Patients With Pelvic and Acetabular Fractures Demonstrate High Risk for Venous Thromboembolism, Prolonged Impaired Fibrinolysis, and Platelet-Dominant Hypercoagulability

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Purpose: The risk for venous thromboembolism (VTE) after pelvic and acetabular fractures remains high, supporting a need for appropriate thromboprophylaxis to reduce the risk of these potentially life-threatening events. Thromboelastography (TEG) is a whole-blood assay that provides a comprehensive analysis of hemostasis from clot initiation to fibrinolysis. This study aimed to use serial TEG analysis to identify those at increased risk for VTE and to determine the different phases of hypercoagulability after a pelvic or acetabular fractures.

Methods: This single-center prospective cohort study enrolled consecutive adult patients requiring pelvic and acetabular fracture fixation who underwent serial TEG analysis until 12 weeks postoperatively. Hypercoagulability was defined as maximal amplitude (MA, a measure of platelet contribution to maximal clot strength) of 65 mm or greater. The most common thromboprophylaxis regimen was low-molecular-weight heparin for 28 days. Wilcoxon tests compared MA values and the hypercoagulability threshold at each time point to define the duration of hypercoagulable state. Impaired fibrinolysis (inability to breakdown clot) was defined as a 30-minute lysis time (LY-30) <0.5%.

Results: A total of 78 patients with pelvic or acetabular were included (mean age = 48.8 ± 18.3 years; 73.4% male). There were 11 symptomatic VTE events (11%; 6 pulmonary embolism [PE], 3 deep vein thromboses [DVT], and 2 with concomitant DVT and PE), with 7 events in the acetabular fracture group and 4 in the pelvic fracture group. There was no difference in age or sex between those with VTE and without VTE (both $P<0.05$). Patients with pelvic and acetabular fractures demonstrated early and persistently impaired fibrinolysis (mean preoperative LY-30 = 0.46; postoperative day [POD]5 LY-30 = 0.08, 2-week LY-30 = 0.14; 4-week LY-30 = 0.28). Patients with pelvic and acetabular fractures also demonstrated a prolonged platelet-dominant hypercoagulability, with 97% demonstrating elevated MA above the threshold at 2 weeks (median = 71.9 mm); 69% remained hypercoagulable at 4 weeks (median = 67 mm), and 52% at 6 weeks (median 65.3 mm).

Conclusion: This study supports that patients with pelvic and acetabular fractures remain at very high VTE risk due, at least in part, to impaired fibrinolysis (reduced clot breakdown). The prolonged platelet-dominant hypercoagulability suggests that extended antiplatelet thromboprophylaxis may be beneficial.

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