FATAL HEMOLYTIC TRANSFUSION REACTION DUE TO A BLOOD GROUP MISMATCH ANSWER

What manifestations of a hemolytic reaction were present in this case? What is their pathogenesis? Did she have TTP?

After the ABO mismatched transfusion on hospital day 10 this patient developed hemolysis, disseminated intravascular coagulation (DIC), and renal failure, classic findings of an immediate hemolytic transfusion reaction. The diagnosis was missed until the next transfusion was ordered, and the relation of these findings to the transfusion was never appreciated. Hemolysis is evident by the fact that the hematocrit returned to baseline by the fourth day after the transfusion. A nurse noted jaundice, but bilirubin levels were not ordered. DIC is demonstrated by the rapid fall in the platelet count after the transfusion and the presence of schistocytes which led the hematology consultant to consider a diagnosis of thrombotic thrombocytopenic purpura (TTP). This consultant also noted that the coagulation times did not improve as rapidly as might have been expected after discontinuation of the coumadin and heparin and the treatment with vitamin K and later FFP. Finally, the patient's renal function was not being closely monitored, so the increase in creatinine was not detected until 4 days after the event. Again, the relationship of the renal failure to the mismatched transfusion was not appreciated.

ABO mismatched transfusion is classically associated with explosive hemolysis due to activation of the entire complement sequence leading to formation of the membrane attack complex. However, it may proceed more slowly by the cellular mechanisms of extravascular destruction. Individual variation in immune phenomena is the rule!

Cell membranes, such as those released by hemolysis act as thromboplastins in vitro, so the presence of DIC should not come as a surprise when the relatively large amount of cells in two units of RBCs are destroyed. however, DIC is more prominent when incompatible RBC stroma is infused into an experimental animal than when ABO compatible stroma is given.

Finally, renal failure in hemolytic transfusion reactions is probably multifactorial. DIC is a well-known cause of renal failure. Although once controversial, it is clear from studies with hemoglobin based oxygen carrier solutions that free hemoglobin in the circulation causes renal failure by itself. And many hemolytic reactions are accompanied by shock.

We expect immediate hemolytic transfusion reactions to announce themselves with dramatic symptoms such as flank pain, but this is not always the case. In retrospect we can see that this elderly patient's decline was closely related to the mis-transfusion which was due to an error within the blood bank.