

Intravenous Iron Infusion Mitigates Platelet Exhaustion and Improves Secretory Response to Agonists in Orthopaedic Trauma Patients

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Purpose: Anemia after orthopaedic trauma is widespread. We recently demonstrated that intravenous iron therapy restores platelet counts and platelet secretory responses in premenopausal women with iron deficiency. We aim to test the hypothesis that intravenous iron improves platelet count and function in anemic patients after orthopaedic trauma.

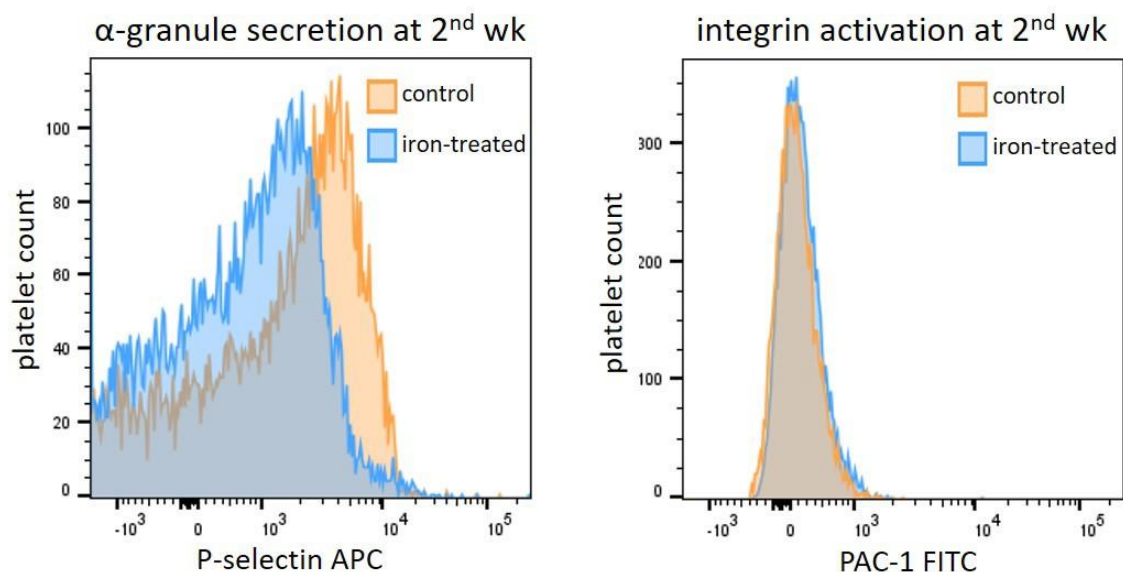
Methods: Patients in an ongoing single-center, double-blind, randomized controlled trial received saline or low- molecular-weight iron dextran (1000 mg, infusion) admitted with lower extremity or pelvis operative fractures (hemoglobin 7-11 g/dL). Time-0 and 3-month blood samples were analyzed (20 patients) seeking the effect of intravenous iron on hematologic parameters and platelet function with flow cytometry and platelet-associated cytokines.

Results: Platelet count and mean platelet volume did not significantly differ between the iron-treated and control groups. However, iron repletion mitigated the elevation of baseline levels of surface marker expression on circulating platelets and the impaired platelet secretory responses to platelet agonists— a paradoxical phenomenon also known as platelet exhaustion. In addition, the iron-treated group exhibited a lower levels of inflammatory plasma cytokines, suggesting that iron repletion improves platelet dysfunction attributed to systemic inflammation after orthopedic trauma.

Conclusion: Iron repletion may have a moderate but significant effect on platelet function and restore platelet reactivity in the setting of platelet exhaustion in anemic patients with orthopaedic trauma.

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Fig.1 Recovery from platelet exhaustion with iron repletion



Iron repletion reduces α -granule secretion while maintaining integrin activation on platelets at 2nd week following orthopedic trauma.