

The Pros and Cons of Preoperative Autologous Blood Donation

WHITE PAPER

Preoperative autologous blood donation (PABD) was once a powerful tool to decrease the risk of transfusion-transmitted disease related to allogeneic blood. With the development of effective viral screening tests and the recognition of the many disadvantages of stored blood, the need for and appropriateness of PABD has greatly diminished. There are now better and safer alternatives. The advantages and disadvantages of PABD are discussed in this review.

Background

With the recognition of the significant risks of transfusion-transmitted HIV and hepatitis B and C in the 1980s, measures to decrease these risks were initiated. At the height of the AIDS epidemic up to 1% of transfusions in some American cities carried HIV. Patients undergoing elective surgery were increasingly offered the option of PABD as a way to decrease exposure to the community blood supply. By 1993 approximately 7% of all Red Cell (RBC) transfusions came from PABD. Since that time the numbers of such donations by elective surgical patients has dropped steadily. By 2006 less than 2% of RBC transfusions were from autologous donations.

Advantages of PABD

- **Decrease in transfusion-transmitted disease.** Clearly, fewer exposures to allogeneic blood increase transfusion safety. Although the risks of HIV and hepatitis are now less than 1:1,000,000 (2), other as yet unknown viruses will eventually enter the blood supply.
- **Decrease in red cell immunization.** Fewer allogeneic transfusions diminish the likelihood of forming RBC antibodies that can complicate future transfusions.
- **Decrease in allogeneic transfusions.** While most studies demonstrate a decrease in requirements for allogeneic transfusion, some patients end up needing more blood, due to worsened preoperative anemia (5).
- **Provides compatible blood for patients with alloantibodies.**

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What is wrong with PABD?

- **Preoperative Anemia.** Most PABD occurs in patients over 60 years old, individuals with diminished bone marrow regenerative capacity. Toy et al. demonstrated that patients undergoing PABD 14-20 days prior to surgery (the typical range) only regenerate 54% of the RBC donated (8). Thus, anemia is exacerbated. Studies have demonstrated that such patients have a paradoxical increase in RBC transfusions (3).
- **Storage Lesions. Decreased 2,3-DPG and ATP levels.** Stored autologous RBC undergo the same morphologic, biochemical and physiologic changes as allogeneic cells. It has been shown that compared to “fresh” cells, stored RBC have significantly reduced microvascular flow (63%), lower oxygen extraction and deliver less oxygen to tissues (9). Blood stored greater than two weeks is associated with worse outcomes than “fresh” blood (6)
- **Adverse Donation Reactions.** Compared with community blood donors, PABD donors have a 12 times greater risk of adverse outcomes from donation, reactions severe enough to require hospitalization (7). These reactions are typically vasovagal.
- **Hemolytic Reactions and Sepsis.** PABD involves many labor-intensive steps, each of which invites the opportunity for error. Error rates of 1 per 149 have been documented (4). Hemolytic transfusion reactions due to mislabeled PABD have been documented. Septicemia has been reported. This occurs in the setting of low-level, asymptomatic bacteremia in the patient at the time of PABD.
- **Inconvenience, Waste and Increased Cost.** It can be burdensome for patients, particularly older ones, to travel to a hospital or blood center on multiple occasions to donate PABD. The literature demonstrates that up 50% of units are not used and are discarded (1)

Conclusion

PABD once served a useful purpose. Although it may decrease allogeneic transfusions, the disadvantages and risks outweigh the advantages.

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