



Rational Use of Blood Components and the Patient Blood Management Project: Narrative Literature Review

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ABSTRACT

Blood transfusions are therapeutic resources widely used in medicine, but they are scarce and finite, since they depend on voluntary donations and blood typing of donors. In the recent context of the pandemic caused by the coronavirus in 2019, we are facing serious problems, due to the lack of blood donors and the reduction in stocks of blood components available in blood centers. blood, based on evidence, focused on the patient and on high care safety. It aims to reduce the patient's blood loss, avoiding the unnecessary use of blood components and optimizing the functioning of blood banks. The program consists of an association of equipment, medication, and surgical and anesthetic techniques, which aims to manage the patient's own blood, increase their hematopoiesis, maximize their tolerance to anemia, and optimize their hemostasis. The research aims to understand the PBM project. It consists of a narrative review of the literature using the PICO strategy, with the guiding question "There is evidence that the implementation of the Patient Blood Management project in patients who need blood transfusions promotes the rational use of blood components and decrease negative clinical outcomes? The Scielo and PubMed databases and the descriptors "Patient Blood Management", "liberal transfusion" and "transfusional hazard" were used, selecting articles prepared between the years 2018 and 2022.

Uso Racional de Componentes Sanguíneos e o Projeto de Gerenciamento de Sangue do Paciente: Revisão Narrativa da Literatura

RESUMO

As transfusões de sangue são recursos terapêuticos amplamente utilizados na medicina, mas são escassos e finitos, pois dependem de doações voluntárias e da tipagem sanguínea dos doadores. No contexto recente da pandemia causada pelo coronavírus em 2019, enfrentamos graves problemas, devido à falta de doadores de sangue e à redução dos estoques de hemocomponentes disponíveis nos hemocentros. sangue, baseado em evidências, focado no paciente e na alta segurança do cuidado. Tem como objetivo reduzir a perda sanguínea do paciente, evitando o uso desnecessário de hemocomponentes e otimizando o funcionamento dos bancos de sangue. O programa consiste na associação de equipamentos, medicamentos e técnicas cirúrgicas e anestésicas, que tem como objetivo gerenciar o sangue do próprio paciente, aumentar sua hematopoiese, maximizar sua tolerância à anemia e otimizar sua hemostasia. A pesquisa tem como objetivo compreender o projeto PBM. Consiste em uma revisão narrativa da literatura utilizando a estratégia PICO, tendo como questão norteadora "Há evidências de que a implantação do projeto Patient Blood Management em pacientes que necessitam de transfusões sanguíneas promove o uso racional de hemocomponentes e diminui desfechos clínicos negativos? Foram utilizadas as bases de dados Scielo e PubMed e os descritores "Patient Blood Management", "liberal transfusion" e "transfusional hazard", selecionando artigos elaborados entre os anos de 2018 e 2022.

INTRODUÇÃO / INTRODUCTION

The history of the therapeutic use of blood transfusions dates back to the 17th century, when animal blood was originally used to treat human beings. From the beginning of the 19th century, it gained greater importance as the only therapeutic option in certain pathologies. During this period, successful reports emerged, when Blundell obtained a good response in half of his patients with uterine atony, using blood transfusion as the only proposed and effective treatment (DE LIMA et al., 2021). suffered severe reactions from its use, and the real causes of the fatal outcome were not known at that time.

At the beginning of the 20th century, with the evolution of science and the discovery of blood groups by Landsteiner, part of this mystery was revealed, avoiding some adverse reactions related to blood transfusions (PINHEIRO et al., 2021).

Blood transfusion can save lives, improve the clinical conditions of patients and, in many situations, it may be the only effective and available therapy, especially in cases of severe, acute bleeding, with consequent hypovolemic shock and high mortality. of the world's population still does not have access to "safe blood". A report by the World Health Organization (WHO) showed that, in 2012, at least 39 countries still did not carry out serological tests of their blood components for some of the diseases transmitted by blood transfusions: HIV, HTLV, syphilis and hepatitis (MARTINS et al., 2021)

Ensuring the safety of transfusion therapy is one of the public health priorities of countries around the world. The National Blood Center in Brazil, organized by the National Health Surveillance Agency (ANVISA) and the National Coordination of Blood and Blood Products, is locally responsible for overseeing the collection and release of blood components, the processes and stages of the cycle of obtaining and processing blood from be transfused, including the correct selection of donors until the storage and release of blood products (CUNHA, 2019).

The research aims to adequately understand the functioning of the PBM project and the necessary care during the transfusion of blood components in the perioperative period.

METODOLOGIA / METHODOLOGY

It consists of a narrative literature review using the PICO strategy, with the guiding question "Is there evidence that the implementation of the Patient Blood Management project in patients who need blood transfusions promotes the rational use of blood components and reduces negative outcomes?". The Scielo and PubMed databases and the descriptors "Patient Blood Management", "liberal transfusion" and "transfusional hazard", being selected articles prepared between the years 2018 and 2022.

RESULTADOS & DISCUSSÃO / RESULTS & DISCUSSION

PBM is defined as a group of care, based on scientific evidence, which aim to optimize clinical treatments, through the management and preservation of the patient's own blood. It is a medical concept designed to maintain the concentration of hemoglobin, improve hemostasis and minimize blood loss, to improve clinical outcomes for patients (ASSUNÇÃO, 2018).

In large observational studies, randomized controlled trials, and meta-analyses, significantly better outcomes have been demonstrated for patients undergoing PBM, significantly reducing blood consumption. The PBM concept proactively focuses on assessing the patient's needs and clinical conditions that would often lead to unnecessary blood transfusions to treat blood loss, anemia, coagulopathies and platelet dysfunction.

PBM shifts the focus from blood transfusions with allogeneic components to prophylactic measures, with optimal administration of the patient's own blood (ASSUNÇÃO, 2018; MONTANO, 2020; ANDRADE, 2018).

Currently, the main serious adverse events related to blood transfusion, mainly in developed countries, are no longer caused by viral infection or other pathogens, but are due to errors in the collection of blood samples or during their infusion, such as exchange of bags, due to the impossibility of identifying recipients and blood products to be transfused. In the state of New York, records of the occurrence of transfusion reactions over a period of 10 years reveal the risk of maladministration in 1 of 14,000 transfusions performed and ABO misclassification in 1 of 38,000 transfusions performed. All these incidents can occur due to failure of procedures outside certified blood centers (SOUZA, 2018).

Blood transfusions have been very important throughout human history. Modern medicine considers them to be one of the most prescribed medical procedures in the world. However, the risks and benefits associated with this practice are questioned, as well as its real need, since several scientific studies show an increase in morbidity and mortality and hospitalization time of patients with its use, due to acute and chronic complications. secondary, including infections, bacterial and viral, transfusion reactions, respiratory complications, with thromboembolic events, acute renal failure, among others. Comparing to a transplanted organ, blood can be considered as an "invader" by the immune system, with consequences for the patient. Among them are possible inflammations in vital organs, with complications in the postoperative period. The "Society for the Advancement of Patient Blood Management" reports that 59% of blood transfusions were considered inappropriate, without clinical results for the patient, only 12% were considered appropriate, and the rest uncertain. In addition, patient blood management can effectively reduce mortality rate (up to 68%), reoperations (up to 43%), hospital readmissions (up to 43%) and overall complications (up to 41%). These indices also bring the benefit of reducing costs from 10 to 24%. Due to the COVID-19 outbreak, the number of blood donors has drastically decreased and blood has become a scarce resource (SOUZA; PIMENTAL, 2020).

Therefore, the concept of "Patient Blood Management" (PBM) emerged, a multidisciplinary approach based on evidence, defined as the proper use of the patient's own blood, with the aim of minimizing its use for transfusions. PBM should be performed throughout the perioperative period, starting as early as possible (ASSUNÇÃO, 2018).

In the preoperative period, it is essential to detect and treat anemia, especially iron-penic or megaloblastic anemia, secondary to vitamin deficiencies (folic acid and vitamin B12), assess underlying diseases, determine the real indication for the use of medication by patients, consider the use of erythropoietin (EPO) and optimize the cardiac output of patients. EPO is widely used in the treatment of various types of anemia, preparation for surgical procedures in which there is great blood loss, replacement of hematological levels even after surgery, as well as in the therapy of chronic conditions (such as hepatitis), cancer treatments, chronic renal failure, blood diseases, autologous transfusion programs and orthopedic surgeries. In the intraoperative period, it is necessary to pay attention to adequate hemostasis, the surgical technique, the anesthesia used, the use of antifibrinolytic agents and also to optimize cardiac output. In the postoperative period, it is extremely important to monitor bleeding, manage and treat anemia, restrict the collection of blood samples for examinations, in order not to spoil the patient even more. Cardiac output should also be optimized. Such strategies aim to reduce unnecessary transfusions based on three main pillars: optimizing the mass of red blood cells, minimizing blood loss and optimizing anemia tolerance (MONTANO, 2018).

Fibrinogen is the first factor to become deficient during perioperative bleeding or trauma and is often the only deficiency that needs to be addressed. According to Keyvan Karkouti, in patients with bleeding and hypofibrinogenemia, the administration of fibrinogen concentrate is always the first choice, guaranteeing promising and satisfactory results, avoiding transfusional complications.

However, it should be noted that there are barriers to the full functioning of the program, such as: lack of administrative support, lack of knowledge of the subject and disagreement between the multidisciplinary team. Thus, existing beliefs about the procedure still present difficulties for its wide implementation. Due to the strong association of blood transfusions with negative outcomes evidenced in the literature, the safe and rational use of transfusions of blood components must always be considered. In this way, therapeutic strategies such as PBM guarantee the safe limitation of transfusions, the reduction of the risks of perioperative complications and the reduction of costs for health systems (ANDRADE, 2018).

The PBM concept was approved in 2010 by the World Health Assembly through the WHA resolution. In 2017, the European delegation recommended it as the gold standard of care. Effective implementation of the PBM is one of the six goals of the WHO action plan, updated to promote universal access to safe, effective and quality-assured blood components by 2020-2023. Despite these strong recommendations and available evidence showing that the PBM model is an excellent therapeutic option, change in clinical practice has not yet occurred. Although there is already a scientific consensus

demonstrating that the PBM model improves clinical outcomes, increases patient safety and reduces costs, hospitals with organized PBM programs are rare (KEDING, 2018). There is a significant reduction in transfusion risks, including acute reactions, since about 345 antigens have already been described and serologically known, we have grouped them into 43 blood group systems.

Many PBM programs were developed in stages. However, PBM is most successful when multiple interventions are combined. They divided these strategies into three main areas, with centered and individualized decisions for each patient, made by a well-qualified multidisciplinary team: (1) Comprehensive management of anemia; (2) Minimization of iatrogenic blood loss (optional); and (3) Utilization and optimization of the patient's specific physiological tolerance to anemia. More than 100 individual PBM indicators have already been defined based on their wide interdisciplinary application (MURPHY; PALMER, 2019).

Although evidence of its safety and clinical efficacy is constantly increasing in the scientific communities, only a few transfusion agencies have acted on its pillars. A possible explanation would be the lack of clinical studies that would investigate the overall clinical and cost effectiveness of a multimodal PBM program. There is already a PBM monitoring and feedback program at the University Hospital of Zurich, for example, documenting a result with a 27% reduction in allogeneic blood transfusions, with substantial savings in direct costs of blood transfusions per year.

PBM was associated with lower red blood cell utilization, shorter hospital stays, and lower rates of clinical complications compared with standard care; however, evidence of high statistical heterogeneity was observed in the overall measures of transfusion rate, units of RBCs transfused per patient, total number of complications and cardiac events (THONSON et al., 2019).

In general, a significant reduction can be observed in the transfusion rate, units of red blood cells transfused per patient, length of stay, total number of complications, acute renal failure and mortality in orthopedic surgeries. Similar results were obtained for patients undergoing cardiac surgery, with a reduction in the rate of blood transfusion and all associated complications, including bleeding after using the PBM recommendations (ALTHOFF et al., 2019).

Intraoperative sampling of autologous red blood cells is also effective in reducing the number of patients exposed to allogeneic red blood cells by 39%. Tranexamic acid is a widely used pharmacological agent to reduce surgical blood loss in various surgical disciplines. The use of tranexamic acid was associated with a significantly lower bleeding rate and reduced the transfusion rate by 46% (ALTHOFF et al., 2019; HOF, 2021).

CONCLUSÃO / CONCLUSION

PBM is an interdisciplinary approach, which tries to optimize patient care in terms of blood transfusion. The basic objective is to reduce the amount of transfused blood products, decreasing intraoperative blood loss, finding the ideal intervention for each individual patient in each surgery.

The present study reflects the need for further research and awareness by the scientific community in order to define and validate techniques for using PBM.

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