

The post-operative management of anaemia: more efforts are needed

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Anaemia, defined by the World Health Organization (WHO) as a haemoglobin concentration <13 g/dL for men and <12 g/dL for women¹, is a very common complication in the immediate post-operative period, being present in up to 90% of patients after major surgery². Post-operative anaemia may be multifactorial in origin, with pre-existing anaemia, peri-operative blood loss, frequent blood sampling and inadequate nutritional intake after surgery all potentially having a role³. In cancer patients undergoing surgical resection of a tumour, post-operative anaemia is an almost invariable finding related, besides the above-mentioned causes, to chronic blood losses, especially in patients with colorectal cancer, and to previous or concomitant chemotherapy and/or radiotherapy⁴. In addition, inflammation-related increased hepcidin levels inhibit intestinal iron absorption and iron release from stores thus aggravating the already present iron deficiency anaemia⁵. Peri-operative anaemia has a deleterious effects on patients' health being associated with prolonged hospitalisation, an increased rate of post-operative complications (especially infections) and, finally, a worsened survival⁶.

The management of peri-operative anaemia is a fundamental pillar of Patient Blood Management (PBM) programmes, which are being progressively though irregularly implemented worldwide. PBM is a multidisciplinary, multimodal patient-centred strategy aimed at minimising the use of blood products and improving patients' outcome⁷⁻⁹. Within a PBM programme, management of anaemia should ideally be started several weeks before surgery, but any available time should be used¹⁰. In the post-operative setting, a PBM-based approach to anaemia following surgery promotes individualised care aimed at attaining haemoglobin levels that avoid or reduce the administration of allogeneic blood transfusion. This should be followed by correction of post-operative anaemia in the shortest possible period, to facilitate the patients' functional recovery and improve their quality of life. Both transfusional and non-transfusional measures have been proposed for the post-operative period within the frame of a PBM programme². The former include restrictive transfusion measures such as reduced red blood cell transfusion thresholds (e.g., 7-8 g/dL) and

a single-unit transfusion policy¹¹⁻¹³, the latter include non-pharmacological strategies (e.g., reduction in the frequency and volume of diagnostic phlebotomies, use of in-line closed blood conservation devices, cell salvage during surgical procedures) and pharmacological agents to control coagulopathy and stimulate erythropoiesis⁹.

As iron deficiency is an almost invariable characteristic of post-operative anaemia, iron supplementation is the main target of a PBM-based approach. Management of iron deficiency with oral iron in the immediate post-operative period has a very limited role due to poor absorption, duration of action and considerable side effects, and is not currently recommended¹⁴. In contrast, post-operative administration of intravenous iron, with or without erythropoiesis-stimulating agents, has been found to be a safe and effective way for correcting anaemia after a variety of major operations¹⁵⁻¹⁷. Currently, six intravenous iron formulations (i.e., iron gluconate, iron sucrose, low molecular weight iron dextran, ferric carboxymaltose, iron isomaltoside and ferumoxytol) are available in the Europe and/or USA: these products have very rarely been associated with serious adverse events¹⁸. As outlined by a recent meta-analysis of 103 trials including nearly 20,000 patients, intravenous iron therapy was not associated with an increased risk of serious adverse events (risk ratio [RR] 1.04; 95% confidence interval [CI] 0.93-1.17) or infections (RR 0.96; 95% CI 0.63-1.46), when compared with oral or intramuscular iron, no iron or placebo¹⁹. In large observational studies, peri-operative intravenous iron did not have a negative impact on rates of infection or 30-day mortality in surgical patients¹⁴.

In a recent prospective randomised trial, Khalafallah and Colleagues²⁰ reported that a single post-operative intravenous infusion of ferric carboxymaltose (800-1,000 mg) after major orthopaedic, abdominal or genitourinary surgery significantly improved haemoglobin and ferritin concentrations, decreased the number of transfusions and shortened the length of hospital stay in treated patients compared with controls. Similar results were observed in the retrospective, single-centre study conducted by Laso-Morales and Colleagues in 159 patients undergoing colorectal cancer surgery

and published in this issue of Blood Transfusion²¹. Compared to standard care, post-operative intravenous administration of iron sucrose (200 mg up to three times a week) to anaemic patients hastened the recovery of haemoglobin levels without adverse events. Although preliminary, these results are very important and open the way to the conduction of randomised controlled trials assessing the benefits and safety of intravenous iron for treating post-operative anaemia in this particular surgical setting.

In conclusion, for most patients, appropriate use of iron supplementation is an essential part of proper management of post-operative anaemia. More efforts are expected from National and International Health Authorities and Medical Societies to sensitise clinicians to the fact that improved post-operative outcome of their patients depends in part on timely post-operative iron supplementation, at the right dose and with the right formulation.

Disclosure of conflicts of interest

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