EDITORIAL

Is it time to integrate patient blood management in ERAS guidelines?

¿Es hora de integrar el manejo sanguíneo del paciente en los protocolos de rehabilitación quirúrgica intensificada?

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The multidisciplinary perioperative approach as well as the anaesthetist role as a perioperative physician, has recently focused on the management of surgical patients in order to reduce post-operative complications and the hospital length of stay. The concept of Enhanced Recovery After Surgery (ERAS)1, or multimodal surgery, involves on the one hand the use of different strategies to reduce the psychological and physiological stress in order to reduce catabolism and, on the other hand, a set of measures to provide a more rapid and stress-free recovery free of complications, which in turn leads to a reduction in the length of stay.

Preoperative anaemia is currently considered as a surrogate marker for any poor clinical basal conditions in surgical patients requiring correction, as far as possible, especially in scheduled surgical patients. In cancer patients, anaemia, often associated with hypoalbuminemia, subjects the patient to excessive surgical stress and an increase in negative immunological consequences involving transfusion1. Optimizing preoperative anaemia takes up minimal place in ERAS Guidelines1 with a moderate recommendation for preoperative correction. However, the prevalence of anaemia in patients with colorectal cancer is 30-75%, depending on the haemoglobin level and staging used to define this level1-4. Anaemia is the most important predictive factor for allogenic blood transfusion (ABT)5. It is associated with increased postoperative morbidity and length of stay6, secondary to ABT itself, as well as inadequate tissue perfusion by alteration in oxygen delivery which could lead to organ dysfunction. This is supported by the observation that acute anaemia results in an increase in mortality that is proportional to the reduction in haemoglobin (Hb)7.

Since the discovery of preoperative anaemia as an important factor of adverse results in non-cardiac surgery, its correction is an excellent candidate for intervention. Recently, the Society for the Advancement of Blood Management (SABM), defined the concept of Patient Blood Management (PBM)8 as: “The timely implementation of the concepts based on the medical and surgical evidence designed to keep the concentration of Hb, maintain homeostasis and minimize blood loss to get the best possible results for the patient”. PBM is an enveloping multidisciplinary concept, while assuming actions in the form of “no drastic change”, it includes actions based on evidence, which is by definition the best clinical practice. This definition of perioperative management meets the standards of surgery.
programs like Fast Track established by ERAS, since these are based on the application of scientific evidence throughout the perioperative period. PBM should be included in this protocol form adapted to the patients included in the Fast Track and according to the type of surgery. Although a variability in trials in which the adoption of these measures has been shown to decrease the ABT\textsuperscript{19,20}, length of stay and readmission\textsuperscript{19,20}, there are no studies linking the two. The correction of preoperative anaemia in patients undergoing total hip replacement in Fast Track protocols (Non ERAS) has improved outcomes\textsuperscript{11}.

98% of all transfusions of packed red blood cells can be predicted by analyzing preoperative haemoglobin level, expected blood loss and transfusion triggers\textsuperscript{9}. The concept of PBM is based on three pillars:

- Optimizing preoperative red cell volume
- Decreased intraoperative blood loss
- Increase tolerance to anaemia and adaptation of transfusion triggers.

The first pillar directly involves preoperative anaesthetic action and requires a multidisciplinary approach. Since performing additional tests required on short notice to surgery impedes their correct evaluation\textsuperscript{13}, time is required to perform a successful detection, evaluation and treatment of preoperative anaemia. The main etiological factors of anaemia in surgical patients are the presence of a chronic inflammatory process (64%) and the presence of iron deficiency (23-33%)\textsuperscript{13,14}. The functional iron deficiency not only leads to ineffective erythropoiesis, but also to an inadequate immune response, increasing length of stay and mortality\textsuperscript{19,20}. Preoperative treatment of anaemia is based on correcting nutritional deficiencies and stimulating erythropoiesis. Treatment should be based on functional iron deficiency, resulting inadequate in cases where iron therapy is not based on its shortage. Particularly in patients undergoing colorectal surgery, this treatment may be performed according the recent recommendations of Muñoz et al\textsuperscript{16}.

The second pillar includes implicitly minimal invasive surgical techniques, as well as other elements such as maintaining normothermia, which are included in ERAS\textsuperscript{8}.

The third pillar includes perioperative measures performed to increase tolerance to anaemia, which are part of the basic patterns of ERAS Guidelines\textsuperscript{1}. These include the intraoperative optimization of oxygen transport and tissue oxygenation, which is achieved in part through Goal Directed Fluid Therapy, fundamental in ERAS, and vasopressors. Moreover, the third pillar of PBM involves individualized transfusion limits. Use of additional parameters such as hemodynamics or oxygen extraction rate can reduce transfusion requirements in anaemic patients provided that there is no organ dysfunction or myocardial ischemia\textsuperscript{19,20}. Patients may be able to tolerate different levels of reduction in Hb according to their genetic background, level of conditioning, and comorbidities. Therefore treatments that focus exclusively on the level of Hb to carry out ABT may not be suitable to all patients\textsuperscript{18}.

Traditional inadequate systemic biomarkers for organ perfusion, including serum creatinine and lactate, are not suitable as indicators needed to define ABT, since they are not sensitive and respond slowly. Recently, specific biomarkers of anaemia, secondary to brain, kidney and liver, have been discovered, as well as hypoxia and Hb levels that are tolerated by these organs before increasing the expression of these biomarkers\textsuperscript{19,20}, which opens a door to future research in this area.

The possible causes of the limited references to the detection and correction of preoperative anaemia shown in ERAS Guidelines\textsuperscript{1} may be, firstly, because it is considered standard care and assumes that its detection and treatment are usually performed, and secondly, due to the correction of preoperative anaemia requiring a time of about 4 weeks for proper identification, evaluation and treatment; a reason why in certain cancer patients this could not be done, or at least should be individualized. Integrating the management of preoperative anaemia in algorithms for performance in fast-track surgery probably facilitates the implementation of these items, with its adapted treatment is based on surgical urgency to neoplastic processes.

Due to the importance that the presence of anaemia has on surgical outcomes, we believe that preoperative management is essential, and should be performed according to international PBM guidelines and be included with more detail in ERAS guidelines, since in these actions which are universally accepted as standard practice such as antibiotic prophylaxis or thromboprophylaxis, however include those interventions which individually have little evidence (p.e. prehab). When still having no particular evidence in ERAS protocol patients its corrective action obviously improves surgical outcomes, and certain items do not directly relate to ERAS protocol evidence. Anaemia is common and despite modern techniques to diagnosis it, it is generally poorly managed\textsuperscript{11}. ERAS guidelines\textsuperscript{1} are a reference for good practice worldwide, and in hospitals that perform Fast Track, it should incorporate interventions for correction of anaemia based on evidence, which would improve surgical outcomes and perioperative management of anaemia.

Moreover, given the homogeneity of patient groups, biomarker research and transfusion limits in these patient groups could, given the multicentre and multinational nature of ERAS, lead to major advances into how the limits of tolerance of anaemia relates. Furthermore, the integration of PBM\textsuperscript{8} in ERAS will help generalize and to expand both.

References

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