



ABO Incompatibility and Neonatal Outcome with Reference to Hemolytic Disease of Newborn

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Abstract

Among the conditions capable of causing hemolytic disease of newborn, blood group incompatibility is the most common cause of which most severe forms are encountered in Rh incompatibility. However with availability of effective antenatal care in detecting Rh negative mothers and successful administration of Rh immunoglobulin ABO incompatibility has emerged the most common cause of haemolytic disease of newborn

Objective

- 1. To determine the incidence of ABO incompatibility and the incidence of neonatal jaundice in ABO incompatibility*
- 2. To determine the risk factors for development of neonatal jaundice in ABO incompatibility*
- 3. To determine the perinatal outcome of ABO incompatible babies*

Material and Methods: *A prospective case control study conducted in the department of Obstetrics and Gynaecology, SAT hospital, government medical college Trivandrum. All O positive mothers delivered during the period were included in the study. Among the ABO incompatible babies, the development of jaundice was taken as the outcome and those babies who did not develop jaundice were taken as control. Risk factors for the development of jaundice in ABO incompatibility were assessed Statistical analysis was performed using chi square test*

Results: *A total of 250 O positive mothers were included in the study. Out of this 102(40.8%) babies had ABO incompatibility, out of this 36% babies had jaundice. Jaundice due to ABO incompatibility was more in preterm babies and babies of those mothers who were given oxytocin augmentation. Among the jaundiced babies 27% underwent exchange transfusion*

Conclusion: *ABO haemolytic disease of the newborn is characterised by a benign evolution because of a mild degree of hemolysis. Anemia is rare, the main clinical problem being jaundice. Severe haemolysis and anemia requiring exchange transfusion was reported in 27% only.*

Keywords: *ABO incompatibility, jaundice, prematurity.*

Introduction

ABO hemolytic disease of the newborn occurs almost exclusively in infants having blood group A or B who are born to O positive mothers. Although ABO incompatibility is common, haemolytic disease due to this has been reported to

be low. Unlike the rhesus disease, it is usually a problem of the neonate rather than the fetus

ABO haemolytic disease of newborn is caused by immune IgG maternal antibodies which have the ability to cross the placental barrier A high titre of these immune antibodies may not present with

adverse effects in utero as A and B antigen are present in cells of all other tissues and body fluids and not only in red blood cells. The presence of these antigens help to protect the incompatible fetal red cells by neutralizing the transferred maternal antibody with small amount of antibody reacting directly with the fetal red blood cells ^[1]. The sensitized red cells are destroyed in the fetal spleen with consequent hyperbilirubinemia

The factors that hindered the general appreciation of ABO haemolytic disease according to Rosen field could generally be that Rh disease is readily recognizable with aid of direct anti globulin test whereas ABO disease may not be recognized easily ^[2]. Jaundice usually becomes evident in the first 24 hours of life. If it appears beyond 24 hours other causes of jaundice like sepsis, inherited red cell disorders and metabolic factors have to be considered. Neonatal jaundice occurs in 60% of term and 80% preterm infants ^[3]. Newborns incompatible with their mothers in the ABO system presents with potentially higher risk of severe hyperbilirubinemia especially in the presence of a positive direct coombs test ^[4]

The objective of this study is to assess the extent to which ABO incompatibility is implicated in neonatal jaundice in our population.

Materials and Methods

This prospective case control study was conducted in the department of Obstetrics and Gynaecology, SAT hospital government medical college Trivandrum over a period of 4 months A total of 250 O positive mothers were included in the study. Detailed history of patient, previous obstetric history, antenatal complications in present pregnancy and details of the neonate were recorded. Cord blood of all mothers were sent for blood grouping, Rh typing and serum bilirubin. ABO incompatible babies were followed up daily for the development of jaundice which was taken as the end point. Statistical significance of risk factors were analyzed using chi square test. Deteriorating cases were followed up for further

management which included sun exposure, phototherapy, or exchange transfusion.

Results

Among the 250 O positive mothers included in the study, 102 babies (40.8%) ha ABO incompatibility. Clinical jaundice among ABO incompatibility was 36% (37 cases).

Table 1: Time of appearance of jaundice

Time in hours	Number	Percentage
<24	22	59
24 – 48	10	27
>48	5	14
Total	37	100

59% of babies developed jaundice within 24 hours. Parity of mothers showed no statistical significance among the jaundiced and non-jaundiced in ABO incompatible babies.

Table 2: Distribution of gestational age of babies among jaundiced and non-jaundiced in ABO incompatibles.

Gestational age in days	Jaundiced		Non -jaundiced	
	Number	%	Number	%
<260	4	11		
260 - 280	33	89	56	86
>280			9	14

Out of 102 ABO incompatible pregnancies, 11% were preterm and all of them were jaundiced.

Table 3: Distribution of pregnant women with jaundiced and non-jaundiced babies with respect to oxytocin augmentation.

Augmentation	Jaundiced		Non -jaundiced	
	Number	%	Number	%
Oxytocin	25	68	33	51
ARM	5	13	6	9
No augmentation	3	8	15	23

66% of women received oxytocin in the jaundiced group.

Among the ABO incompatible babies 46% were A positive and 54% were B positive. 32% of ABO incompatible babies had a cord bilirubin 3.2 and above.

TABLE 4: Distribution of cord bilirubin in babies among jaundiced and non-jaundiced group.

Cord Bilirubin	Jaundiced		Non -jaundiced	
	Number	%	Number	%
0.2 – 1.2	7	19	43	66
1.2 – 2.2	4	11	14	22
2.2 – 3.2	14	38	8	12
3.2 and above	12	32		
Total	37	100	65	100

Phototherapy was the mainstay of treatment in 54% of cases and 27% (10) cases required exchange transfusion.

Discussion

Among the O positive mothers included in the study, 40.8% had ABO incompatibility. Incidence reported in various studies range from 15% to 25%. Some studies suggest ethnic difference with increased severity among Blacks [5]. Among the 102 incompatible babies, 36% were jaundiced. Similar reports were given by Dufour et al [6].

The time of appearance of jaundice showed that 50% of jaundiced babies develop jaundice within 24 hours of delivery. In our series, incidence was high in preterm neonates. Similar finding was reported by Cashore et al [7]. This occurs due to the fact that preterm infants liver is unable to process bilirubin as well as a term infant and also the level of albumin is lower compared to term infant.

In our series, 43 male and 31 female neonates were in the jaundiced group and this was not statistically significant. Higher incidence among females have been reported in some studies [8]. Various other studies have failed to demonstrate any correlation between sex of the babies and development of haemolytic disease of newborn [9]. Oxytocin augmentation was found to increase the development of jaundice probably due to increased osmotic fragility and water retention, similar to that reported in the literature. The maximum number of babies were in the 2.5 to 2.9kg group in both jaundiced and non-jaundiced group. Mean difference in weight was not found

to influence the development of jaundice. This is in agreement with reports by Kitchen W H [10].

The mean cord bilirubin was found to be significantly higher in babies that developed jaundice as was reported by Risemberg [11]. 54% of jaundiced babies required phototherapy, 27% had exchange transfusion, 19% needed no treatment.

Routine screening for ABO incompatibility is not presently performed in our centre. There is no test that is of high predictive value for severe haemolytic disease.

Conclusion

Newborn incompatible with their mothers in the ABO system presents potentially high risk of neonatal hyperbilirubinemia. Incidence of jaundice was found to be more among premature babies. The neonate presents with jaundice, and anemia is usually rare. But there are cases which need exchange transfusion. Early detection and treatment of neonatal hyperbilirubinemia is important in prevention of bilirubin induced encephalopathy in affected children.

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