

## ASK A SPECIALIST

## Ask a Pathologist: Preoperative Anemia Management

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**Question:** My patient's blood type is O negative, but the platelet transfusion he received yesterday was Rh positive. What is the risk of developing an anti-D alloantibody after exposure to an Rh positive platelet unit, and does he need Rh Immune Globulin prophylaxis?

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**Answer:** Platelet units have a shelf life of only 5 days from the day of collection and are often in short supply. Therefore sometimes it may be necessary to transfuse platelet units that are ABO or Rh mismatched to the patient. Although platelets themselves do not express Rh antigens, contaminating red blood cells (RBCs) in platelet units may be capable of causing an Rh negative patient to develop an anti-D alloantibody after an Rh positive platelet transfusion.

In studies performed prior to 2000, the alloimmunization rate of Rh negative patients exposed to Rh positive platelet transfusions was found to be as high as 19%. Recent studies have consistently shown either very low or even 0% alloimmunization rates after an Rh positive platelet transfusion.<sup>1,2</sup> The ADAPT study (Anti-D Alloimmunization after D-incompatible Platelet Transfusions) evaluated 485 Rh negative patients who received a combined 3150 Rh positive platelet transfusions (1180 whole blood derived and 1970 apheresis) and found an overall alloimmunization rate of 1.44%.<sup>1</sup>

Evidence suggests that 0.03 mL of Rh positive RBCs is the minimum volume exposure required for an Rh negative

recipient to become alloimmunized against the D antigen.<sup>3</sup> While pooled platelet concentrates collected from whole blood donations may still contain a sufficient volume of contaminating RBCs to cause alloimmunization, newer apheresis platelet collection methods are associated with a residual RBC volume of only 0.0004 to 0.0008 mL.<sup>3</sup>

In addition to the volume of antigen exposure, the immune status of the recipient at the time of exposure appears to also be associated with alloimmunization risk. Healthy Rh negative volunteers exposed to small quantities of Rh positive RBCs have alloimmunization rates of over 80%, while hospital patients not on immunosuppressive medications have an anti-D alloimmunization rate of around 22% after receiving at least one unit of Rh positive RBCs.<sup>4</sup>

Given the very low alloimmunization risk, prophylaxis with Rh Immune Globulin (RhIg) is not routinely recommended for Rh negative males and females over 50 after Rh positive platelet transfusions. Since anti-D can cause severe hemolytic disease of the fetus and newborn, RhIg prophylaxis may be considered in women of child-bearing

age after one or more Rh positive platelet transfusions.

#### Notes

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