A BLOOD BANKER'S NIGHTMARE

ANSWERS/COMMENTS:

What is your impression? What do you want to know? What do you want the blood bank to do next?

The combination of anemia and a positive DAT suggest warm autoimmune hemolytic anemia (WAIHA). When an older patient with severe anemia comes to the ED with anemia the treating physicians tend to have gastrointestinal bleeding as their highest diagnostic concerns. In contrast, WAIHA is uncommon, so it is often the laboratory which suggests the correct diagnosis.

Additional history is needed. In particular, the laboratory needs to know whether the patient has been transfused before, and whether the patient is hemodynamically unstable. In this case the hemoglobin of 4.5 suggests that transfusion is a true emergency. Although a complete immunohematological investigation including autoadsorption to rule out underlying alloantibodies may take 8 hours or more, other measures that might improve the safety of transfusion may take less time. So the next thing to do is to talk to the physician caring for the patient.

What counsel should you give the physician?

The negative tests for gastrointestinal bleeding and the slight jaundice further substantiate the diagnosis of WAIHA, so you should suggest this explanation for his anemia as well as the laboratory tests for hemolysis needed to document hemolysis. You should also suggest that they start high dose steroid treatment as it can rapidly slow the rate of hemolysis. Intravenous immune globulin treatment should also be considered as it can have an immediate effect on the rate of hemolysis as well.

With his history of coronary artery bypass grafting and repair of an abdominal aortic aneurysm (at a time prior to invention of endovascular repairs) the patient has undoubtedly received multiple units of blood. His risk of having an underlying blood group alloantibody is as high as 30%. So a difficult judgment must be made by the treating physician and the transfusion medicine specialist in concert. The latter individual must convey the risk of alloimmunization and a consequent hemolytic transfusion reaction, as well as the time needed to rule out underlying blood group alloantibodies and the uncertainties involved in this process. The treating physician must then weigh these risks against the risk of delaying transfusion, based on his or her assessment of the severity of the patient's condition. The transfusion medicine physician may have significant input into this part of the decision as well, as many physicians overestimate the physiologic consequences of anemia less severe than was present in this case.

Finally, the transfusion medicine consultant should request additional samples as the tests the patient needs require a large amount of both RBCs and serum or plasma.

What should you ask the laboratory to do?

The laboratory should initiate testing to prove the presence of a warm-reactive autoantibody, specifically testing the patient's serum or plasma against an antibody identification panel of RBCs and an elution procedure to identify the antibody bound to the patient's cells. In addition, the data on hand is sufficient to immediately initiate testing to rule out underlying alloantibodies, so autoadsorption should be initiated concurrently. With time available, the above tests would be sufficient to start with. However, even if the clinician thinks that transfusion can be delayed for several hours, the patient could deteriorate rapidly, so a "fall back" plan should be implemented as well.

With alloimmunization likely, it is useful to predict what antibodies the patient MIGHT make. Obtaining a patient phenotype for all of the antigens against which patients most commonly form clinically significant antibodies allows selection of blood that lacks those antigens. Phenotyping for some of these antigens is complicated by the IgG bound

to the RBCs, so a phenotype may take some time to determine as well, particularly with multiple priorities.

The measure that can be taken in the shortest timeframe is to find RBCs that lack the antigens that are most commonly an issue in the population. The two most common antibodies in this population are anti-E and anti-K. Ninety percent of Rh negative RBCs will lack both antigens. Also common in this population, and a cause of severe hemolytic transfusion reactions is anti-Jk^a. About 1 in 5 units of Rh negative RBCs will lack both K and Jk^a, and will likely lack E and C as well, so finding at least one such group O unit may provide some additional probability of compatibility in a minimum of time.

Could the patient be having a hemolytic reaction? Can you rule it out?

Hypotension can certainly be a feature of an immediate hemolytic transfusion reaction. However, there are other likely causes of hypotension in this severely anemic patient with cardiovascular disease, namely cardiogenic shock. Normally, a hemolytic reaction is ruled out if the DAT is negative and there is no visible hemoglobinemia in a post-transfusion blood specimen. Since the DAT is already positive, the former is not helpful. However, if the patient's hypotension were due to an immediate hemolytic transfusion reaction, hemoglobinemia would be likely. So if a blood specimen of the patient can be obtained quickly and the plasma appears clear after centrifugation, it is probably safe to proceed with transfusion, which is what he needs if further deterioration is to be avoided.

What needs to be done now?

The phenotype findings suggest that you have guessed correctly and that the units selected are compatible. Transfusion should proceed as rapidly as possible.