Evaluation of Enoxaparin Dosing Strategies and Anti–Factor Xa Guided Adjustments for Venous Thromboembolism Prophylaxis in Trauma Patients

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Abstract

Background: Venous thromboembolism (VTE) is a common and potentially preventable complication in trauma patients. Enoxaparin is the preferred agent for pharmacologic VTE prophylaxis; however, prior studies have demonstrated that standard fixed dosing may not consistently achieve prophylactic anti-factor Xa levels in trauma populations.[8,10] Anti-factor Xa (anti-Xa) monitoring has been proposed as a method to assess the adequacy of prophylaxis, though recommendations regarding its routine use vary across trauma guidelines and institutions.[1,4]

Objective: To evaluate anti-factor Xa levels in trauma patients receiving pharmacologic VTE prophylaxis and to describe dosing adjustments, safety, and efficacy outcomes associated with anti-Xa–guided enoxaparin therapy.

Methods: This single-center, retrospective cohort study included adult trauma patients admitted between March 1, 2021, and May 1, 2025, who received pharmacologic VTE prophylaxis and had at least one anti-Xa level obtained. Therapeutic anti-Xa levels were defined as 0.2–0.4 IU/mL. The primary outcome was the proportion of patients with subtherapeutic anti-Xa levels. Secondary outcomes included dose adjustments, VTE incidence, and bleeding events.

Results: Fifty patients were included, of whom 60% had a body mass index ≥30 kg/m². Initial anti-Xa levels were subtherapeutic in 86% of patients, with only 10% achieving therapeutic levels. Most patients required enoxaparin dose escalation, with final regimens commonly ranging from 50 mg to 60 mg subcutaneously every 12 hours. Two patients (4%) developed deep vein thrombosis, and no pulmonary embolism events were observed. Major and minor bleeding occurred in 6% of patients each.

Conclusions: Subtherapeutic anti-Xa levels were common in trauma patients receiving standard enoxaparin prophylaxis. Anti-Xa–guided dose escalation was frequently required and was not associated with a marked increase in bleeding events. These findings support individualized dosing strategies and highlight the potential value of pharmacist-driven anti-Xa monitoring programs to optimize venous thromboembolism prophylaxis in trauma patients.