ABID CASE #1, ANSWERS

Case study by Jim Perkins, M.D. (© 2006)

Indian Immunohematology Initiative

1. What is the probable identity of this antibody?

   Alloanti-K

2. Is any further workup needed to prove it? Articulate the standards for identification of a blood group alloantibody (see SOP, Investigation of a Positive Antibody Detection Test).

   Yes. *If you include the antibody screening cell there are 3 K positive cells reactive, 3 non-reactive cells, the DAT is negative, and the appropriate antibodies are ruled out (anti-D, -C, -E, -c, -e, -k, -Fy^a, -Fy^b, -Jk^a, -Jk^b, -Le^a, -Le^b, -S, -s, -M, -N, -P1). However, we need to prove that the patient forming the antibody lacks the K antigen.*

3. What is the probable source of the immunizing stimulus in this case?

   The patient was transfused at the time of the recent proctocolectomy, but she may have been immunized by pregnancy or a previous transfusion and then had an anamnestic response to the recent transfusion.

4. Does this antibody cause hemolytic transfusion reactions?

   Yes, severe, even fatal IHTRs, as well as DHTRs.

5. Does this antibody cause hemolytic disease of the fetus and newborn?

   Yes, severe HDN.

6. How would we select compatible blood for this patient? What percentage of donors are expected to be compatible with this recipient?

   In the US we would select group O, Rh negative, K negative units, which were compatible in a crossmatch using the indirect antiglobulin test ("Coombs' crossmatch"). Ninety one per cent (91%) of Caucasian donors, about 94% of South Asian donors, and 98% of African American donors (of the proper blood group) are K-negative (compatible).

7. What is the biochemical nature of the antigen? (Review the features of the relevant blood group system.)

   The K antigen is carried on a single-pass transmembrane metalloendopeptidase that processes endothelin-3. It is not destroyed by proteases, but is denatured by sulfhydryl reducing agents (DTT and AET). The K antigen is highly immunogenic; as many as 10% of K neg individuals receiving a unit of K positive RBCs make anti-K. Therefore, anti-K is one of the most common unexpected antibodies detected in Caucasians. The most important antigens of the Kell system comprise 3 pairs of relatively low frequency/high frequency pairs, K/k, Js^a/Js^b, and Kp^a/Kp^b all of which differ by a single amino acid substitution. A third Kp antigen, Kp^c exists, and Js^a is present in up to 20% of African populations. There are no alleles described which direct expression of any two of the low frequency members of these pairs. A null phenotype exists, and cells of the null phenotype have an abnormal morphology. The Kell system includes multiple other high and low frequency antigens and is closely linked to another blood group system termed Kx.