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LETTER

Unaddressed Biases in a Retrospective Study of Anticoagulant Prophylaxis in Trauma Patients [Letter]

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Dear editor

Chen et al are to be commended for linking clinical records with a clinician survey to characterize real-world thromboprophylaxis practice in Chinese trauma care.[1] The interdepartmental variability they describe is an under-appreciated problem, and the dataset is one of the larger single-center series from this region. We offer four methodological observations that we believe deserve consideration in interpreting the findings.

The most consequential concern involves differential imaging intensity between groups. Patients who received anticoagulation were far more likely to undergo lower extremity vascular ultrasound and pulmonary CT re-examination (84.47% vs. 47.15%, P<0.001). Given this disparity, the higher observed thrombotic event rate in the anticoagulation group (17.93% vs. 7.32%) cannot be straightforwardly attributed to treatment failure; it is at least partly a product of who was looked at and how often. This phenomenon—in which hospitals or patient groups that image more frequently appear to have worse thrombotic outcomes—has been documented extensively in the VTE literature[2] and validated on large national datasets.[3] The logistic regression in Table 7 includes re-examination status as a covariate but does not account for the mechanistic path through which imaging frequency inflates event detection. Restricting analyses to patients with complete imaging workup, or adjudicating outcomes in a blinded fashion, would be more defensible approaches in future work.

A related issue is confounding by indication. Anticoagulated patients were older, had longer stays, and were more likely to have already experienced a thrombotic event before the comparison was made—a profile that reflects clinician selection rather than random assignment. Binary logistic regression can adjust for listed covariates but cannot address the systematic, clinician-driven selection of higher-risk patients into treatment. Propensity score matching or inverse probability of treatment weighting would better equalize the baseline risk burden between groups and yield less biased effect estimates.[4] The Nagelkerke R^2 values of 0.325 and 0.160 in Tables 3 and 7, respectively, suggest the current models explain a modest share of outcome variance, which further limits the confidence one can place in the adjusted odds ratios.

Third, the study reports thrombotic events without any corresponding data on bleeding complications. For trauma patients, the decision to prescribe pharmacologic prophylaxis is inseparable from the risk of hemorrhage—intracranial hematoma expansion, need for operative hemostasis, or transfusion dependence are all plausible harms that anticoagulation may precipitate or worsen. Current trauma consensus guidance explicitly frames thromboprophylaxis as a risk-benefit calculation rather than a unilateral intervention.[5] Presenting only the thrombotic side of the ledger makes it difficult to judge whether the anticoagulation practices documented here were, on balance, beneficial. Adoption of the definition of major bleeding from the International Society on Thrombosis and Haemostasis as a prespecified secondary endpoint would substantially improve the clinical interpretability of future studies.[6]

Finally, two narrower but practically important issues merit mention. Anticoagulant doses were recorded in millilitres rather than milligrams or weight-adjusted units, making it impossible to determine whether patients received standard prophylactic,

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weight-adapted, or inadvertently therapeutic regimens. Anti-Xa–guided dose adjustment has been shown to improve prophylactic target attainment in trauma populations with altered pharmacokinetics,[7] and future studies would benefit from reporting doses in standardized units alongside body weight and renal function. Separately, anticoagulation initiation was treated as a static binary exposure despite the fact that patients must survive long enough to receive their first dose—a scenario that generates immortal time bias toward apparent benefit of later treatment. Modeling anticoagulation as a time-varying covariate within a survival framework, together with a prespecified missing-data strategy such as multiple imputation, would yield more reliable estimates of timing effects.[8]

These observations are not intended to diminish the contribution of the study, which addresses a genuine evidence gap in Chinese trauma practice. We hope they prove useful in designing the multicenter prospective work the authors themselves advocate.

Artificial Intelligence Statement

The authors used ChatGPT (version 5.4; OpenAI) solely for language polishing and to improve the readability of the manuscript.

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Disclosure

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