

## Extremity Trauma Results in Severe Coagulopathy and Impaired Fibrinolysis Based on Serial Rapid Thrombelastography

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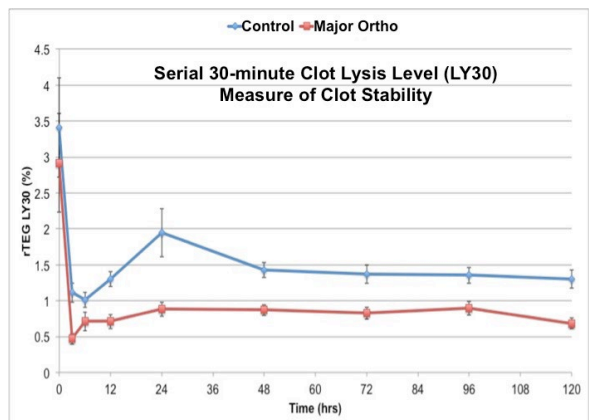
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**Purpose:** Trauma-induced coagulopathy correlates with morbidity and mortality. Rapid thrombelastography (rTEG) evaluates the clotting function of whole blood and is now used to guide blood product resuscitation. Elevated maximal amplitude (MA) has been shown to be predictive of in-hospital venous thromboembolic events (VTE). To date, coagulopathy has not been studied in major extremity trauma beyond 24-hours post-injury.

**Method:** Subset analysis of a prospective, observational trial evaluating serial rTEG in severely injured patients. Serial rTEG (activated clotting time, k-time, a-angle, MA, lysis) and traditional coagulation testing were obtained at admission and then at 3, 6, 12, 24, 48, 72, 96, and 120 hours. Patients were dichotomized into ORTHO (extremity AIS>2) or CONTROLS (extremity AIS 0-2). Univariate analysis was conducted, followed by longitudinal analysis using generalized estimating equations (GEE) to evaluate the effects of time, splenectomy, and group-time interactions on changes in rTEG, controlling for age, gender, base deficit and ORTHO group. A multiple logistic regression was developed to evaluate the development of VTE.

**Results:** 340 patients had complete serial rTEG data; 75 were classified as ORTHO and 265 were CONTROLS. There were no differences in baseline demographics or non-extremity AIS scores. ORTHO patients were more likely to have sustained blunt mechanism (91% vs. 62%) and have higher ISS (median 27 vs. 17); both  $p<0.001$ . ORTHO patients were more unstable on arrival (median Revised Trauma Score 3.51 vs. 6.81,  $p=0.035$ ). Based on the GEE model, the ORTHO group was more hypocoagulable, as measured by k-time and decreased MA, over the first 5-days post-injury. However, despite being unexpectedly more hypocoagulable, the ORTHO patients demonstrated impaired lysis ( $p<0.05$ ) and had an increased VTE rate (13.3% vs. 1.8%;  $p<0.001$ ) compared to CONTROLS. On multivariate analysis, ORTHO was an independent predictor of in-hospital VTE (Odds Ratio = 6.36; 95% CI = 1.94 to 20.81;  $p=0.002$ ).

**Conclusion:** Based on 5-day serial rTEG analysis of 340 trauma patients, the ORTHO group was more coagulopathic. Both groups became progressively more hypercoagulable, however, ORTHO patients were more hypocoagulable. Despite this, ORTHO patients had decreased fibrinolysis, which may translate into higher VTE. Major extremity trauma remains a strong, independent predictor of VTE.



The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.