Targeted Dosing of Low Molecular-Weight Heparin (LMWH) for Deep Vein Thrombosis (DVT) Prophylaxis in Orthopaedic Trauma Patients Does Not Reduce Thromboembolic Events

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Purpose: Low molecular-weight heparin (LMWH) is commonly used to prevent venous thromboembolism (VTE) in orthopaedic trauma patients. However, differences in body habitus, medical comorbidities, and creatinine clearance may affect LMWH bioavailability in the multiply injured patient, and studies have suggested that targeted LMWH dosing as measured by anti-factor Xa (AFXa) levels may reduce rates of VTE. We sought to determine the effect of AFXa level on the rate of deep vein thrombosis (DVT) and pulmonary embolism (PE) in orthopaedic trauma patients with lower-extremity and pelvic fractures.

Methods: This was a comparison between prospectively followed patients from January 2017-July 2018 placed on a targeted LMWH protocol with the goal of an AFXa trough of >0.1 U/mL starting with 30-mg BID (twice daily) dosing to a historical cohort from October 2012-April 2013 who were placed only on 30-mg BID dosing. Patients were included if they had a trauma activation, had a lower extremity injury, were hospitalized for at least 3 days, and had no DVT prophylaxis protocol violations. Patients were excluded if they were <18 years old, had a coagulopathy or prothrombotic condition, or received DVT prophylaxis other than LMWH. Outcomes included transfusion rate, wound complications, bleeding complications, and rates of VTE. One-way analysis of variance, $\chi 2$, and Kruskal-Wallis tests were used for comparison. A P value <0.05 was considered significant.

Results: 174 patients met criteria, 97 patients were in the historical group, and 77 in the in the protocol group. In the protocol group, 53 (69%) of patients were found to be subtherapeutic with 30-mg BID dosing. The median ISS was lower in the historical group (34 vs 45, P = 0.002). There was no difference in VTE between the historical and protocol groups (15% vs 10%, P = 0.559). There was no difference in wound complications (12.7% vs 13%, P = 0.975). Patients in the control group had more units of packed red blood cells transfused (1.64 vs 0.025 units, P <0.01).

Conclusion: Appropriate VTE prophylaxis in patients with lower extremity fractures remains unclear. Many patients are subtherapeutic with commonly used 30-mg BID dosing. However, while targeted AFXa dosing does not increase bleeding complications, it does not appear to reduce VTE rates.

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