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Case Report

Alloimmunisation in Rh "c" negative mother causing severe fetal hemolysis

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ABSTRACT

The most severe form of HDN is caused by Anti-D. Other common Rh antigens in the order of immunogenicity are c, E, C and e. Anti-c is the most important Rh antigen after the D antigen. We report a case of hemolytic disease of the newborn due to Rh anti-c in an infant of Rh c negative mother.

Keywords: Alloimmunisation, Hemolytic disease of the newborn, Rh anti-c antibodies.

INTRODUCTION

The commonest cause of severe haemolytic disease of the newborn (HDN) is due to Rh D isoimmunisation.[1] After the development of anti-D immunoglobulins, the incidence of Rh D isoimmunisation has reduced and isoimmunisation due to other Rh phenotypes is increasing. Other common Rh antigens are in the order of immunogenicity are c, E, C and e.[2] Maternal alloimmunisation to other red cell antigens remains the cause of fetal disease since no prophylactic immunoglobulins are available to prevent the formation of these antibodies. We here report a case of haemolysis caused by Rh "c" antibodies in the newborn.

CASE REPORT

A 28 year old mother (G3P1A2L1) with history of two ectopic gestations terminated by surgical intervention and transfusion of one unit of blood at each time of termination delivered full term male baby. After three days, the baby developed severe jaundice of 17.6 mg/dl, retic count 7.2 % and PCV was 32 vol%. The mother's and baby's blood samples were sent to the Department of Transfusion Medicine for evaluation of feto-maternal incompatibility.

Mother's blood group was found to be A Rh D Positive (Table 1). Baby's blood group was B Rh D Positive (Table 1) and direct coomb's test was positive (Table 2).

Her indirect coomb's test (ICT) was positive (3+) (Table 2). Her antibody screening with three cell panels was positive for "c", "F_y^a", "Le^b" and "N". On further evaluation of mother's serum with eleven cell panel, confirmed presence of anti-"c"antibodies. Rh extended phenotyping of mother and baby confirmed fetal haemolysis is due to anti"c"antibodies of mother (Table 3). The baby was treated with exchange transfusion with O negative and Rh c negative blood and recovered well.

DISCUSSION

Rh blood group system is complex and consists of 49 Rh antigens known to date, out of which D, C, E, c and e are the most significant.[3] Some unusual phenotypes are Cw, f, G, Hro etc. In most of the antenatal care units and transfusion centers in developing countries routine

antenatal screening for antibodies is done for Rh negative mothers to screen for anti-D antibodies only. Hence there may be delay in identification of alloantibodies other than Rh anti-D, in a pregnant women causing HDFN due to their rarity. To avoid HDFN to these rare Rh blood groups other than Rh D routine antibody screening should be done first time the pregnant lady attends for antenatal check-up. If no antibodies are detected once more the test is done in the third trimester between 28-36 weeks.

First case of HDN due to "c" alloimmunisation was reported in 2007 which caused severe hydrops fetalis.[4] This case was successfully treated with intra-uterine compatible O negative, c- negative blood. The baby was also treated with double volume exchange blood transfusion post-natally. The specific treatment for isoimmunisation of anti-c antibodies or any red cell irregular antibodies is similar to the management of anti-D isoimmunisation. Here the specification is the fetal/ neonatal blood used for transfusion should be negative for its respective antibody.

Table 1: Mother's and baby's blood group.

	Forward grouping			Reverse grouping			Interpretation
	A	B	Rh D	Control (Pooled O cells)	A1 cells	B cells	
Mother	4+	-	4+	-	-	4+	A Rh-D Positive
Baby	-	4+	4+	-	-	-	B Rh-D Positive

In our case, we came to the conclusion that mother has developed "c"-antibodies which caused severe HDN based on the following observations: mother's ICT and baby's DCT were positive. Mother's eleven cell panel was positive for anti-c antibodies. Rh extended phenotype of mother was negative for "c" antigen and baby's Rh phenotype was positive for "c" antigen. The baby was successfully treated by exchange transfusion with O and c negative compatible blood unit.

Table 2: Coomb's test of mother and baby.

	Mother	Baby
Direct coomb's test	--	Positive 3+
Indirect coomb's test	Positive 3+	--
Control	--	--

Table 3: Rh extended phenotyping of mother and baby.

	C	c	E	e	K	Ctl
Mother	4+	-	-	3+	-	-
Baby	-	4+	4+	1+	-	-

In this case the cause of mother developing isoimmunisation to "c" antibodies is difficult to assess: may be due to previous blood transfusion or previous pregnancies/ abortions.

CONCLUSION

Anti-c isoimmunisation may cause severe HDN. The data on the prevalence of irregular antibodies causing HDN in Indian population is not clear. Blood bank protocols for screening of maternal antibodies in both Rh positive and Rh negative women have to be upgraded so that preventable perinatal mortality and morbidity can be minimized.

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