

CORRESPONDENCE

An update on iron therapy as an intervention to reduce blood transfusion for patients undergoing hip fracture surgery

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Editor—Preoperative anaemia occurs in one-third of patients and is associated with an increased risk of blood transfusion, patient morbidity, and mortality.^{1,2} The leading cause of anaemia is iron deficiency, with several studies exploring the use of iron around the time of surgery.³ Preoperative iron therapy has become a plausible and attractive therapeutic intervention to reduce patient complications. However, large RCTs have not supported the anticipated benefits suggested by observational and associative data.⁴

Recently, Lewis and colleagues⁵ published an overview of systematic reviews assessing interventions for reducing red blood cell transfusion in patients undergoing hip fracture surgery. Although data on tranexamic acid enabled a recommendation for use, the data on iron therapy were limited and no recommendation could be made.

The largest systematic review assessing iron therapy use in hip fracture surgery was by Sinclair and colleagues⁶ in 2022. This included four RCTs and nine cohort studies. The meta-analysis reflected the conclusions by Lewis and colleagues,⁵ finding no clinical benefit to iron therapy in this setting, with suggestion for larger studies to further explore these outcomes.

In response to the evident demand for more RCT data, we have combined the meta-analysis data from Lewis and colleagues⁵ with data from our recent RCT: IRON NOF (Fig 1).⁷ The meta-analysis trends towards favouring i.v. iron; however, there is insufficient evidence to support a true effect (odds ratio [OR] 0.80, 95% confidence interval [CI] 0.61–1.06; overall effect $P=0.12$).

Blood transfusion incidence

A meta-analysis was conducted on RCTs assessing blood transfusion use in patients undergoing hip fracture surgery

randomised to iron therapy or control. Data were informed from the 2022 systematic review by Sinclair and colleagues⁶ with the addition of data from the IRON NOF trial.⁷

Despite an increase in the OR compared with the findings of Lewis and colleagues⁵ (OR 0.80 vs 0.85), there remains insufficient evidence to support the use of i.v. iron in this setting. Of note, including IRON NOF, only two trials in this meta-analysis were conducted using a single high dose of i.v. iron as the intervention, whereas the remaining RCTs used three separate low doses of i.v. iron.

In addition, IRON NOF administered the intervention peri-operatively, whereas the remaining RCTs administered the intervention upon admission.⁵ Currently, the optimal dosing and timing of i.v. iron administration in relation to surgery remains under debate, suggesting that further RCTs exploring these differences in this patient population might be required to clarify whether iron therapy administered around the time of hip fracture surgery influences the risk of blood transfusion.

Upon exploring the influence of liberal vs restrictive transfusion on recovery from NOF surgery, the trial by Carson and colleagues⁸ acknowledged the need for functional endpoints in this fragile population by assessing the patients' ability to independently walk across a room. The POP-I trial (ISRCTN24330080) is currently recruiting hip fracture patients across 18 centres, to randomisation of i.v. iron (with or without ESA injection) or placebo delivered during the postoperative period. Promisingly, this trial will present an opportunity to explore the influence of the timing of iron therapy administration in relation to NOF surgery and explore a multidimensional analysis of self-reported mobility.

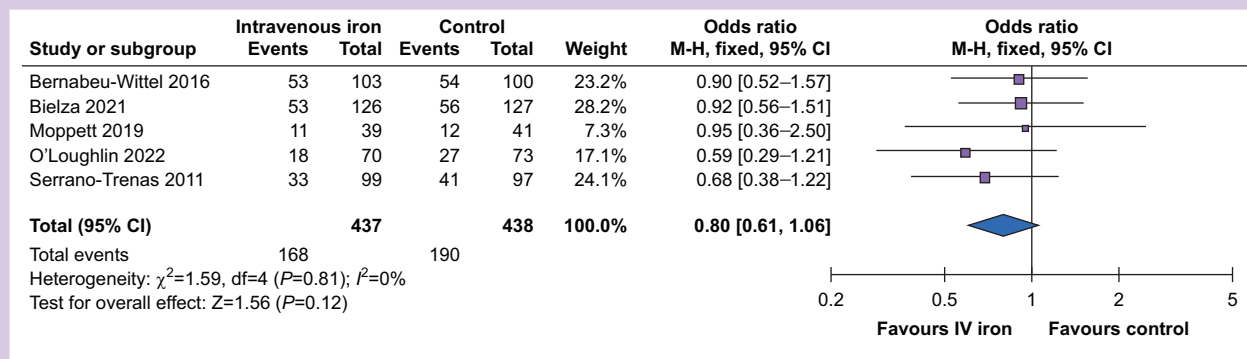


Fig. 1. Meta-analysis of RCTs on iron therapy in patients with hip fractures.

Declarations of interest

The authors declare that they have no conflicts of interest.

References

1. Beattie WS, Karkouti K, Wijeyesundera DN, Tait G. Risk associated with preoperative anemia in noncardiac surgery: a single-center cohort study. *Anesthesiology* 2009; **110**: 574–81
2. Shander A, Javidrooz M, Ozawa S, Hare GM. What is really dangerous: anaemia or transfusion? *Br J Anaesth* 2011; **107**(Suppl 1): i41–59
3. Shander A, Corwin HL, Meier J, et al. Recommendations from the international consensus conference on anemia management in surgical patients (ICCAMS). *Ann Surg* 2023; **277**: 581–90
4. MacLean B, Weyand A, Lim J, Richards T. Pre-operative iron therapy: where are we? *Best Pract Res Clin Anaesthesiol* 2023; **37**: 503–10
5. Lewis SR, Pritchard MW, Estcourt LJ, Stanworth SJ, Griffin XL. Interventions for reducing red blood cell transfusion in adults undergoing hip fracture surgery: an overview of systematic reviews. *Cochrane Database Syst Rev* 2023; **6**, CD013737
6. Sinclair RCF, Bowman MJA, Moppett IK, Gillies MA. Peri-operative intravenous iron to treat patients with fractured hip surgery: a systematic review and meta-analysis. *Health Sci Rep* 2022; **5**: e633
7. O'Loughlin E, Chih H, Sivalingam P, et al. IRON NOF trial: IV iron for anaemic patients with femoral fracture. *BJA Open* 2023; **7**: 100222
8. Carson JL, Terrin ML, Noveck H, et al. Liberal or restrictive transfusion in high-risk patients after hip surgery. *N Engl J Med* 2011; **365**: 2453–62

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