REPEATED SEVERE NEONATAL HEMOLYSIS DUE TO RHESUS ISOIMMUNIZATION IN A PREGNANT WOMAN

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Abstract: Rhesus (Rh) isoimmunization presenting as severe neonatal hemolytic disease is rare in RhD negative primigravidas of Chinese ethnicity. We report the case of a 32-year-old pregnant Taiwanese woman, RhD negative, who gave birth vaginally to two RhD-positive full-term fetuses 6 years apart. Antenatal follow-up was uneventful and there was no obvious fetal-maternal hemorrhage except at the performance of amniocentesis at the 19th week of the first pregnancy without anti-D immune globulin prophylaxis. Although anti-D immune globulins were administered to the mother within 1 hour after each birth, both of the newborns had severe neonatal hemolysis refractory to phototherapy and were rescued by exchange transfusions. Both of the children were well at age 7-years-old and one-year-old respectively.

Key words: neonatal hemolysis pregnancy Rh isoimmunization

Case Report

This 32-year-old, blood type O, Rh-negative pregnant woman had no history of fetal-maternal hemorrhage including spontaneous abortion, elective termination, or ectopic pregnancy before the birth of her first child. Amniocentesis had been performed at a regional hospital at about 19 weeks' gestation due to the high risk of Down's syndrome (1/129). Prophylactic anti-D immune globulin treatment was not given. Thereafter, serial fetal sonography disclosed no fetal hydrops. She delivered a blood type B, Rh-positive, full-term male baby spontaneously. Anti-D immune globulin 500 µg was administered to the mother within 1 hour postpartum. The neonate developed severe hemolysis refractory to phototherapy on the second day. RhD isoimmunization was confirmed by anti-D monospecific immunoglobulin G (IgG) with direct Coombs test and the newborn was treated with two volume exchange transfusions. Follow-up of the first baby, 7 years old at the time of writing, is unremarkable to date.

During her second pregnancy, although no suspicious fetal-maternal hemorrhage was found, she also received 500 µg anti-D immune globulin treatment at 23 weeks' gestation post appendectomy. Similar to the first infant, the second full-term, blood type B, Rh-positive, female infant was spontaneously delivered, and developed neonatal hemolytic disease 12 hours after birth. Total bilirubin peaked on Day 3 at 19.1 mg/dL and hematocrit dropped to 29%. The infant was refractory to phototherapy and was rescued by two volume exchange transfusions. Anti-D IgG monospecific antibody from the fetus was also confirmed by direct Coombs test. The neonate recovered with good outcome.
Discussion

The rhesus blood group includes five red cell antigens: c, C, D, e, and E. Rh antigens are encoded by two homologous genes, RhD and RhCE, located on the short arm of chromosome 1 with highly racial variations. It is generally accepted that RhD negative individuals are homozygous for a deletion of RhD and absence of D antigens on the surface of red blood cells (RBCs) [2, 3]. The entry of RhD-positive fetal RBCs into D-negative maternal circulation will cause sensitization of anti-D IgG antibody, which could transport through the placenta and result in the destruction of fetal RBCs and fetal hemolysis, leading to fetal anemia or severe hydrops fetalis.

Serial antenatal follow-up of maternal indirect Coombs titer and ultrasonography are essential in an RhD-negative pregnancy. If the maternal indirect Coombs titer reaches a critical value (1:16), cordocentesis with direct access to the fetal circulation can be performed to ascertain fetal blood group, Rh type, hemoglobin, and hematocrit. If needed, intrauterine transfusions may be performed before 27 weeks but this carries a fetal mortality rate of 0.8 to 2.7% [4]. After 27 weeks, amniotic fluid delta optic density measured at 450 nm, which significantly reflects bilirubin levels, can predict the severity of fetal anemia in correlation with Liley’s graph [5]. Early detection of fetal RBCs and fetal Rh status in maternal circulation or in amniotic fluid using the polymerase chain reaction (PCR) provides a new alternative potential management with high sensitivity and specificity [6, 7]. Using Doppler waveform ultrasonography, the increase in fetal middle cerebral artery (MCA) peak systolic velocity (PSV) can predict the severity of fetal anemia [8, 9]. Moreover, Bahado-Singh et al reported that the fetal splenic artery PSV for interval screening can be performed. The administration of anti-D immune globulin during pregnancy and postpartum within 72 hours in an RhD-positive infant birth will reduce the risk of RhD isoimmunization. Besides, prophylactic anti-D immune globulin should be given immediately without hesitation in cases with suspicious fetal-maternal hemorrhage.

References


