Commentary: Can we make autologous blood transfusion a reality in high-risk cardiac surgery cases?

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Left to right: James Anton, MD, Ourania Preventza, MD, and Arthur Bracey, MD

Central Message

A well-designed study examining the effects of autologous blood or platelet-rich plasma transfusion in high-risk cardiac surgery cases is needed.

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In patients requiring aortic surgery under circulatory arrest, a drop in body temperature may cause disturbances in the coagulation system as a result of hypothermia. Lower temperature may be associated with a higher rate of reexploration for bleeding and profound coagulopathy, although no consensus exists. Perioperative coagulopathy leading to transfusions is common in patients with acute type A aortic dissection. Sandhu and colleagues¹ are to be commended for addressing the important subject of how to minimize intraoperative and postoperative blood transfusions in this issue of the *Journal*.

The use of blood conservation techniques in cardiac surgery, combined with careful examination of the transfusion indications, may help to minimize or avoid transfusions during the perioperative period. Blood collected from the operative field and from the oxygenator after bypass can be processed, and concentrated red blood cells can be reinfused. In addition, the use of autologous blood transfusions could reduce postoperative bleeding and further decrease the use of banked blood and components.

Efforts to decrease or eliminate blood transfusions are helpful because of the benefit to the patient as well as other economic considerations. These benefits include decreasing blood product transfusion, postoperative adverse events, morbidity (in terms of ventilator time), and possibly sternal wound complications, along with the potential to reduce both intensive care unit and hospital stay, as pointed out by Sandhu and colleagues¹ and others.²⁻⁴

Intraoperative processing of blood drawn before cardiopulmonary bypass provides autologous platelet-rich plasma (aPRP) for infusion after reversal of heparin. The major benefit of this approach is that the harvested platelets are not exposed to the cardiopulmonary bypass circuit; allogenic platelets, which have been stored, are not as effective when they are transfused as fresh platelets. Among the

drawbacks of aPRP are the time needed to collect the blood before cardiopulmonary bypass and the equipment cost, depending on the type of disposable material used for collection. In addition, preoperative anemia and the patient's preoperative fluid status can be limiting factors. Moreover, the storage time and the centrifugal force necessary to generate aPRP may potentially affect platelet aggregation.⁵ Sandhu and colleagues¹ reported a preoperative hemoglobin level of 12.3 ± 1.7 g/dL in the patients from whom aPRP was harvested, but postoperative levels of hemoglobin and the number and function of platelets were not reported. This information could be beneficial. Interestingly, in the group treated with aPRP, approximately one-third of patients had been taking clopidogrel and aspirin before the index emergency procedure. Although aspirin and clopidogrel are not contraindications for performing emergency cardiac surgery procedures requiring hypothermic circulatory arrest, these medications may result in the transfusion of less-functional autologous platelets at the end of the procedure. In addition, the differences between transfusing only aPRP versus transfusing autologous whole blood are unknown. The procoagulant effect of aPRP is potentially stronger than the effect of autologous whole blood, although the effect of reinfusing whole blood cannot be underestimated. This study provides an excellent call for a well-designed regional or national study to examine the benefits of aPRP or autologous blood transfusion. Tackling

this issue will require a collaborative effort among cardiac surgeons, pathologists, and anesthesiologists.

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