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"Use of Viscoelastic Testing in Trauma Patients"

Background: Coagulopathic trauma patients are at a three-fold higher risk of death compared to noncoagulopathic patients. However, identification and targeted treatment of coagulopathy is still being researched. Thromboelastography (TEG) may allow us to not only identify these patients, but also provide optimal transfusion to reverse coagulopathy.

Methods: This was a secondary analysis of a multicenter retrospective review, which included adult patients receiving massive transfusion protocol. A numerical "TEG score" was calculated for each patient based on abnormalities in TEG alpha angle (<65 degrees), clot time (>8.9 min), and clot strength (<55 mm). Each abnormal value was assigned a point value of 1, with the overall TEG score range 0-3. Multiple regression was used to control confounding variables while evaluating the association between abnormal TEG values and key outcome variables, including patient mortality and blood product transfusion.

Results: Abnormal TEG angle was significantly predictive of 24-hour platelet ($p<0.001$) and cryoprecipitate ($p<0.001$) transfusion requirements. Abnormal clot time similarly predicted 24-hour platelet ($p<0.001$) and cryoprecipitate ($p=0.046$) transfusion. Abnormal clot strength was significantly predictive of patient mortality ($p=0.015$), and 24-hour fresh frozen plasma transfusion ($p=0.016$). Patients with higher TEG scores had significantly increased odds of mortality, and greater PRBC, platelet, FFP, and cryoprecipitate transfusion requirements (all $p<0.001$). Sensitivity analysis testing additional permutations of TEG scoring values (e.g. assigning 2 points for abnormal clot time) did not yield significant enhancement of predictive power.

Conclusions: Abnormal alpha angle, clot time, and clot strength were independently associated with patient outcomes, including mortality and transfusion characteristics. A composite TEG score integrating these factors strongly predicted all outcomes of interest. Further research is needed to validate the TEG score in a prospective manner.