# Tranexamic Acid Reduces Perioperative Bleeding Complications Following Aseptic Revision Total Knee Arthroplasty: An Analysis of 51,781 Revision Knees

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INTRODUCTION: Tranexamic acid (TXA) has emerged as a valuable adjunct for reducing perioperative blood loss in elective total knee arthroplasty. However, its role in revision total knee arthroplasty (rTKA), which is associated with increased operative complexity, longer surgical duration, and greater blood loss, remains less well-defined. This study sought to evaluate the thromboembolic and bleeding risk profiles associated with TXA administration following aseptic, both-component rTKA.

METHODS: A large, nationally representative database capturing approximately 25% of all procedures performed in the United States was retrospectively queried to identify all aseptic, both-component rTKAs performed between 2016 and 2023. Patients were divided based on whether TXA was administered. Demographic characteristics, comorbidity profiles, and 90-day postoperative rates of bleeding and thromboembolic complications were compared between cohorts. Multivariable logistic regression was used to adjust for potential confounding factors.

RESULTS SECTION: In total, 51,781 aseptic rTKA patients (TXA: 36,209 [69.9%], no TXA: 15,572 [30.1%]) were identified. For the TXA cohort, 9,707 (62.4%) patients were female and 5,855 (37.6%) were male, while for the no TXA cohort, 22,281 (61.5%) were female and 13,923 (38.5%) were male. Patients receiving TXA demonstrated a significantly lower risk of aggregate bleeding complications (adjusted odds ratio [aOR]=0.80, 95% CI=0.72–0.89; P<0.001) and acute anemia (aOR=0.83, 95% CI=0.73–0.94; P=0.003). Although statistically insignificant, patients who received TXA had lower rates of transfusion (aOR=0.90, 95% CI=0.72–1.11; *P*=0.325), hematoma (aOR=0.85, 95% CI=0.67–1.09; *P*=0.212), and postoperative hemorrhage (aOR=0.78, 95% CI=0.58–1.04; *P*=0.086). TXA use was associated with a significantly reduced risk of deep vein thrombosis (aOR=0.75, 95% CI =0.61–0.93; P=0.007). No significant differences were observed in the incidence of pulmonary embolism, stroke, or myocardial infarction between groups.

DISCUSSION: TXA use during aseptic rTKA was associated with a meaningful reduction in perioperative bleeding complications without a corresponding increase in thromboembolic events.

SIGNIFICANCE/CLINICAL RELEVANCE: These findings support TXA use as a safe and effective strategy to minimize perioperative blood loss.

IMAGES AND TABLES:

**Table 1: Bleeding Complications**

| 90-Day Postoperative Outcomes | No TXA (N= 15,572) | | TXA (N= 36,209) | | Univariate Regression | | | Multivariable Regression | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | OR | 95%-CI | P-Value | aOR | 95%-CI | P-Value |
| Aggregate Bleeding Complications | 599 | 3.8% | 1,044 | 2.9% | 0.74 | 0.67-0.82 | 0.000 | 0.80 | 0.72-0.89 | **<0.001** |
| Transfusion | 138 | 0.9% | 257 | 0.7% | 0.80 | 0.65-0.98 | 0.035 | 0.90 | 0.72-1.11 | 0.325 |
| Acute Anemia | 417 | 2.7% | 736 | 2.0% | 0.75 | 0.67-0.85 | 0.000 | 0.83 | 0.73-0.94 | **0.003** |
| Hematoma | 97 | 0.6% | 195 | 0.5% | 0.86 | 0.68-1.10 | 0.240 | 0.85 | 0.67-1.09 | 0.212 |
| Hemorrhage | 73 | 0.5% | 133 | 0.4% | 0.78 | 0.59-1.04 | 0.093 | 0.78 | 0.58-1.04 | 0.086 |

**Table 2: Thromboembolic Complications**

| 90-Day Postoperative Outcomes | No TXA (N= 15,572) | | TXA (N= 36,209) | | Univariate Regression | | | Multivariable Regression | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | OR | 95%-CI | P-Value | aOR | 95%-CI | P-Value |
| Deep Vein Thrombosis | 147 | 0.9% | 248 | 0.7% | 0.72 | 0.59-0.89 | 0.002 | 0.75 | 0.61-0.93 | **0.007** |
| Pulmonary Embolism | 59 | 0.4% | 124 | 0.3% | 0.90 | 0.66-1.23 | 0.522 | 0.96 | 0.70-1.32 | 0.819 |
| Stroke | 22 | 0.1% | 46 | 0.1% | 0.90 | 0.54-1.49 | 0.682 | 1.09 | 0.63-1.85 | 0.745 |
| Myocardial Infarction | 31 | 0.2% | 44 | 0.1% | 0.61 | 0.39-0.97 | 0.035 | 0.74 | 0.46-1.17 | 0.193 |