AIHA CASE #8, ANSWERS

Case study by Jim Perkins, M.D. (© 2009)

Indian Immunohematology Initiative

1. What is the ABO discrepancy? What is its cause? What does saline displacement do?

The forward typing was group B, but the initial reverse typing showed apparent agglutination of both the A and B reagent cells. However, rouleaux was observed microscopically and it was dispersed by saline displacement. Saline displacement dilutes serum proteins which otherwise can cause RBCs to stack with one another and give the macroscopic appearance of agglutination. Note that the patient has a normal total protein level, but his albumin level was low, so his level of "globulins" and other high molecular weight proteins was probably elevated.

2. What is cause of the positive antibody screen? Why did technologist perform a P1 typing? Why was the second serum panel run?

The positive antibody screen was due to an anti-HLA (anti-Bg) antibody as shown by the fact that it was neutralized by HPC (human platelet concentrate). Although RBCs generally don't express HLA molecules, nucleated RBC precursors do, and they may persist as RBCs mature. HLA expression on RBCs varies by individual. "HPC" or Human Platelet Concentrate is a lyophilized product containing membranes from pools of platelets. Since class I HLA is strongly expressed on platelet membranes, incubation of serum with HPC removes antibodies against a broad range of class I HLA.

The P1 antigen typing was performed to rule out anti-P1 since the reactive cell in the panel was P1 positive. Similarly, the cells selected for testing from in the second panel were all K positive, including one which was a double dose K positive, so the technologist handling the problem must have been concerned about ruling out a weak anti-K.

3. Why might the DAT be positive? That is, what can cause a positive DAT with a negative eluate? Can you relate this to any other findings?

The differential diagnosis of a positive DAT with a negative eluate includes non-specific adsorption of immunoglobulin to the RBC surface and drug related RBC antibodies. The latter are typically detected only when the serum or eluate are reacted with drug coated RBCs or when drug is added to the in vitro system. More frequently, this combination of findings is due to polyclonal hypergammaglobulinemia, and patients with end-stage renal disease on dialysis frequently show it. As discussed above the patient's serum protein levels are consistent with hypergammaglobulinemia, and high serum globulin levels are associated with rouleaux phenomenon. It is also consistent with the patient's history of chronic infection (decubitus ulcers with osteomyelitis).

RBCs have Fc receptors which are thought to aid in clearance of immune complexes by the spleen. High levels of immune globulin presumably will increase the amount of antibody bound to the RBCs, reaching levels that can support agglutination by anti-IgG. The eluate is non-reactive because the bound antibodies are not necessarily directed against blood group allo- and autoantigens.