Comparison of Anti-Xa Versus Activated Partial Thromboplastin Time Monitoring for Therapeutic Unfractionated Heparin Management

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Background: Recent literature has demonstrated the benefits of anti-Xa monitoring, such as a faster time to achieve a therapeutic level and less frequent dose adjustments for heparin management. However, current studies lack generalizability due to differences in methodology and limited data in certain populations, such as those with recent use of a factor Xa inhibitor, obesity, or with an initial dose cap on a cardiac nomogram.

Objective: Evaluate the use of anti-Xa monitoring compared to aPTT monitoring for intravenous unfractionated heparin (IV UFH) in a diverse patient population.

Methods: This is a retrospective cohort study comparing monitoring using anti-Xa and activated partial thromboplastin time (aPTT) in adult patients who received IV UFH therapy for at least 24 hours from January to March 2021 (aPTT) and August to November 2021 (anti-Xa). The primary outcome was time to therapeutic range. Patients who did not achieve therapeutic range on either protocol were censored at 96 hours. Secondary objectives included the percentage of levels in therapeutic range while on IV UFH, the percentage of patients achieving therapeutic range at 24, 48, and 72 hours, the number of dose adjustments to reach therapeutic range, and the time to therapeutic range in patients who received a factor Xa inhibitor in the last 72 hours prior to IV UFH initiation on the anti-Xa protocol, are obese, or who had an initial dose capped at 1000 units per hour on the cardiac nomogram. Safety outcomes included the development of thromboembolism and bleeding events.

Results: A total of 548 patients were identified. Overall, 200 patients from each group were evaluated. Within 96 hours, 131 patients in the aPTT group and 161 patients in anti-Xa group reached therapeutic range. The median time to achieve therapeutic range in the anti-Xa group was 6 hours earlier than the aPTT group (33.9 hours vs. 27.7 hours, p=0.0014). For the secondary outcomes, patients in the anti-Xa group had a higher percentage of labs within therapeutic range (43.5% vs. 55.1%, p=0.0001) and fewer dose adjustments (2 vs. 1, p=0.04). There were trends toward more patients achieving a therapeutic range within 24 hours and a shorter time to therapeutic range on the cardiac nomogram with an initial dose cap for the anti-Xa group compared to the aPTT group. Patients who received a factor Xa inhibitor within 72 hours prior to IV UFH initiation appeared to have no difference in achieving time to therapeutic range with anti-Xa monitoring. A total of 10 bleeding events occurred in the anti-Xa group compared to 13 bleeding events in the aPTT group. One thromboembolism event occurred in the anti-Xa group.

Conclusions: Patients on IV UFH therapy with anti-Xa monitoring achieved therapeutic range earlier than patients on an aPTT protocol. Additionally, anti-Xa monitoring resulted in a greater percentage of levels within therapeutic range with fewer dose adjustments.