

# Transfusion of Blood Products: Considerations for Anesthesia Providers

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## Introduction

Blood products allow for the optimization of patient status preoperatively as well as intraoperative resuscitation of blood components. Preoperatively, it is important for providers to recognize which lab values are important for their patients to have optimized and what blood products to use for each. Blood products also play a vital role intraoperatively for resuscitation following blood loss, and for the replacement of specific blood components. It is critical for providers to understand each blood product, how they affect patients, when they are indicated, and the risks involved in transfusing these. It is also important for practitioners to understand the current recommendations around massive blood transfusion protocols.

During an anesthesia provider's career, they will more than likely encounter patients who are unwilling to accept blood products. These patients vary in their preferences. Some may be willing to accept certain blood products in the case of an emergency, while others will be unwilling to accept any blood products under regardless of circumstance. Providers must be ready to have difficult and sensitive conversations with patients regarding these preferences. They must also be able to speak knowledgeably about alternatives to blood products.

## Indications and Contraindications

In a review, a restrictive pediatric transfusion trigger of Hgb of 7g/dL is examined. This change of transfusion trigger was found to decrease the number of units of PRCBs transfused by 44 percent, while the outcomes of sepsis, transfusion reactions, nosocomial respiratory infections, catheter related infections, adverse events and lengths of stay remained the same (Goodnough et al. 2017). Overall, provider education and more restrictive transfusion triggers improves or maintains patient outcomes while reducing utilization of blood and therefore providing cost savings to facilities (Goodnough et al. 2017).

Massive transfusion protocols (MTPs) are often institutionally developed as to maintain consistency between providers in a facility and allow the blood bank to know what to send according to facility policy. MTPs are highly specific, and include such specific information as who they can be ordered by, who alerts the blood bank, and what tests are run during the MTP. Pham and Shaz emphasize that early resuscitation improves outcomes, and state that communication between clinical, laboratory, and hematology teams is of critical importance in the efficacy of MT (Pham et al. 2013).

In a prospective study, Chidester and colleagues collected data regarding the 55 (n=55) pediatric patients who required un-cross-matched blood during a period of two years in a facility. Between those patients who received un-cross-matched blood, 22 were given blood under the MTP while 33 received it at physician discretion (non-MTP) (Chidester et al. 2005). MTP was found to have higher efficacy compared to single-provider direction.

## Complications

As with all medical treatments, transfusion of autologous blood transfusions carries inherent risks. It is of vital importance that providers weigh the risks of transfusing blood with the benefit provided to the patient by the treatment. These risks include non-pathogenic risks, such as incompatibility reactions and transfusion-related acute lung injury (TRALI). Between 2007 and 2011, TRALI was the blood-transfusion risk with the highest mortality, making up 43 percent of fatalities. This was followed by hemolytic transfusion reactions at 23 percent. Other risks make up a much smaller proportion of these fatalities. In addition to these, there is a small risk of pathogenic transmission including human immunodeficiency virus (HIV) and hepatitis, among many others (Goodnough et al. 2017). For these reasons, it is important for providers to transfuse blood only when it is indicated, and never routinely.

## Alternatives to Blood Products

One meta-analysis included 3352 patients receiving total hip or knee arthroplasties, identifying those who were given allogenic or autologous transfusions, and those who had a reoperation for suspected infection within three months after surgery. In total, authors noted that data seem to indicate that patients receiving allogenic blood transfusions intraoperatively were more likely to require reoperation within the time window, but noted these patients had higher infection risk factors. When including only those patients with an ASA score greater than 2, these effects diminished and no difference was noted between the groups (Newman et al. 2014).

Preoperative hemodilution is a blood management strategy by which patients' blood is drawn preoperatively, replaced with IV fluids, and transfused back to them after intraoperative blood loss. A meta-analysis of twenty-nine randomized controlled trials totaling 2439 patients undergoing cardiac surgery with or without PANH. Authors found that PANH resulted in a decreased number of allogenic red blood cell (RBC) transfusions intraoperatively across those patients receiving PANH preoperatively (Barile et al. 2017).

Intraoperative cell salvage (cell saver) allows patients to keep some of their red blood cells which may otherwise be lost, maintaining their hematocrit and hemoglobin levels (Chand et al. 2014).

## Discussion

A systemic review supports a more restrictive approach to transfusion triggers, transfusing patients at a lower hematocrit and hemoglobin level than was previously suggested. Those current recommendations include transfusing at a hematocrit of 21 percent or a hemoglobin of 7 g/dL in healthy patients who do not otherwise necessitate earlier transfusion.

Currently, the largest risk associated with transfusions of blood products is TRALI, making up almost half of the fatalities associated with blood transfusions. There is, however, still a relatively minimal risk of negative reactions to blood transfusions and they still are considered safe. There is a movement away from blood products as a first-line treatment. There is a trend of providers prophylactically using methods such as PANH and cell saver even in patients who are willing to accept blood products, to limit the number of intraoperative blood transfusions provided to patients. In the trials discussed above, these methods show promise in limiting the number of transfusions needed while providing the same outcomes. It is important that providers understand the indications for transfusion of blood products, the risks associated with them, and the current alternative blood management strategies.

## References

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