Haemolytic disease of the newborn and severe neonatal jaundice due to anti-Mur antibodies

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Introduction

Maternal red cell antibodies are the commonest cause of Haemolytic Disease of Newborn (HDN). Although Rh and ABO antibodies are responsible for most cases, other minor red cell antibodies remain a significant but uncommon cause of HDN[1]. We report a Sri Lankan baby girl who developed HDN with severe neonatal jaundice due to anti-Mur, one of the minor group red cell antibodies.

Case report

A baby girl was born by elective lower segment caesarean section due to breech presentation at a gestational age of 37 weeks and 5 days. Birth weight was 4640g. She was the first live born of non-consanguineous Sri Lankan parents. Mother had two previous first trimester miscarriages. The antenatal period was uneventful. Antenatal blood sugar screening in the mother did not reveal diabetes mellitus. Baby cried at birth and the Apgar scores were 10, 10 and 10 at 1, 5 and 10 minutes respectively. There was no family history of haemolytic anaemia. Neonatal examination was unremarkable

On day two of life, baby was found to have icterus up to the sole without pallor or organomegaly. Total serum bilirubin was 371 µmol/L, which was just above the exchange transfusion level (phototherapy level: 270 µmol/L, exchange transfusion level: 370 µmol/L, NICE guidelines 2010[2]), with an elevated indirect fraction of 315.3 µmol/L. Complete blood count showed a white cell count of 20,000/cu mm (neutrophils 63%, lymphocytes 32%, monocytes 3% and eosinophils 2%), a haemoglobin level of 11.5 g/dL, a platelet count of 262,000/cu mm and a reticulocyte count of 14.8%. Blood picture showed polychromatic red cells, nucleated red cells and occasional target cells, suggestive of haemolysis. Spherocytes, elliptocytes or fragmented red cells were not seen. C-reactive protein and hepatic transaminases were within normal limits. Blood culture was negative. Blood pictures of both parents were normal. Blood groups of mother and the baby were O positive and O negative respectively. Direct anti-globulin test (DAT) of the baby's blood was positive. Mother's direct and indirect antiglobulin tests were negative. Antibody screening of the mother revealed antibodies to Mur antigen, following which a diagnosis of HDN due to anti-Mur was made.

Baby was given double surface phototherapy (LED), after which the serum bilirubin came down to the phototherapy range at 6 hours after commencement of phototherapy. Serum bilirubin levels were meticulously monitored and phototherapy was given according to the 2010 NICE Guidelines[2]. Single surface phototherapy was needed for a total of 7 days. Hydration was maintained using expressed breast milk in addition to direct breastfeeding. Mother was provided one to one support to establishing breastfeeding. Parental counselling was done regarding the risk of HDN in future pregnancies.

Discussion

Maternal red cell antibodies to Rh and ABO blood group systems are commonly responsible for the blood group incompatibilities in HDN., There are several other clinically significant red cell antibodies including MNS blood group system which can cause HDN. Antigens of the MNS blood group system are expressed in the red cell (RBC) membrane on two sialic acid-rich glycoproteins, glycophorin A (GPA) and glycophorin B (GPB). The MNS system is highly polymorphic and there are 46 distinct antigens, including MUT, Mi^a and Mur antigens[1,3].

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Anti-Mur is a red cell antibody to a low-incidence antigen, that occurs in less than 1% of the population. It is known to cause HDN as well as transfusion reactions. Antenatal detection of these antibodies facilitates early detection of HDN and neonatal jaundice[1,3,4]. The homologous genes, *GYP*A and GYP*B* which are located on the long arm of chromosome 4 (4q31) encodes MNS blood group system[1]. The incidence of gene encoding Mur antigen is 5-6% in South East Asia[3]. Some South East Asian countries have included Mur positive RBCs in antibody screening tests[3].

Anti-Mur antibodies are either IgG or IgM antibodies. Though, naturally occurring IgM antibodies are more frequent than IgG antibodies, IgG are more likely to be clinically significant as it crosses the placenta[3,5]. These antibodies are missed when using standard screening cells because transfusion laboratories in some developing countries use commercially available screening cells rather than prepared panels sourced from their own localities[3,4].

Clinically significant cases of hydrops fetalis and mild HDN due to anti-Mur have been reported[7,8]. In our patient, findings of significant neonatal indirect hyperbilirubinaemia and a strongly positive DAT with evidence of haemolysis were most likely due to anti-Mur detected in her mother's plasma. Genetic analysis for *GYP*A &GYP*B* genes would demonstrate the presence of the Mur antigen, although this facility was not available.

Screening for the presence of MNS antibodies is an important component in antenatal screening. The antibody screening test should be designed to ensure that all clinically significant antibodies among the local population are recognized so that steps can be taken to provide appropriate counselling and management to pregnant mothers at risk of HDN.

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