

## Incompatible Blood Transfusions in Liver Transplant Patients with Significant Red Cell Alloantibodies

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**L**IVER TRANSPLANT patients often need large amounts of blood.<sup>1</sup> The presence of significant red blood cell (RBC) alloantibodies in these patients complicates the blood bank's ability to provide the necessary blood products. In the first 1000 liver transplantations performed at our center, 13.7% of adults and 6.3% of children had significant RBC alloantibodies.<sup>2</sup> We now have had 17 patients with significant RBC antibodies, rapid surgical blood need, and use of potentially incompatible blood untested for offending antigens. (Eight cases were noted previously.<sup>2</sup>) In this report we analyze our growing experience, characterize the cases according to outcome, and discuss our blood bank's approach to this problem.

### MATERIALS AND METHODS

We reviewed the Central Blood Bank's transfusion service records for all liver transplantations at the University of Pittsburgh from February 1981 to July 1988. From about 1500 transplantations, 17 were identified in which potentially incompatible blood had to be given despite current and previous existence of significant antibodies. We tabulated the amount and sequence of RBCs (whole blood or packed cells) issued, and reviewed antibody studies and clinical records for evidence of subsequent immune hemolysis: otherwise unexplained decrease in hematocrit, increase in indirect bilirubin, and positive direct antiglobulin test (DAT) due to alloantibody.

### RESULTS

The 17 patients had 28 significant antibodies (15 Rh, 8 Kell, 3 Kidd (Jk), 2 Duffy (Fy)). They received an average of 70 units of RBCs (median 67, range 11-160). All patients received  $\geq 8$  units of antigen-negative RBCs before untyped blood was given. Six patients survived, and 11 died between 0-48 days. These findings are consistent with the reported correlation of high blood use with a lower survival rate.<sup>3</sup> The patients were classified as follows: hemolysis occurred in 2, no hemolysis in 5, analysis pending (chart sought) in 1, and in 9 patients,  $\leq 2$  units of incompatible RBCs were given (5) and/or death occurred within 3 days (4). Patient 1 with hemolysis was a 14-year-old with a delayed reaction from anti-Fy<sup>a</sup>. Patient 2 with hemolysis was a 29-year-old O Rh- woman with Budd-Chiari syndrome due to paroxysmal nocturnal hemoglobinuria (PNH), and anti-D and -C. After pretransplantation red cell exchange, she was given 12 units of Rh+ RBCs during surgery (86 total units) because of a low supply of O Rh-, and also unintentionally given 2 units of group A RBCs, which may have caused coagulopathy resulting in retransplantation the next day. Twenty of 64 subsequent units of RBCs were also Rh+, including some given during a third transplantation at day 5. Hemolysis ensued from day 8 to death at day 13 from sepsis and hepatic

thrombosis. A positive DAT and then reversion to Rh-typing before death suggested destruction of Rh+ RBCs, but hemolysis of any residual PNH RBCs may have contributed. The five patients without hemolysis had the following antibodies, estimated antigen-positive RBCs, and total units of RBCs given: (1) c+E, 86/155; (2) E+K, 33/100; (3) E+K+Jk<sup>a</sup>, 29/45; (4) Jk<sup>a</sup>, 22/39; (5) E, 15/78. In cases 3 and 5 these were prior antibodies not detected at surgery. Patients 1 and 4 died at 26 and 34 days.

### DISCUSSION

The likelihood of acute hemolysis was lessened in these 17 patients by (1) initial transfusion of  $\geq 8$  units of antigen-negative blood and (2) the known absence of complement fixation by Rh antibodies, the most common ones involved. Seven patients receiving substantial numbers of incompatible RBCs were at risk of delayed hemolysis after surviving  $> 7$  days; two had clinical evidence of hemolysis, but one was complicated by an intrinsic hemolytic defect of her own RBCs (PNH). Corticosteroids may suppress phagocytic immune RBC destruction in these patients. We attempted to reserve some antigen-negative RBCs until the end of surgery, but the timing was difficult to achieve. Another delayed hemolytic reaction following liver transplantation has been described.<sup>4</sup>

In patients with difficult RBC antibody problems, we strive to have the first 10 or more units as antigen-negative. When large numbers of incompatible RBCs were necessary, most surviving patients (5 of 7) had no significant delayed hemolysis. Our only patient with anti-D who got Rh+ RBCs had hemolysis, but underlying PNH made evaluation difficult.

### REFERENCES

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