

Iron Supplementation for Patients Undergoing Cardiac Surgery: A Systematic Review and Meta-Analysis of Randomized-Controlled Trials

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Abstract : Background: Iron supplementation has been evaluated in several randomized controlled trials (RCTs) for the potential to increase baseline hemoglobin and decrease the incidence of red blood cell (RBC) transfusion during cardiac surgery. This study's main objective was to evaluate the evidence for iron administration in cardiac surgery patients for its effect on the incidence of perioperative RBC transfusion. Methods: This systematic review protocol was registered with PROSPERO (CRD42020161927) on Dec. 19th, 2019, and was prepared as per the PRISMA guidelines. MEDLINE, EMBASE, CENTRAL, Web of Science databases, and Google Scholar were searched for RCTs evaluating perioperative iron administration in adult patients undergoing cardiac surgery. Each abstract was independently reviewed by two reviewers using predefined eligibility criteria. The primary outcome was perioperative RBC transfusion, with secondary outcomes of the number of RBC units transfused, change in ferritin level, reticulocyte count, hemoglobin, and adverse events, after iron administration. The risk of bias was assessed with the Cochrane Collaboration Risk of Bias Tool, and the primary and secondary outcomes were analyzed with a random-effects model. Results: Out of 1556 citations reviewed, five studies (n = 554 patients) met the inclusion criteria. The use of iron demonstrated no difference in transfusion incidence (RR 0.86; 95% CI 0.65 to 1.13). There was a low heterogeneity between studies ($I^2=0\%$). The trial sequential analysis suggested an optimal information size of 1132 participants, which the accrued information size did not reach. Conclusion: The current literature does not support the routine use of iron supplementation before cardiac surgery; however, insufficient data is available to draw a definite conclusion. A critical knowledge gap has been identified, and more robust RCTs are required on this topic.

Keywords : cardiac surgery, iron, iron supplementation, perioperative medicine, meta-analysis, systematic review, randomized controlled trial

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