LETTER TO THE EDITOR

Filipa Félix[1], Mafalda Silva[2], Fátima Lima[2], Diana Paupério[2]

[1] Unidade de Saúde Local de Matosinhos – Hospital Pedro Hispano
[2] Centro Hospitalar Vila Nova de Gaia Espinho

Patient blood management in a Cardiac Surgery Center, how to start?

The Society for the Advancement of Patient Blood Management (SABM) defines Patient Blood Management (PBM) as a patient-centered, systematic, evidence-based approach to improve patient outcomes by managing and preserving a patient's blood while promoting patient safety and empowerment.[1]

Since 2010, the World Health Organization recommended the application of PMB. Worldwide, several cardiac centers have already incorporated PBM approaches into their daily practice. These centers have reported encouraging outcomes including decreased perioperative blood loss and red blood cell transfusions, as well as shorter hospital length-of-stay, lower costs, and decreased morbidity and mortality.[2]

Despite the current knowledge about the clear benefits of PBM programs their recommendation by important institutions such as SABM, European Association of Cardiothoracic Anaesthesiology and Intensive Care, European Association of Cardiothoracic Surgery and Society of Thoracic Surgeons, as good clinical practice, Portugal is still far from achieving many of these goals, and a cultural shift is crucial. [3] How did we begin? In 2018, a multidisciplinary team at our center, composed of two anesthesiologists, one hematologist, and one specialist in Transfusion Medicine created a PBM algorithm designed specifically for the requirements of our facility.

Cardiac surgery patients have important comorbidities as well as a reduced ability to tolerate anemia. Additionally, the significant blood loss and coagulopathy related to cardiac surgery increases the exposure of these patients to allogeneic blood transfusions, which is related to worst outcomes.[2]

PBM in cardiac surgery involves collaboration between Anesthesiology, Hematology, Transfusion Medicine, Cardiac Surgery, Cardiology, Internal Medicine, Nephrology, Clinical Pathology, Primary Care, Nutrition, Nursing, and Information Technology.[2] Our PBM program was implemented in January 2019 with pre-operative, intra- operative, and post-operative measures meeting Goodnough and Shander's PBM pillars: optimize erythropoiesis, minimize blood loss, and manage tolerance to anemia.[4] Despite the importance of all measures, as anemia is an important contributor to chronic heart failure mortality and intravenous iron infusion had proved to ameliorate cardiac function and exercise level, reducing the prevalence of heart failure-related edema and hospital admission rates by increasing the left ventricular

ejection fraction, we prioritize preoperative anemia assessment and optimization in all surgical operations in which probably all anesthesiologists can act in a simple and very effective way.[2]

Patients of both genders with hemoglobin <13 g/dL are referred for primary care physician, hematology, nephrology, or internal medicine consultation, depending on the type of anemia and surgical urgency. The protocol also recommends that patients can be optimized in their hospitals of origin to improve patient satisfaction.

A high percentage of cardiac patients are urgent or emergent, so to optimize all patients, we developed several algorithms adapted to the urgency of the procedure, prioritizing intravenous iron for its rapid impact.

The surgical teams also modified their techniques, offering minimal invasive surgical approaches whenever possible, the cardiopulmonary bypass cannula and tube length were reduced, and the use of cell salvage was promoted. Tranexamic acid was applied to all patients without formal contraindications (class I, Level A).1 Restricting inappropriate transfusions (trigger between 7 and 8 g/dL) (class I, level A) and goal- directed coagulation therapy based on viscoelastic techniques (ROTEM®) (Class I, level B-R) was promoted, according to the literature, without increasing the risk of mortality or morbidity.[1]

During the postoperative period, initiatives to reduce blood loss were privileged, and the restrictive use of transfusion was once again promoted. The micronutrient deficiency approach was extended to the postoperative period.

The PBM program represents a cultural change that we believe needs to be adopted. Our main challenges were the lack of awareness and consequently lack of financial support and human resources. To contour this problem our results were periodically evaluated with monthly reports and transfusion rate assessment.

And what can we report so far? After one year of data collection, and using the 2018 population as a preliminary comparison, we found that 40% of our patients were anemic in the pre-anesthetic evaluation (71 patients), but only 4 patients still maintained values below 13g/dL on the day of surgery. The overall average of hemoglobin was 13.6 g/dL. We had a relative risk reduction of transfusion of 27% when compared to the patients operated previously to the PBM program, allowing us to achieve an absolute transfusion rate of 39% in all patients undergoing cardiac surgery.

Although the length of stay is related to many variables, our data show that since the introduction of the PBM protocol, this was reduced by about two days (6.7 days).

Impact studies have been conducted at the hospital level and they estimated a reduction of €3,320 per patient before and after the program was implemented. The literature supports these data, which also show that in addition to the fact that PBM protocols are currently regarded as a measure of good clinical practice, this also represents a hospital cost reduction and allows an attempt to reach the sustainability of blood banks. Exact numbers, however, require more in-depth analysis, and we must now determine if the patient population was similar before and after the PBM program implantation. Nevertheless, easily identifiable changes have been found before and after the program: less transfusions, less anemic patients before and after the program, and lower length of stay. PBM represents a patient-centered approach based on economic, ethical, and scientific fundamentals.[3]

The evaluation of the impact of PBM on our cardiac patients aims to confirm that the implementation of PBM protocols, based on international guidelines, results in the same positive impact, on patients and institutions.

Through this communication, we hope to inform our peers of our protocol and preliminary results and encourage them to contact the authors for their discussion. We also wish to bring about a cultural shift in favor of blood health, emphasizing that PBM entails more than just fewer blood transfusions, but the balance between patient optimization and the management of thrombosis and bleeding.

REFERENCES

1. Huang JP, Firestone S, Moffatt-Bruce S, Tibi P, Shore-Lesserson L. 2021 Clinical Practice Guidelines for Anesthesiologists on Patient Blood Management in Cardiac Surgery. Journal of Cardiothoracic and Vascular Anesthesia. Dec 2021;35(12):3493-3495. doi:10.1053/j.jvca.2021.09.032.
2. Meybohm P, Westphal S, Ravn HB, et al. Perioperative Anemia Management as Part of PBM in Cardiac Surgery - A Narrative Updated Review. J Cardiothorac Vasc Anesth. Apr 2020;34(4):1060-1073. doi:10.1053/ j.jvca.2019.06.047
3. WHO. The urgent need to implement patient blood management: policy brief.: World Health Organization; 2021.
4. Lawrence Tim Goodnough AS, Bruno Riou. Patient Blood Management. 2012:1367–1376.