

Background

- Tranexamic acid (TXA), an antifibrinolytic agent, has demonstrated efficacy in reducing perioperative bleeding across multiple surgical interventions.
- Perioperative administration of TXA has demonstrated a reduction in the risk of postoperative hematoma, reduced seroma formation, and decreased drain duration and output ¹⁻⁵.
- While increasingly utilized in breast reconstruction, evidence regarding its role in free flap procedures remains limited and inconsistent.
- This study evaluates the impact of preoperative TXA administration on postoperative outcomes in free flap breast reconstruction.

Methods

- A retrospective cohort study was performed using the TriNetX research network to identify patients undergoing free flap breast reconstruction.
- Patients were stratified into two cohorts based on whether they received preoperative tranexamic acid (TXA) administration on the day of breast reconstruction.
- Propensity score matching was performed in a 1:1 ratio.
- Primary outcomes included hematoma, seroma, bleeding, venous thrombosis, and flap loss.

Results

Cohort overview

- Among 20,778 patients, 524 (2.5%) received preoperative TXA.
- Before propensity matching, fewer Black/African American patients received pre-op TXA (8.2% vs. 13.4%, $p < 0.05$) and a higher proportion of white patients received pre-op TXA (76.8% vs. 72.3%, $p < 0.05$).

Matched analysis

- After 1:1 propensity score matching, 524 TXA patients were compared with 524 controls, yielding cohorts with no significant differences in demographic or clinical characteristics.

Hematoma and seroma outcomes

- Hematoma rates were significantly higher in the TXA group (21.2% vs. 15.3%, RR 0.72, 95% CI 0.55–0.94, $p = 0.01$).
- Seroma occurred more frequently in TXA patients (23.2% vs. 18.9%) but was not statistically significant ($p > 0.05$).

Other outcomes

- Postoperative bleeding, venous thrombosis, and flap loss rates were comparable.
- Intraoperative hemorrhage occurred exclusively in the non-TXA group ($\leq 1.9\%$ vs. 0%, $p = 0.001$).

Variables	No TXA (n=524)	TXA (n=524)	RR (95% CI)	P-value
Breast hematoma	78 (15.3)	108 (21.2)	0.72 (0.55, 0.94)	0.01
Seroma	96 (18.9)	118 (23.2)	0.81 (0.64, 1.03)	0.09
Bleeding	≤ 10 (1.90)	≤ 10 (1.90)	1.00 (0.42, 2.38)	1.00
Venous thrombosis	18 (3.53)	15 (2.94)	1.20 (0.61, 2.35)	0.59
Flap loss	11 (2.10)	≤ 10 (1.90)	1.10 (0.47, 2.56)	0.82
Intraoperative hemorrhage	≤ 10 (1.90)	0	---	0.001

Table 2. Comparison of postoperative outcomes between patients receiving preoperative tranexamic acid and controls following free flap breast reconstruction.

Conclusion

- Contrary to prior reports, preoperative TXA use in free flap breast reconstruction was associated with a higher incidence of hematoma, without significant reduction in the rate of other complications.
- No optimal TXA dosing protocols for free flap breast reconstruction exist, and the lack of standardized dosing of TXA in our cohort could explain the deviation from existing literature.
- Other limitations to the dataset include provider-dependent designations of hematoma and seroma formation, and lack of stratification by flap type.

References

- Liechti R, van de Wall BJM, Hug U, Fritsche E, Franchi A. Tranexamic Acid Use in Breast Surgery: A Systematic Review and Meta-Analysis. *Plast Reconstr Surg.* 2023;151(5):949–957. doi:10.1097/prs.00000000000010071
- Weissler JM, Banuelos J, Jacobson SR, et al. Intravenous Tranexamic Acid in Implant-Based Breast Reconstruction Safely Reduces Hematoma without Thromboembolic Events. *Plast Reconstr Surg.* 2020;146(2):238–245. doi:10.1097/prs.00000000000006967
- Althobaiti MA, Maniya MT, Alelyani RH, et al. Tranexamic Acid for Postoperative Outcomes in Breast Plastic Surgery: A Systematic Review and Meta-analysis. *Aesthetic Plast Surg.* 2025/07/01 2025;49(13):3728–3735. doi:10.1007/s00266-025-04772-5
- Buheiri AR, Tveskov L, Dines LM, Bagge JD, Möller S, Bille C. Tranexamic Acid in Breast Surgery – A Systematic Review and Meta-Analysis. *Clin Breast Cancer.* 2025/07/01/ 2025;25(5):e496–e510. doi: 10.1016/clbc.2025.01.011
- Fung E, Godek M, Roth JM, Montalmant KE, Yu BZ, Henderson PW. The current state of tranexamic acid in mastectomy and breast reconstruction: A systematic review and meta-analysis. *J Plast Reconstr Aesthet Surg.* May 2025;104:259–272. doi:10.1016/j.bjps.2025.03.022

Variable	Before Matching (TXA vs. non-TXA)	P-value	After Matching (TXA vs. non-TXA)	P-value
Age (years)	50.0 ± 10.1 vs 51.3 ± 10.2	< 0.05	50.0 ± 10.1 vs 50.0 ± 9.9	> 0.05
White (% of cohort)	76.8 vs 72.3	< 0.05	76.8 vs 77.2	> 0.05
African American (% of cohort)	8.2 vs 13.4	< 0.05	8.2 vs 7.6	> 0.05
Pre-operative anticoagulation (%)	97.2 vs 75.6	< 0.05	97.2 vs 97.2	> 0.05
Pre-operative heparin (%)	96.5 vs 73.2	< 0.05	96.5 vs 96.3	> 0.05

Table 1. Selected baseline characteristics before and after propensity score matching.

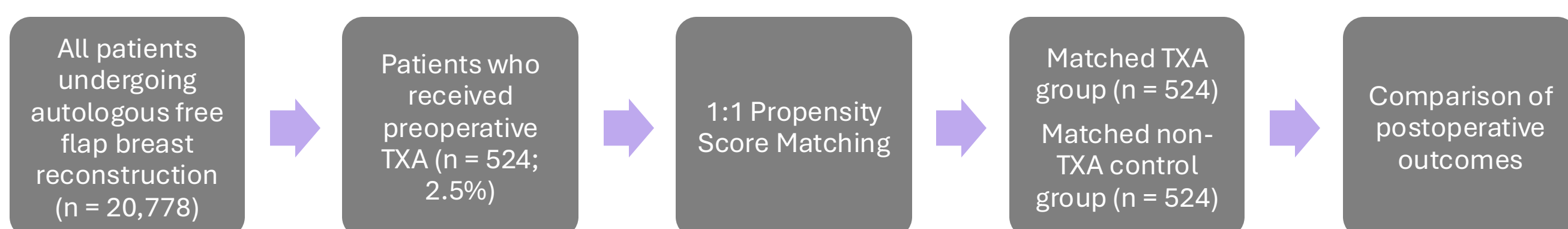


Figure 1. Study workflow outlining patient selection, propensity score matching, and postoperative outcome comparison.