

### **Δ Patients with Hip Fractures Treated with Arthroplasty Demonstrate Prolonged Hypercoagulability and Increased Venous Thromboembolism Risk**

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**Purpose:** The venous thromboembolism (VTE) risk after hip fracture surgery (HFS) is among the highest for all procedures. Recent clinical studies have demonstrated an increased VTE rate following surgical treatment of hip fractures with arthroplasty compared to surgical fixation. Thrombelastography (TEG) is a whole-blood viscoelastic assay capable of providing real-time hemostasis analysis. An elevated TEG maximal amplitude (MA) value >65 (measure of maximal clot strength) is indicative of a hypercoagulable state. This study's objective was to perform serial TEG analysis in patients with hip fracture, in order to (1) compare hypercoagulability between patients treated with arthroplasty compared to fixation and (2) determine the duration of postoperative hypercoagulability.

**Methods:** Consecutive patients >50 years of age with a hip fracture amenable to surgical treatment (AO 31A1-3 and 31B1-3) were recruited at a Level I trauma center. Whole blood was collected every 24 hours from admission until 5 days postoperatively, and in follow-up at 2, 4, and 6 weeks for TEG analysis. All patients received 28 days of pharmacological thromboprophylaxis. Results were summarized using descriptive statistics. Logistic regression analysis was performed using the presence or absence of MA >65 for patient and surgical factors associated with hypercoagulability.

**Results:** In total, 121 patients (81 female) with a median age of 81 (interquartile range 71-87) were included. 64 patients had intertrochanteric fractures (AO 31A) and 57 patients had femoral neck fractures (AO 31B). Patients treated with arthroplasty were significantly more hypercoagulable on postoperative day (POD) 3 (odds ratio [OR] = 7.08, 95% confidence interval [CI] = 2.00-34.09;  $P = 0.005$ ), at 2 weeks postoperative (OR = 2.84, 95% CI = 1.10-7.68,  $P = 0.034$ ), and at 6 weeks postoperative (OR = 5.14, 95% CI = 1.73-17.16) compared to patients treated with surgical fixation. All three patients (2.5%) who developed symptomatic VTE following hip fracture were treated with arthroplasty procedures. At 6 weeks, the majority of patients remained above the MA >65 hypercoagulable threshold (mean MA = 65.9, standard deviation = 4.0;  $P < 0.04$ ).

**Conclusion:** This study demonstrates for the first time that patients with hip fracture treated with arthroplasty were significantly more hypercoagulable postoperatively (based on MA >65) than patients treated with surgical fixation. The increased VTE risk may be associated with more invasive surgical approaches and leg manipulation during arthroplasty, leading to increased activation of the coagulation cascade. Additionally, blood flow has been shown to be reduced in the operated leg following arthroplasty up to 6 weeks postoperatively coinciding with our findings. Risk stratification with TEG and TEG-guided thromboprophylaxis regimens may reduce VTE risk in patients with hip fracture requiring arthroplasty and with prolonged hypercoagulability.

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See the meeting app for complete listing of authors' disclosure information. Schedule and presenters subject to change.