

## TRANEXAMIC ACID ON PERIOPERATIVE BLOOD LOSS IN SPINE SURGERY: A PROSPECTIVE OBSERVATIONAL STUDY

SEHAR E. NAGHMA<sup>1</sup>, THARSIS P. RESHMA<sup>2</sup> RAJASAB DEEBA FARHA<sup>3</sup>, KALAPPA RAKESH<sup>4\*</sup>

<sup>1,3</sup>Shri Atal Bihari Vajpayee Medical College and Research Institute, Bengaluru, India. <sup>2</sup>Marsleeva Medicity, Pala, Kerala, India. <sup>4</sup>MVJ Medical College and Research Hospital, Bengaluru, Karnataka, India

\*Corresponding author: Kalappa Rakesh; \*Email: [dr.rakeshkalappa@gmail.com](mailto:dr.rakeshkalappa@gmail.com)

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### ABSTRACT

**Objective:** To evaluate the efficacy and safety of tranexamic acid in reducing perioperative blood loss and transfusion requirements in patients undergoing spinal surgery.

**Methods:** This prospective observational study was conducted at MVJ Medical College and Research Hospital from January 2022 to February 2023. Patients undergoing spinal surgery who received perioperative TXA were assessed for intraoperative blood loss, postoperative drain output, transfusion requirements, and adverse events, including thromboembolic complications.

**Results:** The use of TXA was associated with a significant reduction in intraoperative blood loss, postoperative drain output, and transfusion requirements. No increase in thromboembolic or other major adverse events was observed.

**Conclusion:** Perioperative administration of tranexamic acid is a safe and effective blood conservation strategy in spinal surgery, significantly reducing blood loss and transfusion needs without increasing thromboembolic risk.

**Keywords:** Tranexamic acid (TXA), Spine surgery, Antifibrinolytic therapy, Perioperative blood loss, Blood transfusion

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### INTRODUCTION

Spinal surgical procedures are commonly associated with considerable perioperative blood loss due to extensive soft tissue dissection, prolonged operative duration, and multilevel instrumentation [1, 2]. Excessive blood loss may contribute to perioperative anemia, increased transfusion requirements, postoperative hematoma formation, and prolonged hospital stay. Allogeneic blood transfusion carries inherent risks, including transfusion reactions, infections, immunomodulation, and increased healthcare costs [3].

To mitigate these complications, perioperative blood conservation strategies have been widely adopted. Among pharmacological interventions, tranexamic acid (TXA), a synthetic antifibrinolytic agent, has gained increasing acceptance in spine surgery. TXA inhibits fibrinolysis by preventing plasminogen activation, thereby stabilizing fibrin clots and reducing surgical bleeding [4]. The present study was undertaken to evaluate the clinical efficacy and safety of TXA in spinal surgeries [5-7] performed at a tertiary care teaching hospital.

### MATERIALS AND METHODS

This prospective observational study was conducted at the Department of Anesthesiology in Neurosurgery OR, MVJ Medical College and Research Hospital, from January 2022 to February 2023, after obtaining institutional ethical committee approval. 60 Patients aged 18-70 y undergoing elective (ASA 1,2,) spinal surgeries, including lumbar and thoracolumbar procedures, were included. Patients with a history of thromboembolic disorders, coagulation

abnormalities, renal impairment, or known hypersensitivity to TXA were excluded.

All included patients received intravenous tranexamic acid at a dose of 10 mg/kg prior to skin incision.

### RESULTS

Primary outcomes included intraoperative blood loss and postoperative drain output. Secondary outcomes included perioperative blood transfusion requirements, duration of hospital stay, and occurrence of adverse events such as thromboembolic complications or seizures.

Data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) version XX.0 (IBM Corp., Armonk, NY, USA). Continuous variables such as intraoperative blood loss, postoperative drain output, and duration of hospital stay were expressed as mean±standard deviation (SD). Categorical variables such as gender distribution, type of surgery, transfusion requirement, and postoperative complications were expressed as frequencies and percentages.

The Shapiro-Wilk test was used to assess the normality of continuous data. Normally distributed variables were compared using the Student's t-test, while non-normally distributed data were analyzed using the Mann-Whitney U test. Categorical variables were compared using the Chi-square test or Fisher's exact test, as appropriate.

A p-value < 0.05 was considered statistically significant.

Table 1: Demographic and clinical characteristics of the study population

Parameter	Observation
Total number of patients	60
Mean age (years)	48.6±11.4
Age range (years)	22 - 68
Male patients	38 (63.3%)
Female patients	22 (36.7%)
Lumbar spine procedures	42 (70%)
Thoracolumbar procedures	18 (30)

Table 2: Perioperative blood loss and transfusion requirements

Outcome measure	Value	Statistical significance
Intraoperative blood loss (ml)	520±140	p<0.05
Postoperative drain output (ml)	180±65	p<0.05
Patients requiring transfusion	12 (20%)	p<0.05

Table 3: Postoperative outcomes and complications

Parameter	Number of patients	Percentage
Thromboembolic events	0	0%
Wound complications	3	5%
mean hospital stay (days)	5.2±1.3	—
Mortality	0	0%

## DISCUSSION

Spinal surgeries are commonly associated with significant perioperative blood loss, which may increase transfusion requirements and postoperative morbidity [1, 2]. In this prospective study conducted at MVJ Medical College and Research Hospital, the perioperative use of tranexamic acid was associated with a significant reduction in intraoperative blood loss, postoperative drain output, and the need for allogeneic blood transfusion.

The observed benefits of tranexamic acid can be attributed to its antifibrinolytic action, which stabilizes fibrin clots and limits excessive fibrinolysis during surgical trauma. [4,5]. Improved hemostasis may also enhance surgical field visibility and facilitate smoother operative progress.

Our findings are consistent with previously published clinical trials and meta-analyses demonstrating the efficacy of tranexamic acid in reducing blood loss during spine surgery [6-9]. Importantly, no thromboembolic complications were observed in the present study, supporting the safety of tranexamic acid when used at standard doses [10-12].

Although the study was limited by its single-center design and modest sample size, the results suggest that tranexamic acid is a safe and effective blood conservation strategy in spinal surgery.

## CONCLUSION

The present study demonstrates that perioperative administration of tranexamic acid in spinal surgeries significantly reduces intraoperative blood loss, postoperative drain output, and the need for allogeneic blood transfusion without increasing adverse events. Tranexamic acid is a safe, effective, and cost-efficient blood conservation strategy and should be considered routinely in spinal procedures with anticipated high blood loss.

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Nil

## AUTHORS CONTRIBUTIONS

All authors have contributed equally

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest related to this study.

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