Increased Platelet Activity Follows Hip Fracture Surgery Compared to Elective Total Hip Arthroplasty

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Purpose: Aspirin (ASA) is an antiplatelet medication commonly used as a thromboprophylaxis agent for the prevention of venous thromboembolism (VTE) following elective total hip arthroplasty (THA). However, this practice has not been as widely adopted in the hip fracture surgery (HFS) population. Thrombelastography (TEG) is a point-of-care tool that evaluates individual coagulation profiles, with the maximal amplitude (MA) parameter indicating clot strength and increased VTE risk. Prior research supports that patients undergoing HFS are more hypercoagulable in the early postoperative period and experience a coinciding higher incidence of VTE compared to patients undergoing elective THA. TEG-based Platelet Mapping (TEG-PLM) analysis quantifies platelet activity and can be used to evaluate antiplatelet efficacy. This study aimed to compare platelet hyperactivity and platelet inhibition in patients undergoing elective THA and urgent HFS.

Methods: This is a comparison of prospective cohort studies with patients who underwent elective THA or urgent HFS, excluding those with known VTE risk factors. Serial whole blood samples were collected preoperatively and until 12 weeks postoperatively for TEG-PLM analysis (TEG6s). Thromboprophylaxis included ASA 81 mg daily for 28 days following THA, while most HFS patients received low-molecular-weight heparin (LMWH) for 35 days. Mann-Whitney U tests compared mean platelet hyperactivity-MA and platelet inhibition values at each timepoint.

Results: The study included 37 THA patients (age: 68.4 ± 9.0 years, female: 51%) and 169 HFS patients (age: 77.5 ± 11.0 years, $p<0.001$; female: 63%, $p = 0.29$). The HFS group exhibited significantly higher platelet hyperactivity and lower platelet inhibition at most postoperative timepoints. VTE events occurred in nine HFS patients (5.3), primarily during the early postoperative period when platelet hyperactivity was highest.

Conclusion: This study found higher platelet hyperactivity and lower platelet inhibition in HFS patients compared to elective THA patients, suggesting that the higher incidence of VTE in the HFS group may be related to the platelet contribution to clot formation that is not targeted by LMWH. These findings support ASA as a potential thromboprophylaxis agent after HFS. The VTE events in THA may reflect ASA resistance, highlighting the importance of a personalized approach for VTE prevention.