FPIN's Clinical Inquiries

Intravenous Iron vs. Oral Iron in Iron Deficiency Anemia

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Clinical Question

Is intravenous iron infusion superior to oral iron for avoiding blood transfusion in adults with iron deficiency anemia?

Evidence-Based Answer

No, intravenous iron administration does not reduce the need for blood transfusion compared with oral iron supplementation. (Strength of Recommendation [SOR]: A, multiple meta-analyses of randomized controlled trials [RCTs].) Compared with oral iron, intravenous iron has no effect on mortality. (SOR: B, multiple meta-analyses of RCTs.) Intravenous iron may increase the risk of infection compared with oral iron. (SOR: B, inconsistent evidence from meta-analyses of RCTs.)

Evidence Summary

A 2013 meta-analysis examined 72 RCTs (N = 10,605) comparing the effectiveness of intravenous iron vs. oral iron or no iron at preventing allogenic blood transfusions in anemic patients (hemoglobin [Hb] of 6.0 to 14.5 g per dL [60 to 145 g per L] with ferritin concentrations between 70 and 7,610 ng per mL [70 and 7,610 mcg per L]).[1] The participants were from a range of clinical specialties, including nephrology, obstetrics, surgery, oncology, cardiology, and gastroenterology. The most common intravenous preparation used was iron sucrose, 200 mg per dose for three to five doses or until replete. The oral iron preparations were not specified. There was no difference in the need for blood transfusion between intravenous iron and oral iron (14 studies; n = 2,263; relative risk [RR] = 0.82; 95% CI, 0.67 to 1.00). Intravenous iron was associated with an increased risk of infection (12 studies; n = 2,622; RR = 1.63; 95% CI, 1.16 to 2.29). Compared with oral or no iron, intravenous iron had no significant impact on mortality (20 studies; n not given; RR = 1.1; 95% CI, 0.8 to 1.5) or adverse effects (19 studies; n not given; RR = 1.1; 95% CI, 0.9 to 1.2). There was a high risk of bias because most studies were not blinded and study heterogeneity was significant.

A 2016 meta-analysis examined 64 RCTs (N = 9,004) to determine the effects of intravenous iron vs. oral iron or control on the need for subsequent blood transfusions in anemic adults (Hb less than 13 g per dL [130 g per L] for men and Hb less than 12 g per dL [120 g per L] for women) without a history of recent childbirth or chronic kidney disease.[2] Twenty-two studies evaluated intravenous iron vs. oral iron and, of these, seven (n = 545) were new and not included in the review by Litton and colleagues above.[1,2] Mean participant ages ranged from 34 to 87 years. No details of intravenous or oral iron formulations or dosing schedules were given. There were no significant differences between intravenous and oral iron in the need for transfusion (five studies; n = 699; RR = 1.20; 95% CI, 0.56 to 2.61), mortality (15 studies; n = 2,088; RR = 1.22; 95% CI, 0.58 to 2.56), or serious adverse effects (15 studies; n = 2,351; RR = 1.18; 95% CI, 0.97 to 1.44). Limitations of this review included selective reporting of outcomes within included studies and evidence of publication bias.

A 2021 systematic review examined 10 RCTs (N = 1,039; five new studies) evaluating the effect of preoperative intravenous iron therapy vs. control (placebo, oral iron [preparation not specified], or standard of care) on the need for allogenic blood transfusion in anemic and nonanemic patients.[3] The mean age of patients was 64 years or older in eight of the 10 studies. Surgery type varied and included

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This series is coordinated by John E. Delzell Jr., MD, MSPH, associate medical editor.

A collection of FPIN's Clinical Inquiries published in *AFP* is available at https://www.aafp.org/afp/fpin.

Author disclosure: No relevant financial relationships.

orthopedic, cardiovascular, colorectal, gynecologic, and major abdominal surgery. The intervention was intravenous iron sucrose (100 mg to 300 mg) or ferric carboxymaltose (15 mg per kg up to 1,000 mg per kg) initiated preoperatively. Dosing ranged from two total doses to once every two days, and timing of the initial dose ranged from three weeks preoperatively to the day of admission for surgery. Intravenous iron compared with oral iron did not reduce the need for transfusion (three studies; n = 283; RR = 0.88; 95% CI, 0.51 to 1.51). Intravenous iron did not increase nonserious or serious adverse effects compared with placebo or standard of care (seven studies; n = 813; RR = 1.13; 95% CI, 0.78 to 1.65; and two studies; n = 176; RR = 0.96; 95% CI, 0.44 to 2.10, respectively). All three studies in the intravenous iron vs. oral iron comparison had a low risk of bias, although one was industry funded.

Recommendations From Others

The American Society of Hematology recommends intravenous iron as a treatment option for iron deficiency anemia if there is a poor response to oral iron, rapid correction is desired, or if there is access to the product and no contraindications.[4]

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