

Answering your questions

Pretransfusion plasma testing

Q Does plasma have to be typed, screened, and cross matched for transfusion? I know plasma can be added to a volume of RBCs in a patient, but matched packed RBCs cannot be added to a volume of plasma in a patient. What is the difference?

A Pretransfusion testing consists of type, screen, and cross match. Type means ABO and Rh testing. Screen is testing for the unexpected red-cell antibodies. Cross match means compatibility testing between patient's plasma and donor packed red cell for transfusion. It is a requirement by the AABB Standards for the Blood Banks and Transfusion Services to type and screen all donors and components prepared from these donations including plasma, platelets, cryoprecipitate, and red cells which should be labeled for the ABO and Rh type. The packed red cells are cross matched with the patient's plasma to confirm the compatibility prior to transfusion. This helps in the prevention of hemolytic-transfusion reactions due to naturally occurring ABO antibodies and unexpected low-incidence red-cell alloantibodies. A person with blood type A has anti-B in his plasma/serum and one with blood type B has anti-A in the plasma/serum (see Table 1).

Transfusing red cells and plasma			
Recipient ABO type	ABO antibodies in recipient's serum	Donor red cell type for transfusion	Donor plasma type for transfusion
A	Anti-B	A or O	A or AB
B	Anti-A	B or O	B or AB
O	Anti-A and Anti-B	O only	O, A, B, or AB
AB	None	AB, A, B, O	AB

Table 1.

These naturally occurring ABO antibodies are mostly IgM, complement binding, reactive at 37°C, and the cause for acute hemolytic transfusion reaction or hyperacute rejection if transfused or transplanted with ABO mismatched red cell products or solid organs (e.g., kidney). The titer of these antibodies in plasma can range from 1:8 to 1:256 for anti-B and 1:8 to 1:2,048 for anti-A. The total blood volume is about 5,000 cc in an average 70-kg male. When transfus-

ing platelets or cryoprecipitate of 200-cc to 300-cc volume, ABO type may not matter for transfusion purposes due to dilutional effect.

It is well known, however, that a high titer unit, especially in a single-donor platelet, which may be large volume, can cause significant hemolysis of the patient's red cells (acute hemolytic transfusion reaction). Therefore, many institutions try not to transfuse ABO mismatched single-donor platelets. Cryoprecipitate, a pooled product of 10 or 20 small units with a chance of dilution of one or two high titer units in it, however, can be safely transfused without worrying about the ABO type and significant red-cell hemolysis. As far as fresh-frozen plasma (now available also as plasma frozen within 24 hours), two or more units are usually required for transfusion to correct coagulation abnormalities in a bleeding patient, and ABO compatibility is a must (see Table 2).

Basic blood components for transfusion	ABO requirements
Red cells	Compatible with patient's plasma*
Fresh-frozen plasma (FFP)	Should be compatible with patient's red cells*
Platelets	All ABO types acceptable, but components compatible with patient's red cells are preferred
Cryoprecipitate	All ABO types acceptable.

Table 2. * Refer to Table 1 for ABO compatibility of red cell and plasma products.

—Krishna Oza, MD
Department of Pathology
University of Arkansas for Medical Sciences
Little Rock, AR

Post-vasectomy semen analysis

Q The physicians in our practice who perform vasectomies are requesting sperm count — if sperm is present — so they know whether the sperm count is going down on the patients' post-vasectomy (PV) specimen. Would it be reasonable to report the number of sperm per high-power field (HPF) or in 10 high-power fields? How should post-vasectomy semen analysis be performed and reported?

A Confirmation of azoospermia is important to establish success of a vasectomy. Typically, two semen samples are tested at least six to eight weeks after the vasectomy. While the World Health Organization provides a guide for establishing azoospermia, a specific procedure for performing and reporting post-vasectomy semen analysis is not provided.¹

Semen analysis for PV samples involves two steps: an initial analysis of the neat semen sample for presence of sperm, followed by centrifugation at 1,000 x g for 15 minutes if no sperm are seen in the ejaculate. It is important to examine a minimum of 30 HPFs (40x magnification) for both the ejaculate and the pelleted sample. Results are reported for motility and number of sperm seen per HPF.

While most PV samples will have either no sperm or will require repeated testing until no sperm are seen, up to one-third of patients have rare non-motile sperm (RNMS) in the PV semen analysis. Presence of RNMS is the most common call a laboratory will receive regarding PV results. Repeated RNMS is generally considered consistent with a successful vasectomy.² □

—Dean Morbeck, PhD
Director
Fertility Testing Laboratory
Mayo Clinic
Rochester, MN

References

1. World Health Organization: *WHO laboratory manual for the examination of human semen and sperm-cervical mucus interaction, 4th edition*. Cambridge, UK. Cambridge University Press, 1999.
2. Chawla A, Bowles B, Zini A. Vasectomy Follow-Up: Clinical Significance of Rare Nonmotile Sperm in Postoperative Semen Analysis. *Urology* 2004;64:1212-1215.



Brad S. Karon, MD, PhD, is assistant professor of laboratory medicine and pathology, and director of the Hospital Clinical Laboratories, point-of-care testing, and phlebotomy services at Mayo Clinic in Rochester, MN.