



Short Communication *Cardiac Critical Care*

Rational Transfusion in Clinical Practice: Walking the Tight Rope

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ABSTRACT

Transfusion therapy has undergone a significant evolution from whole blood transfusions to highly specialized blood component therapy. There is enough evidence in the literature that estimates that half of the transfusions given to the patients were actually not required as their hemoglobin can be improved with the help of alternative methods. The introduction of patient blood management (PBM) marks a paradigm shift in clinical transfusion practice and anemia management, emphasizing a patient-centric approach. PBM strategies aim to preserve and improve the patient's blood, thereby reducing the need for allogeneic blood transfusions. PBM strategies include treating anemia, correcting coagulopathy, and minimizing blood loss. Every healthcare facility should plan to implement PBM as a multidisciplinary and multi-professional program, requiring collaboration from clinicians, public health professionals, and hospital administration. Thus, PBM implementation requires a comprehensive business plan, evidence-based transfusion guidelines, education, and a clinical decision support system. Data acquisition, analysis, and reports play a crucial role in continuously improving the healthcare system and enhancing patient safety.

Keywords: Rational transfusion, Clinical practice, Patient blood management

INTRODUCTION

Transfusion therapy has undergone a significant evolution from whole blood transfusions to highly specialized blood component therapy. Despite these advancements, rational blood use remains a challenge in clinical practice due to the scarcity of high quality clinical evidence to support the same. Initially, blood transfusion was considered a tonic with the capacity to prevent or correct many mild to severe surgical or non-surgical ailments. This leads to an increase in indications for blood transfusion and irrational blood usage, leading to an increase in morbidity and mortality due to blood transfusion.^[1] Hence, an urgent need was felt to revise the existing indications for blood transfusion and to promote the rational use of blood. In 1958, few seminal scientific publications shed light on the lack of rational blood use and the related issues. As per this report, the person would be responsible for damage due to transfusion if the transfusion is done without proper indication.^[2] However, still, the focus has been on improving blood safety in terms of promoting voluntary blood donation and the introduction of enhancing blood donor screening technology. Irrational blood use continues to pose a significant threat to transfusion safety all over the world. This misuse not only results in the wastage of scarce resources and more adverse transfusion reactions but also creates a pseudo-shortage in blood supply.

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There is enough evidence in the literature that estimates that half of the transfusions given to the patients were actually not required as their hemoglobin can be improved with the help of alternative methods. Blood transfusion should only be done in conditions with appropriate blood components with adequate justification.^[3] A critical review by Hasley *et al.*, 1989, evaluated the appropriateness of red cell transfusion in adults. Three of the nine studies showed appropriate blood usage from 88% to 99%, whereas the other two revealed inappropriate use from 0.3% to 57.3% and 18% to 55% in the other four studies. Overall, it was observed that 50% of the transfusions are being done without appropriate indications, which, hence, require urgent attention and intervention.^[4] In a study from China, the inappropriate transfusion was estimated to be 37.3%, with a higher appropriate transfusion incidence of 47.5% in operative departments.^[5]

Hence, the decision to transfuse or not should be based on good clinical judgment supported by sound scientific evidence to justify the indication of blood transfusion. In the absence of evidence-based guidelines for clinical transfusion in different parts of the world, it is a challenging task to optimize blood usage. In India, the only available document for clinical transfusion practice is by the National Institute of Biologicals NOIDA;^[6] However, there is an urgent need to develop evidence-based guidelines for rational blood use in collaboration with clinical colleagues in our country.

Rational transfusion practices based on evidence-based guidelines play a significant role in impacting both blood availability and blood safety. It helps in reducing the risk of transfusion reactions and prevention of transfusion transmitted infections. It also helps in maintaining blood inventory and reducing the wastage of blood products by promoting judicious blood use and preventing shortages in the blood supply. Rational transfusion practice also helps healthcare facilities to strategically allocate blood products to those patients who have the highest clinical need. Rational and judicious blood use leads to a decrease in the number of blood transfusions and is found to be very cost-effective in decreasing the total health care cost of the patient.

The introduction of patient blood management (PBM) marks a paradigm shift in clinical transfusion practice and anemia management, emphasizing a patient-centric approach. PBM strategies aim to preserve and improve the patient's blood, thereby reducing the need for allogeneic blood transfusions. PBM Strategies include treating anemia, correcting coagulopathy, and minimizing blood loss. This patient-centric approach aligns with the Society for Advancement of Blood Management's definition of PBM as the timely application of evidence-based medical and surgical concepts designed to maintain hemoglobin concentration, optimize hemostasis, and minimize blood loss to improve patient outcomes.^[7]

PBM has already been endorsed by the World Health Assembly (WHA) Resolution WHA63.12 in 2010 and has demonstrated its effectiveness in Western Australia from 2008 to 2012, leading to improved outcomes, cost savings, and reduced blood product usage. With the high global prevalence of anemia, micronutrient deficiencies, and bleeding disorders, PBM can certainly address these issues on a larger scale, ultimately improving patient outcomes, saving healthcare resources, and reducing healthcare costs globally. Worldwide, the prevalence and health-related implications of anemia are profound both in general as well in the patient population, impacting their productivity, cognitive functions, and overall health. Thus, adopting PBM at the community level holds the potential to mitigate these challenges and bring about positive transformations in the healthcare delivery system.^[8]

PBM rests on three fundamental pillars: optimizing erythropoiesis and the patient's endogenous red cell mass, minimizing bleeding and blood loss, and harnessing and optimizing the patient-specific physiological tolerance of anemia, including adopting more restrictive transfusion thresholds. The essence of PBM lies in identifying patients at risk of transfusion and devising management plans to reduce or eliminate the need for allogeneic transfusion, thus mitigating inherent risks, inventory pressures, and escalating costs associated with transfusion. This patient-centered approach is applicable to both surgical and medical patients, systematically addressing the major contributors to negative outcomes: anemia, blood loss, and transfusion.

PBM employs various strategies to minimize the need for allogeneic blood transfusions. These encompass pre-operative anemia management, minimally invasive surgical techniques, the use of hemostatic agents, cell salvage (autologous transfusion), pharmacologic interventions, post-operative monitoring and management, the establishment of evidence-based transfusion triggers, and education on the latest guidelines for blood management.

Scientific studies on restrictive transfusion strategies have significantly and successfully demonstrated a 50% reduction in transfusion requirements. However, the primary outcome was found to be better in a few studies only, with no significant difference in the patient outcome in other studies. However, the consistent role of the restrictive hemoglobin threshold for transfusion was the overall decline in the number of transfusions, hence conserving the precious commodity. There is ample evidence to suggest the utility of restrictive transfusion strategies in various clinical groups of patients.^[9-13]

CONCLUSION

In our country, there is an urgent need to create awareness regarding PBM principles among all the stakeholders to

improve overall patient care. The responsibility lies with health ministries and departments of health to formulate appropriate PBM policies and guidelines. Integrating PBM with existing national programs, such as the anemia control program, can effectively address the first pillar of PBM and can certainly go a long way in improving community health. Every healthcare facility should plan to implement PBM as a multidisciplinary and multi-professional program, requiring collaboration from clinicians, public health professionals, and hospital administration. Thus, PBM implementation requires a comprehensive business plan, evidence-based transfusion guidelines, education, and a clinical decision support system. Data acquisition, analysis, audits, and reports play a crucial role in continuously improving the healthcare system and enhancing patient safety.

Ethical approval

The Institutional Review Board approval is not required.

Declaration of patient consent

Patient's consent was not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript, and no images were manipulated using AI.

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