Prolonged Platelet-Mediated Hypercoagulability Occurs Following Surgically Treated Hip Fractures and ASA Reduces Platelet Hyperactivity

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Purpose: Hip fractures are an epidemic and despite thromboprophylaxis, venous thromboembolism (VTE) rates remain high (2.5%-5%). While serial thrombelastography (TEG) analysis can quantify hypercoagulable state and increased VTE risk, platelet mapping (PLM) can be used to measure clot strength. Using PLM, platelets are activated by binding to the adenosine diphosphate (ADP) receptor or the thromboxane A2 (AA) receptor. This study aimed to evaluate platelet contribution to hypercoagulability and to evaluate the effect of acetylsalicylic acid (ASA).

Methods: Consecutive adult patients undergoing acute hip fracture surgery were enrolled in this prospective cohort study. Exclusion criteria were prior VTE, active malignancy, or preinjury therapeutic anticoagulation. Following informed or surrogate consent, serial PLM analysis was performed at admission, postoperative day (POD) 1, 3, 5, and 7 and at 2, 4, 6, and 12 weeks postoperatively, using the TEG6s hemostasis analyzer (Haemonetics Corporation). All patients received low-molecular-weight heparin (LMWH) for 28 days postoperatively. Platelet hyperactivity was defined as maximal amplitude (MA; a measure of clot strength) over 55 mm. Student t tests were used to compare MA values with the hyperactivity threshold and between those patients receiving ASA or not.

Results: 58 patients were enrolled with a mean age of 78.6 (±11.0) years and 66% being female. 10 (17.2%) received ASA postoperatively. PLM analysis identified prolonged platelet-mediated hypercoagulability based on elevated ADP-MA and AA-MA, with more pronounced platelet contribution via the AA pathway (Figure 1). Patients who received ASA postoperatively demonstrated reduced platelet hyperactivity. One pulmonary embolism occurred in a patient not receiving ASA.

Conclusion: This study supports further investigation into the safety and efficacy of prolonged thromboprophylaxis for some patients and the investigation of anti-platelet thromboprophylaxis following hip fracture surgery.

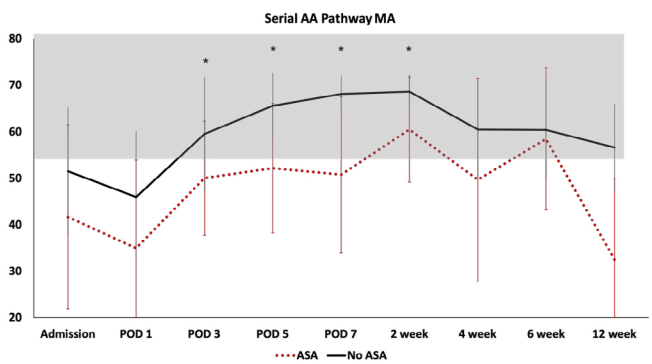

Figure 1: Serial mean (± SD) maximal amplitude (MA) for the thromboxane A2 (AA) pathway, indicating platelet hyperactivity (over 55 mm; shaded area) until 12-weeks post-operatively. Patients receiving ASA demonstrate a reduction in platelet hyperactivity, where * indicates significantly lower mean AA-MA for those on ASA ($p<0.05$).

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