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Overcoming Patient Blood Management Barriers in Low- and Medium-Income Countries: Starting Small to Stand Tall

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ABSTRACT

Although being essential in several clinical and surgical contexts, the transfusion of blood components is not considered a risk-free approach or an abundantly available resource, becoming imperative to establish judicious transfusion decisions, based not only on medical purposes, but also on economic grounds and the estimated cost of the entire chain of blood components. It was in this context that Patient Blood Management (PBM) programmes emerged, a patient-centered bundle of care, upon which decisions are taken from a multidisciplinary, systematized and evidence-based vision, optimizing treatment, prognosis and the use of resources. Notwithstanding that PBM pillars are universally applicable, regional differences require thorough scrutiny on how they can be effectively met, considering local reality, its potentials and challenges. Healthcare providers and funders, professional medical societies and scholars, each of them in their limited scale, are the main advocates for PBM implementation, by creating local-adapted, pilot guidelines and algorithms, with whatever tools and resources available, that will permit the first kickoff to set up PBM as the standard of care, personalized to the reality of each society or institution.

Keywords: patient blood management, transfusion, protocols, developing countries

Introduction

For a long time, the standard treatment for anaemia and bleeding disorders was the transfusion of blood components[1]. However, although being essential in several clinical and surgical contexts, it is not considered a risk-free approach or an abundantly available resource. Transfusions are related to the transmission of infectious diseases, hemolytic reactions, tumor recurrence and increased mortality[2]. Alongside the realization of the need of improving blood products' safety, it became imperative to establish judicious transfusion decisions, based not only on medical purposes, but also on economic grounds and the estimated cost of the entire chain of blood components[3].

It was in this context that Patient Blood Management (PBM) programmes emerged. This is a patient-centered bundle of care, upon which all the decisions are taken from a multidisciplinary, systematized and evidence-based vision, with the intention of sharpening treatment, prognosis and rationally improving patient outcomes and resource utilization[4]. It adresses anaemia and bleeding disorders as serious global health challenges; anaemia, for instance, affects 1.95-2.36 billion people[5] and can be found in 75% of surgical preoperative patients[6].

The implementation of PBM protocols, beyond improving surgical patients' outcomes, is associated with cost-savings, a particularly important situation in low income and/or developing countries, such as Brazil, which have a considerable shortage of resources[7,8]. Over the years, recommendations guiding the decision-making process regarding the management of perioperative hemotherapy have been established. However, creating and establishing protocols must primarily take into account the local reality, considering its potentials and challenges, so that these are fulfilled[9,10].

Given the brief scenario reported, PBM can improve public health indicators and ease the pressure over the blood supply chain, which is already overcharged. However, the biggest challenges for its implementation in emerging and peripheral economies consists in diagnosing the institutions' profile, analysing if and how PBM bundles might become feasible and, finally, changing to a patient-centered practice rationale of resource allocation[11], being the scope of this article to uncover ways of overcoming its pitfalls and thrive.

Discussion

The global disease burden of anaemia has its highest prevalence in low and middle-income countries, particularly in neonates and children, women of reproductive age and elderly people[12], being associated not only with increased morbidity and mortality, but also with social costs and loss of work productivity. In this sense, detecting and tackling anaemia remains mandatory, especially in surgical patients, where an estimated 100 million surgeries are performed despite the presence of this condition[13].

For decades, the default treatment for anaemia and bleeding disorders was allogeneic blood transfusion, being it "*associated with the greatest range of hazards of any single medical intervention*"[14] towards the population health, as well as the economic health; in Brazil, for example, transfusion costs are estimated, for one pack of red blood cell, in around R$ 1.119,69 to R$ 1.905,18[8]. In this way, PBM became a fast-growing field in the international agenda, either by improving patients' health, or by mitigating resource constraints.

The successful implementation of a PBM program rests, foremost, in public awareness (patients, heath care professionals since graduation, health authorities, hospital administration, etc). Secondly, in the adjustment of countless PBM guidelines available in literature, taking into account local and institutional realities[4], therefore refining recommended and preset bundles according to their regional applicability[9,11]. It is highly encouraged for each institution to create its own Multidisciplinary Transfusion Committee, focused in prompting the practice of debates concerning local demands, the application of evidence-based protocols, giving rise to direct advice from specialists, thus avoiding the transfusion indication based on personal beliefs[15].

Establishing a Commission provides the handling and coordination of decisions, tending towards a more holistic and unison approach; it consists of a haematologist and counterparts from distinct specialties, such as surgeons, anaesthesiologists, obstetricians and emergencists, who are responsible for addressing transfusion therapy nearly on a daily-basis; in addition, nurses and technicians involved in these sectors and a member of the hospital board are strongly recommended to constitute the Committee[7].

Members would meet periodically (fortnightly or monthly meetings, for example), personally and/or online, where Continuing Education Programs about blood components and hemotherapy shall be taking place, aimed at improving the use of these constituents in a more effective way, as well as being an opportunity of exposing institutional data, assessing the impact of the program, such as number of appointments, number of transfusions and transfusion reactions, length of stay and mortality rate.

Furthermore, these meetings shall outline evidence-based PBM strategies, known as "the three pillars of PBM"[10], and define which interventions, and at what scope, might be regionally feasible, be it (1) detecting and managing anaemia, (2) minimizing surgical blood loss and (3) optimizing coagulopathy. This should enable the development and updating of institutional guidelines (general and specific by specialty), allowing reasonable usage of red blood cells concentrates, and even its reduction[16].

Another supporting strategy in transfusion decision-making process, although potentially limited in low and medium-income countries, consists in creating computerized prescription systems for blood products and blood components[17], with filters that could enable not only the linking of databases (ranging from medical records to laboratory tests), but also the professional's conference of the potential indication of the related element. Any requests that eventually veer from the available integrated models should be handled separately[18]. As a result, there is a shrinkage in the

indiscriminate use of packed red blood cells and an overview of the adopted tendencies in each location is obtained, showing where do the biggest challenges lie[15].

Notwithstanding that PBM pillars and principles are universally applicable, regional differences require thorough scrutiny on how the three pillars can be effectively met[19]. The first pillar of PBM consists of anemia and coagulopathy management, which encompasses not only the enhancement of preoperative hematimetric parameters, but also the reduction of perioperative losses. It is recommended to investigate anemia at least 3-4 weeks in advance of elective surgeries, treating it according to etiology (nutritional deficiencies, chronic kidney disease, inflammatory diseases)[10]. To this end, the implementation of a pre-operative outpatient clinic, with clinicians and/or hematologists, is highly endorsed, since it must permit a thorough clinical assessment and the request of laboratory tests, in addition to multidisciplinary coordination with anaesthesiologists, surgeons, laboratories and blood banks, promoting greater patient safety and better use of resources[11].

The second pillar consists of strategies that promote meticulous intraoperative hemostasis and volume replacement; guidelines[9,10] suggest to lay down goals, as a way of steering surgical and anaesthetic conducts, seeking minimum dependence on blood products, namely: settling hypotension tolerance values; prevention of intraoperative hypothermia (preheating, temperature monitoring); defining when to re-approach the patient or how to use more conservative surgical techniques; designating the best way to recover lost blood based on the hospital's availability (autologous or heterologous transfusion, cell saver, acute normovolemic hemodilution, etc.); adopting a concept of severe hemorrhage and establishing a massive transfusion protocol, beneath the responsibility of a single professional per institution[10].

Finally, the third pillar involves postoperative management, especially regarding anemia tolerance and coagulopathy. Several studies[20,21] have demonstrated that patients presenting with varied clinical scenarios can tolerate moderate degrees of anemia, without harm from a clinical point of view. In fact, they may even present unfavorable outcomes more due to a possible transfusion, than resultant from a low hematocrit itself. Therefore, intolerance to anemia has been increasingly seen as a factor related to the care provider rather than the patient themselves. Monitoring macro and micro hemodynamics, reducing phlebotomies during hospitalization and individualizing patients are effective ways of rationalizing transfusion indications, typically reserved for patients with symptomatic anemia, with hemodynamic repercussions and more restrictive hemoglobin values (Hb < 7g/dL or < 8g/dL in the presence of comorbidities, single unit)[22].

Ultimately, healthcare providers and funders, professional medical societies and scholars, each of them in their limited scale, are the main advocates for PBM implementation, by creating local-adapted, pilot guidelines and algorithms, with whatever tools and resources available, that will permit the first kickoff to set up PBM as the standard of care. Treating anaemia, promoting the best intraoperative conditions at hand, and monitoring bleeding outcomes in the surgical aftermath are elementary and incipient approaches capable of giving way for the best cultural switch towards the PBM paradigm, particularly in peripheral societies.

Conclusions

The multidisciplinary nature of the proposed strategies allows the patient to be placed at the center of the care process, improving patient safety indicators and, in turn, the quality of hospital service. Furthermore, they do not require the use of additional financial resources, increasing their acceptance and applicability.

Despite being elementary and feasible strategies, management programs require long-term investments in order not to stagnate; This includes everything from planning the curriculum of medical schools, covering subjects of Hematology and Transfusion Medicine, to the systematization of continuing education for all health professionals in several Brazilian hospitals (especially those in the public network).

The application, however timidly, of the proposed strategies, regardless of its simplicty and constraints, allows the establishment of parameters that act as a framework for the beginning of intermittent evaluations, as a manner of validation of fund raising appeals, implementation and use of technologies that can not only minimize the unnecessary use of blood components, but also allow their management to be personalized to the reality of each society or institution.

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