GRAFT-VERSUS-HOST ANTIBODY REACTION CAUSING A DELAYED HEMOLYTIC ANEMIA AFTER BLOOD TRANSFUSION

To the Editor:

There have been a number of reports of immune hemolytic anemia after organ transplantation despite the use of immunosuppressive therapy.1 In all these reports, the recipients have been transplanted from ABO-mismatched donors. Anti-recipient’s red blood cell (RBC) antibodies could be detected by positive direct antiglobulin test (DAT) and evidence that these antibodies were of donor origin could be obtained by allotyping of the IgG eluated from the patient’s RBCs.2 So, these cases could be considered as a graft-versus-host (GVH) antibody reaction. This report presents a case in which an immune hemolysis developed after ABO-matched liver transplantation, suggesting the possibility of GVH antibody reaction associated with blood transfusion.

The patient was a young male who had developed jaundice at birth caused by congenital biliary atresia and had been treated twice with the portoenterostomy. However, this treatment had not been successful and he had suffered from persistent jaundice, recurrent cholangitis, and progressive biliary cirrhosis. Therefore, at the age of 11 months, the patient underwent liver transplantation from a living donor who was his 26-year-old, healthy father. Blood type of the donor and recipient matched with group A and RhD-positive. During the surgery and postoperative course, the recipient had been multiply transfused, including fresh whole blood, packed RBCs, fresh frozen plasma, and platelets. The immunosuppressive therapy was achieved with the use of cyclosporine, azathioprine, and prednisolone. When signs of graft rejection appeared, prednisolone pulse therapy and/or administration of FK506 was performed. On postoperative day 198, the patient had massive bleeding from the portal vein and became severely anemic. At this time, he presented positive DAT for the first time after transplantation (33 days after the last blood transfusion of RBCs). The antibody eluated from the patient’s RBCs showed panagglutination including panel cells (Ortho Diagnostic Systems Inc, Raritan, NJ), cord cells, Rh null, and -D- cells. Because the patient had a life-threatening anemia with hypovolemic shock, we tested a large number of donor blood samples and selected those units that had given the weakest reactions in vitro, and then transfused them into the patient. Although we could obtain recovery from the shock with this treatment, severe hemolytic reaction with progressive anemia (Hgb, 4.0 g/dL), hyperbilirubinemia (direct, 16.6 mg/dL; indirect, 6.2 mg/dL), hemoglobinuria, high LDH (2,546 IU/L), and increase of nuclear red blood cells in the peripheral blood (191.5/100 WBC) ensued 2 days later. Plasmapheresis and whole blood exchange were performed. Cyclophosphamide pulse therapy (500 mg/m²) to suppress the antibody production and high-dose γ-globulin to block the reticuloendothelial activity were also added. Fulminant hemolysis was well controlled with these treatments and DAT became negative 31 days later. Further serologic analysis of the eluate from the DAT-positive RBCs showed that the antibodies had a titer of 1:32 in the dilution test and that IgG₂ subclass with the ability to bind complements was predominant. As panagglutination is a characteristic type of reactivity of autoantibodies, we analyzed the IgG heavy chain allotypes (Gm) of the eluate and compared them with those of the Ig in the serum of donor and recipient to determine the origin of the antibody.3 Gm allotypes were exactly the same between recipient and donor (axgb₁b₄b₅stu) before transplantation. However, Gm typing of the eluate from the patient’s RBCs showed that the antibodies had all kinds of allotypes tested (axgb₁b₂b₄b₅stu). This means that these antibodies are multiple alloantibodies derived from two or more persons other than the donor and recipient. The possible source of passenger lymphocytes evoking such a situation may be the multiple transfusion. Thus, the observed delayed hemolytic anemia might be the manifestation of a GVH antibody reaction after blood transfusion, whereas T-cell–mediated transfusion-associated GVH disease is well established.4 There are several anecdotal cases of delayed hemolysis after multiple blood transfusion by antibodies showing panagglutination.5 The investigators have explained that this was caused by autoantibody production by the recipient of blood transfusion. However, nobody has presented enough evi-
dence that these antibodies were of recipient origin. So, we hypothe-
size that similar mechanisms as our case might have occurred in
some of these cases, although it is not certain whether these patients
were under an immunosuppressive state or not. Thus, it should be
noted that GVH antibody reaction causing a delayed hemolytic
anemia after blood transfusion is a distinct possibility.

Hiroto Ishikura
Jiro Endo
Division of Blood Transfusion
Yoji Saiko
Yoshihiro Kosaka
Department of Anesthesiology
Susumu Matsuo
Naofumi Nagasue
Teruhisa Nakamura
The Second Department of Surgery
Tokugoro Tsunematsu
The Third Division of Internal Medicine
Shimane Medical University
Izumo, Japan

Tokiko Miyazaki
Hideo Matsumoto
Department of Legal Medicine
Osaka Medical College
Takatsuki, Japan

REFERENCES

1. Ramsey G: Red cell antibodies arising from solid organ trans-
plants. Transfusion 31:76, 1991
2. Swanson J, Sebring E, Sastamoinen R, Chopek M: Gm allo-
typing to determine the origin of the anti-D causing hemolytic ane-
3. Nakao Y, Matsumoto H, Miyazaki T, Nishitani H, Ota K,
Fujita T, Tsuji K: Gm allotypes in myasthenia gravis. Lancet 1:677,
1980
4. Anderson KC, Weinstein HJ: Transfusion-associated graft-
5. Ness PM, Shirey RS, Thoman SK, Buck SA: The differentiation
of delayed serologic and delayed hemolytic transfusion reac-
tions: Incidence, long-term serologic findings, and clinical signifi-
cance. Transfusion 30:688, 1990
Graft-versus-host antibody reaction causing a delayed hemolytic anemia after blood transfusion [letter]

H Ishikura, J Endo, Y Saito, Y Kosaka, S Matsuo, N Nagasue, T Nakamura, T Tsunematsu, T Miyazaki and H Matsumoto