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Hemolytic Disease of Newborn due to Anti-c Antibodies - A Case Report

Dr. N. Vani[1], Dr. A. Mangaiyarkarasi[2]

Abstract: ***Hemolytic Disease of Newborn also called as erythroblastosisfoetalisis caused by maternal alloimmunisation to blood group antigens expressed by fetalred blood cells. The Rh blood group is the main cause of Hemolytic Disease of Newborn. The Rh antibody Anti-D is most common to cause HDN. Due to prophylactic immunoglobulins, the isoimmunisation to D antigen is nowadays low. Howeverother Rh red cell antigens remain a significant but uncommon cause of Hemolytic Disease of Newborn. Anti- c is the most important Rh antigen after D antigen to cause severe HDN. Therefore antibody screening should be performed for all pregnant women to reduce fetal or neonatal morbidity and mortality. We report a case of Hemolytic Disease of Newborndue to anti-c antibody in an infant of a Rh positive mother.***

Keywords: hemolytic disease of newborn, Rh blood group, anti-c

1. Introduction

Hemolytic Disease of the fetus andnewbornis a disorder which is immune – mediated.(1) The clinical presentation range from mild to severe and life – threatening. Maternal alloimmunisation to Rh D blood group antigen expressed by fetal red blood cells was a major cause of fetal and neonatal morbidity and mortality.(2) The risk of developing Hemolytic Disease of Newborn is reduced to 0.1% -0.2% after the introduction of anti-DIgG immunoglobulin prophylaxis.(3)

However other Rh red cell antigens such as c, C and E remain a significant but uncommon cause of Hemolytic Disease of Newborn. (4)After D antigen the most clinically important Rh antigen is c which is associated with severe HDN.(5) Only a few cases of HDN due to anti-c antibodies have been reported in the literature.(6) The prevalence of anti-c antibodies in the Indian population was found to be 6.4%.(7)

2. Case Report

A term live female baby adequate for gestation age, weighing 3.1kg was admitted to neonatal unit with jaundice. The baby was delivered by Labour natural.The baby was third child for the mother. The first child is a healthy 5 year boy and the second child is a healthy 2 year old girl. The first two pregnancies were uneventful. There was no consangunity in the parents.

The current antenatal period was uncomplicated and she had regular clinic follow up. The baby did not have any perinatal complications but was found icteric after birth. On clinical examination the baby was icteric and extended up to palms and soles. Abdominal examination revealed hepatosplenomegaly. There was no visible rash or oedema. The baby had mild respiratory distress. Oxygen saturation was normal. Heart rate was 108/min and respiratory rate was 58/min.

The laboratory investigations were as follows:

- Hemoglobin – 6.5g/dl
- Platelet count – 76000 /cu mm
- Peripheral smear – showed erythroblastemia, spherocytosis and reticulocytosis
- Direct Coomb's test – positive
- Total bilirubin - 23mg/dl
- Baby blood group – B positive
- Mother blood group –B positive

In view of persistent anaemia and hyperbilirubinemia, minor blood group incompatibility was suspected.The mother and baby blood samples were investigated for Rh and minor blood group antibodies. The mother's blood was found to be positive for anti-c antibodies.

Blood grouping and Rh phenotyping was carried out in parents

	ABO status	Rh status	Rh phenotype
Mother	B	Positive	c antigen- 0
Father	B	Negative	c antigen- 4+

In view of seizures, baby was incubated and on ventilator support. Baby was treated with two cycles of double volume exchange transfusion, phototherapy and IV immunoglobulins. The baby recovered and was discharged.

3. Discussion

Hemolytic Disease of the fetus and new born caused by Rhisoimmunisation is a serious and fatal disease. (8) It is a condition in which there is immune hemolysisof fetal or neonatal red cells by transplacental transmission of maternal antibodies.(9) The clinical manifestation range from mild anaemia to hydropsfetalis in fetus and in the new born it can cause hyperbilirubinemia and kernicterus.(10)

The Rh blood group system is comprised of about 45 to 50 antigens among which the most important are D, C, c, E, and e. The genes encoding these antigens are RHD and RHCE genes located on chromosome 1.(11) The Rh blood group system is polymorphic and most immunogenic. D antigen is the most clinically significant Rh antigen and cause severe form of HDN. However due to widespread use of Rh-D immunoglobulin during pregnancy and post natal period the number of HDN cases due to anti-D has decreased. This has

led to relative increase in the diagnosis of Hemolytic Disease of Newborndue to non-Rh D isoimmunisation. (12)

The most important Rh antigen after D is c antigen which causes severe HDN.(13) 21 out of 567 pregnancies developed severe hemolytic disease of newborn resulting from antigens other than D in which 8.5% were due to anti-c.(14) Similar to Rh D, anti-c antibodies develop through previous exposure such as transfusion or fetomaternal haemorrhage. Anti-c can produce both acute and delayed hemolytic reactions. The incidence of anti-c can be reviewed from a retrospective study by Hackney and collegues in which there were 102 cases over a 34 year period at one United States institution. (15)

The treatment for anti-c isoimmunisation is fetal or neonatal transfusion similar to anti-D isoimmunised pregnancy with blood negative for the respective antibody.Since the perinatal morbidity and mortality is preventable in non Rh D isoimmunisation, screening of maternal serum antibodies in both Rh negative and Rh positive pregnant women should be made mandatory for early diagnosis of Hemolytic Disease of Newborn.

4. Conclusion

Most of the transfusion and antenatal care centres perform routine antibody screening only for Rh negative mother to screen for anti-D antibodies. Hence the diagnosis of Hemolytic Disease of Newborn due to other antigens may be delayed or undiagnosed. Therefore it is needed to formulate protocols for routine antibody screening of all pregnant women irrespective of the Rh blood group to prevent fetal and neonatal morbidity and mortality due to Hemolytic Disease of Newborn.

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