Anti Rh Hemolytic Disease due to Anti C Antibody: Is Testing for Anti D Antibodies Enough?

Gita Negi · Gaur Dushyant Singh

Received: 15 January 2011 / Accepted: 9 August 2011 / Published online: 28 August 2011
© Indian Society of Haematology & Transfusion Medicine 2011

Abstract Rh blood group system is a complex blood group system. Rh antibodies are produced in Rh negative individuals following exposure to foreign RBCs after transfusion or pregnancy. Anti C is a rare cause of hemolytic disease of newborn and is very scarcely reported in the literature. The aim of the present case report of Hemolytic disease caused by Anti C antibody is to bring out the fact that antibodies other than anti D should be considered in cases that give a suggestive history but no evidence of Anti D.

Background

Rh blood group system is a complex blood group system. There are many nomenclatures and about 50 different antigen specificities. Two closely linked genes on chromosome 1 control the expression of Rh antigens. Common Rh antigens are D, c, E, C and e in order of immunogenicity. Rarely no Rh antigens are expressed resulting in Rh null phenotype. Some individuals express weak D antigen (Du phenotype) which can be detected only after testing through antiglobulin phase.

Rh antibodies are produced in Rh negative individuals following exposure to foreign RBCs after transfusion or pregnancy. Initially IgM antibodies are formed followed by a transition to IgG. These persist for many years. As they are IgG in nature, these can cross the placenta and may coat fetal RBCs that carry the corresponding antigen. Rh immunoglobulin is a preparation of IgG anti D given to a D negative

woman during pregnancy and following delivery of a D positive fetus. It can prevent only Anti D Hemolytic disease of newborn. Anti C is a rare cause of hemolytic disease of newborn and very scarcely reported in the literature.

Case Report

A 45 year old female having blood group B negative was to undergo a major surgery for Cholelithiasis and abdominal tuberculosis. Her hemoglobin value was 8.0 g/dl with low iron and ferritin levels. She was advised medical treatment for iron deficiency anemia before surgery. The surgeons also wanted to keep blood ready for transfusion if needed at time of surgery. On cross matching, she was found to show major incompatibility with many donor units of the same blood group. Indirect Coombs test was performed and found to be positive. Further antibody screening revealed Anti C antibody using gel cards. Many Group B Negative units were cross-matched and only one suitable unit was found that was cross-match compatible and surgery was performed. She gave a history that surgery was planned many times in the past but she could not be operated as suitable blood was never available. The patient had a past history of blood transfusion of 4 units many years back for severe anemia (Hb-4.8 g/dl). She also had a history of two abortions after the delivery of one healthy baby. On both these instances, anti D was given. After many years she had one normal delivery.

Discussion

Rh system of blood groups is a complex system consisting of many Rh antigens, common ones being D, C, E, c, e and

G. Negi (✉) · G. D. Singh
Department of Pathology, Himalayan Institute of Medical Sciences, Jolly Grant, Doiwala, Dehradun, Uttarakhand, India
e-mail: gita_12@rediffmail.com

some unusual phenotypes—Cw, f, G, Hro etc [1]. Anti C is an uncommon antibody responsible for hemolytic disease of newborn but there are few such recorded cases in the literature [2–4]. Moise studied irregular antibodies in pregnancy and found a decreased incidence of anti Rh D and increased incidence of anti Kell-K1 [5]. Koelewijn studied the effect of first trimesters screening program on timely detection of hemolytic disease of newborn caused by antibodies other than anti D and found that severe hemolytic disease of newborn is associated with anti K, anti C and to a lesser extent by other Rh alloantibodies [6].

Baker has reported a case of hemolytic disease of newborn caused by anti C antibody necessitating intra-uterine transfusion [2]. Trevett and Moise reported a case of twin pregnancy with severe hemolytic disease of newborn due to anti g and anti C [3, 5].

Mitchell reported a case of severe hemolytic disease of newborn in surrogate pregnancy after oocyte donation and found Anti C antibody [4]. Another antibody implicated in hemolytic disease of newborn is anti Cw although rare [7–9].

The present case is being reported owing to the extreme rarity of Hemolytic disease being caused by Anti C antibody. In this case, injections of Anti D Immunoglobulin were given in the second and third pregnancies but both the episodes resulted in abortions because the culprit antibody was Anti C antibody. However, in the subsequent pregnancy, the child survived which could have been possible if the fetus was negative for C antigen. It would be difficult to determine whether the stimulus for formation of these antibodies was one of the earlier pregnancies with a C antigen positive fetus or one or more of the previous transfusions given for treatment of anemia in the past. The aim is to bring out the fact that antibodies other than anti D should be considered in cases that give a suggestive history

but no beneficial effect of Anti D prophylaxis. Moreover, it was also possible to find a suitable unit for surgery as the antibody was known.

Thus antibody screening in selected cases helps in difficult situations to understand the underlying reason in alloimmunised patients and also to find suitable antigen negative donor units.

References

1. Harmening DM (ed) (2005) Modern blood banking and transfusion practices, 5th edn. F A Davis Company, Philadelphia
2. Baker JW, Harrison KL, Harvey PJ (1981) Anti-C haemolytic disease requiring intrauterine and exchange transfusion. *Med J Aust* 2(6):296
3. Trevett TN Jr, Moise KJ Jr (2005) Twin pregnancy complicated by severe hemolytic disease of the fetus and newborn due to anti-g and anti-C. *Obstet Gynecol* 106(5 Pt 2):1178–1180
4. Mitchell S, James A (1999) Severe hemolytic disease from rhesus anti-C antibodies in a surrogate pregnancy after oocyte donation: a case report. *J Reprod Med*. 44(4):388–390
5. Moise KJ Jr (2000) Non-anti-D antibodies in red-cell alloimmunization. *Eur J Obstet Gynecol Reprod Biol* 92(1):75–81
6. Koelewijn JM, Vrijkotte TG, van der Schoot CE, Bonsel GJ, de Haas M (2008) Effect of screening for red cell antibodies, other than anti-D, to detect hemolytic disease of the fetus and newborn: a population study in the Netherlands. *Transfusion* 48(5):941–952
7. Chu HP, Kanagalingam D, Chan DK (2007) Severe intrauterine hemolysis due to anti-C(w). *Am J Perinatol* 24(10):623–626 (Epub 30 Oct 2007)
8. May-Wewers J, Kaiser JR, Moore EK, Blackall DP (2006) Severe neonatal hemolysis due to a maternal antibody to the low-frequency Rh antigen C (w). *Am J Perinatol* 23(4):213–217 (Epub 4 Apr 2006)
9. Kollamparambil TG, Jani BR, Aldouri M, Soe A, Ducker DA (2005) Anti-C(w) alloimmunization presenting as hydrops fetalis. *Acta Paediatr* 94(4):499–501