e-GRIPS
Case 12

ABO/Rh in Platelet Transfusion

ABO antigens on platelets
ABO antigens are intrinsic to the platelet membrane; anti-ABO isoagglutinins are in the plasma portion of the platelet component. ABO antigens or isoagglutinins can adversely affect posttransfusion platelet recovery and survival in ABO-incompatible recipients. Patients receiving incompatible platelets frequently develop a positive DAT. Those receiving identical platelets do not develop positivity.

Selecting the ABO for platelet transfusion
If at all possible, patients should receive ABO identical platelet transfusions, especially when a significant amount of red blood cells (>2 mL) is present in the platelet component. Receiving ABO identical platelets is especially important for high-risk patients, such as pediatric patients and those patients receiving long-term platelet support.

Many institutions select platelets without regard to ABO. The reasons are inventory management, lack of ABO compatible platelets, and decreased platelet supplies. Group O recipients may have a lower increment when given Group A platelets than when group identical platelets are selected. Group A, B, and AB patients may also develop a positive direct antiglobulin test (DAT) owing to passive transfer of anti-A, anti-B, or anti-A,B when several ABO-incompatible platelet transfusions are given. Ideally, ABO antigens on platelets should be compatible with the recipient plasma or the donor plasma, in which the platelets are suspended, or with the recipient red cells. When a patient is massively bleeding, selecting the least incompatible platelets for transfusion seems unimportant.

The amount of incompatible ABO antibody transfused is dependent on the concentration of antibody and the volume of product transfused. Antibody concentration is largely dependent on the blood type of the donor. Group O plasma products have a higher concentration of ABO antibodies than either group A or B.

Use of ABO-incompatible platelets
Red cell alloimmunization may occur because of the presence of red cells in the platelets. Non-group specific ABO platelets suspended in plasma incompatible with the patient may cause a positive DAT and possibly low-grade hemolysis.

Rarely D immunization may result when Rh positive platelets, containing red cells, are transfused to an Rh-negative patient. The main concern is the transfusion of Rh-positive platelets to an Rh-negative female of childbearing age. Rh immune globulin (RhIG) should be administered if Rh-negative platelets are not available when a transfusion of Rh-positive platelets is necessary.

RhIG is a formulation prepared from the plasma of humans sensitized with anti-D and is processed to make it a viral-free blood derivative. One vial contains 300 µg of anti-D which will protect against 30 mL of Rh-positive whole blood or 15 mL of Rh-positive red blood cells. A reduced dose or microdose, approximately 50 µg RhIG, which is protective for up to 2.5 mL of Rh-positive red cells, is available; however, because of fears of miscalculation and under treatment, the full dose is usually administered.

A single dose should provide protection for at least 15-30 random donor platelet units, providing bloody platelets are not administered. If 30 random donor platelet units are administered, it is presumed that each unit would contain less than 0.5 mL red blood cells. A visual for teaching purposes and confirming the “less than 0.5 mL red blood cells” can be accomplished by injecting 0.5 mL red blood cells into a sample bag containing 50 mL plasma.