

Thromboelastography as a Marker for Heritable Thrombophilia and Increased Risk of Venous Thromboembolism After Pelvic Fracture

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Purpose: Despite recent advancements in venous thromboembolism (VTE) prophylaxis like factor-Xa level-based enoxaparin dosing, VTE remains a significant complication of orthopaedic trauma. Patients presenting with pelvic and acetabular trauma are of particular concern given prolonged recumbency and increased risk of pelvic venous thrombosis. Approximately 10% of the normal population has known heritable thrombophilia, further increasing VTE risk. The purpose of this study was to determine if routine postoperative rapid thromboelastography (rTEG) can be used as a surrogate to identify hypercoagulability and an association with heritable thrombophilia, and to determine if these patients are, in fact, at increased VTE risk despite appropriate prophylaxis.

Methods: Patients presenting to 2 Level I trauma centers with isolated operative pelvic or acetabular fractures were enrolled in this prospective study. Patients were treated with enoxaparin twice daily, adjusted based on factor-Xa levels during admission, for minimum 6 weeks after discharge. Postoperatively and at the 6-week mark, the following labs were drawn: rTEG, protein C/S, factor V, lupus anticoagulant, homocysteine, and antithrombin. Records were reviewed for VTE at a minimum of 3 months of follow-up. Hypercoagulable rTEG was defined as maximum amplitude (MA) 65mm.

Results: In total, 147 patients with isolated pelvic and /or acetabular fractures were enrolled. 92 patients (63%) with all blood work and minimum follow-up were included in final analysis. 59% of patients (n = 86) had postoperative rTEG consistent with hypercoagulability and 48% of patients (n = 70) had at least 1 marker of thrombophilia. Patients with rTEG MA 65mm were significantly associated with at least 1 marker of thrombophilia (odds ratio [OR] = 2.1,

Conclusion: This study suggests a paradigm shift for VTE prophylaxis in patients with operative pelvic and acetabular fractures is indicated, as VTE incidence was 12% despite appropriate factor-Xa based enoxaparin prophylaxis. There is an association between underlying heritable thrombophilia and a postoperative rTEG suggesting hypercoagulability. While TEG results in this study (and others) were not directly associated with VTE, all patients who had a VTE had at least 1 marker of heritable thrombophilia. Given that TEG is an economical and ubiquitous test, all patients who sustain pelvic and acetabular trauma should undergo postoperative TEG with subsequent hereditary thrombophilia workup if results indicate hypercoagulability, as these patients likely require alterations in VTE prophylaxis.