

Prolonged Hypercoagulability Exists Following Pelvic and Acetabular Fractures Regardless of Surgical Management or Non-Operative Treatment

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Purpose: Venous thromboembolism (VTE) is a potentially life-threatening blood clotting complication, occurring in up to 27% of patients with pelvic or acetabular (PA) fractures. Thrombelastography (TEG) is a point-of-care tool that evaluates real-time viscoelastic changes in whole blood throughout the clotting process. TEG has been used to quantify hypercoagulability and identify those at increased risk for VTE. Duration of post-injury hypercoagulability in patients with PA fractures is undefined; therefore, the optimal duration of thromboprophylaxis to prevent VTE remains unknown. We aimed to evaluate the duration of post-injury hypercoagulability in PA fractures using serial TEG analysis.

Methods: In this study of adults with PA fractures, patients who underwent nonoperative treatment were prospectively enrolled and compared with age- and sex-matched patients with PA fracture who underwent surgery from a prior prospective cohort study. Whole blood samples were collected upon hospital admission, on post-admission days (PAD) one and three for nonoperative (or postoperative days [POD]) one and three in surgically treated PA patients, and at 2- and 4-weeks post-admission. Samples were analyzed using the TEG®6s Hemostasis Analyzer (Haemonetics Corporation) to quantify maximal amplitude (MA), which indicates clot strength. Hypercoagulability was defined as MA ≥ 65 mm based on current literature. Descriptive statistics were used to determine the duration of the hypercoagulable state and increased VTE risk.

Results: A total of 18 participants (age: 51 ± 21 years; 44.4% female) were included, half of whom were treated surgically. There were no statistically significant differences between the groups in age ($p = 0.95$), sex ($p = 1.0$), body mass index ($p = 0.44$), or admission MA values ($p = 0.09$). However, MA was significantly elevated in surgically treated participants on POD1 (67.1 ± 2.7 mm) and POD3 (71.2 ± 1.8 mm) compared with MA in nonoperatively treated patients on PAD1 (61.6 ± 3.2 mm; $p < 0.01$) and PAD3 (63.8 ± 3.2 mm; $p < 0.01$). Participants in both groups remained hypercoagulable (mean MA = 67.5 mm; $p = 1.0$) at 4 weeks post-injury.

Conclusion: Major orthopaedic injuries, such as PA fractures, induces a hypercoagulable state. Regardless of surgical or nonsurgical management, patients with PA fractures remained hypercoagulable based on serial TEG analysis until 4 weeks post-injury. Consideration for prolonged thromboprophylaxis is warranted for patients with pelvic and acetabular fractures, regardless of surgical intervention or not.