**FEATURED CASE #19-09; ANSWERS**
(Case study by Jim Perkins, © 2019)

Indian Immunohematology Initiative

**Questions:**

1. What is the specificity of the patient's antibody? Is it proven? Would this problem meet the CDC/AABB Hemovigilance criteria for a delayed hemolytic transfusion reaction (DHTR)?

   *This patient has an alloanti-E that meets all the criteria for proof (3 E-pos cells reactive, 3 E-neg cells nonreactive, "everything else" ruled out, patient is E neg).*

   *This case does not meet the criteria for a DHTR, nor does it meet the criteria for a "Delayed Serologic Reaction" (DSTR), as the new antibody was detected more than 28 days after transfusion.*

2. What is the specificity of the patient's antibody(ies) now? What antibody(ies) is proven? What other tests would you like to do?

   *This patient now has an alloanti-K that again meets all the criteria for proof (3 K-pos cells are reactive, 3 K-neg cells are nonreactive, "everything else" is ruled out, patient is K-negative). Surprisingly, the anti-E demonstrated just 18 days earlier appears is undetectable as shown by 2 non-reactive R2R2 cells! In addition to the anti-K there are 2 K-, E- cells (#'s 4 and 10) reacting more weakly. Looking at the phenotypes of these 2 cells note that both are Jk(a+), although one is Jk(a+b-) and the other is Jk(a+b+). However, 3 other Jk(a+b-) cells are NOT reacting, so anti-$Jk^a$ was "ruled out". The appearance of a new antibody 17 days after transfusion suggests a DHTR, and one would like to determine whether any of the recently-transfused units were K positive.*

3. Does this event meet the CDC/AABB Hemovigilance criteria for a DHTR?

   *This event appears to represent a DHTR as the new antibody was detected within 28 days after the last transfusion, However, the CDC/AABB criteria for a "definitive" DHTR aren't be met (as discussed in featured in cases #19-8) because the DAT is negative. We would also like to see evidence of hemolysis. Although the patient's hemoglobin fell after transfusion he had complications with his large wound so we cannot say he was hemolyzing by that criterion. Also we would not be surprised to see a small bump in his bilirubin or LDH levels due to lysis of tissue hematomas. However, the facts that no K-positive donor cells are detected in the K phenotyping and that the DAT is negative suggests that the K-positive donor cells have been destroyed, but these results are not part of the CDC/AABB criteria.*

4. What antibodies does the patient have now? Are any new antibody specificities proven? What other tests would you like to do? Is this another DHTR?

   *The patient still has detectable anti-K, and now the previously suspected anti-$Jk^a$ is proven. The mystery of the disappearing anti-E continues! This workup really just provides more information about the DHTR detected on 7/15, namely that there were 2 new antibodies, albeit anti-$Jk^a$ could not be proven on the 8/2 specimen. We would like to know the $Jk^a$ phenotype of the 6 units transfused in July, but the segments from those units were discarded after typing the units for K.*

5. What phenotype of RBCs would you reserve for the patient? What percentage of Caucasian donor would be expected to have that phenotype? Is there anything else you would like to do?

   *The patient should ideally receive RBCs lacking K, $Jk^a$, and E antigens. Fifteen percent (15%) of Caucasian donors are expected to have this phenotype. The 2 units of RBCs requested are unlikely to be enough for this huge surgery involving multiple large blood vessels and an operative field that had been operated before as well as irradiated. In consultation with the anesthesiologist the blood bank decided to increase the order to 10 units.*

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6. Why do you think the antibody screen is negative? Could he have been transfused differently?

   *The patient had received a massive transfusion of almost 2 blood volumes. This is sufficient to have "washed out" his antibodies, so it might have been unnecessary to have given the last 8 RBCs which were obtained on an emergency basis as "antigen negative". However, if "antigen positive" units were being considered one would like to have shown intraoperatively that the antibody screen, or AHG crossmatches, had become negative, and had "antigen positive" RBCs been used there may have been more delayed hemolysis after the operation.*

7. Why do you think the patient's antibody screen is still negative?

   *We can only guess that his overall condition, including chemotherapy, radiation, and perhaps massive transfusion (due to transfusion-related immunomodulation or TRIM) had suppressed his ability to rapidly synthesize a detectable level of his antibodies.*

**Take home points:**

In a situation of ongoing transfusion of an immunocompetent patient the antibody situation can change rapidly, justifying the requirement for a new patient blood specimen every 3 days.

In very massive transfusion of patients with antibodies it may not be necessary to provide all RBCs as lacking the corresponding antigens.