surgical Factors				
Anatomic Location, n (%)				0.67
Proximal Femur	342 (57)	87 (53)	255 (59)	
Distal Femur	188 (31)	57 (35)	131 (30)	
Proximal Tibia	55 (9)	16 (10)	39 (9)	
Total Femur	10 (2)	4 (2)	6 (1)	
Combined Distal Femur + Proximal Tibia	4 (1)	1 (1)	3 (1)	
Length of Bony Resection, cm, mean (SD)	14.5 (7.7)	14.8 (6.7)	14.3 (7.9)	0.60
Operative Time, minutes, mean (SD)	216 (81)	222 (75)	214 (83)	0.12
Route of TXA Administration, n (%)				---
IV only		111 (67)	---	
Oral only		45 (27)	---	
Oral and IV		6 (4)	---	
Topical only		3 (2)	---	
Dose of TXA, grams, mean (SD)		2.1 (0.8)	---	

*Continuous variables are compared using non-parametric Mann-Whitney U tests. Categorical variables are compared using Fisher's exact test. TXA: Tranexamic acid.

Table 2. Outcomes.

	All n = 599 (100%)	TXA n = 165 (28%)	No TXA n = 434 (72%)	p-value*
Estimated Blood Loss, ml, mean (SD)	536 (447)	426 (312)	577 (482)	0.0003
Intraoperative Transfusion of pRBCs, n (%)	180 (30)	47 (28)	133 (31)	0.62
Intraoperative Transfusion Volume, units of pRBCs, mean (SD)	2.4 (2.0)	1.9 (1.0)	2.6 (2.2)	0.03
Post-operative Transfusion of pRBCs, n (%)	151 (25)	27 (16)	124 (29)	0.002
Postoperative Transfusion Volume, units of pRBCs, mean (SD)	2.0 (1.1)	1.6 (0.8)	2.1 (1.1)	0.01
Deep Vein Thrombosis, n (%)	15 (2.5)	6 (3.6)	9 (2.1)	0.38
Pulmonary Embolism, n (%)	13 (2.2)	6 (3.6)	7 (1.6)	0.20
Myocardial Infarction, n (%)	3 (0.5)	2 (1.2)	1 (0.2)	0.19
Transient Ischemic Attack/Ischemic Stroke, n (%)	2 (0.3)	1 (0.6)	1 (0.2)	0.48
All-cause 90-day mortality, n (%)	59 (9.8)	17 (10.3)	42 (9.7)	0.88

*Continuous variables are compared using non-parametric Mann-Whitney U tests. Categorical variables are compared using Fisher's exact test. TXA: Tranexamic acid; pRBCs: packed red blood cells.