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Frequency of ABO incompatibility as a cause of neonatal jaundice in neonatal unit of Ayub Teaching Hospital, Abbottabad

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***Abstract*---**Background: Neonatal jaundice is a common problem encountered by neonatologists. After prevention of Rh-isoimmunization ABO incompatibility has become the most common cause of hemolysis. For infants delivered of 35 weeks gestation or later ABO incompatibility have been found to be the major risk factors for development of severe hyperbilirubinemia. Objective: To assess the frequency of ABO incompatibility as a cause of neonatal jaundice. Methodology: The current study was Cross-sectional descriptive study carried out at the Neonatal units of Ayub teaching hospital, Abbottabad. Study was carried out over a period of six months from 01-06-2011 to 30-11-2011. The calculated sample size based on using the WHO software was 246 patients. Investigations were done regarding mother and baby's blood group, serum bilirubin levels (total, direct and indirect). Data was entered into computer using SPSS version 10. Results: A total of 246 neonates were included in this study. Mean age of the neonates was 4.62±4.09. Males were 157 (63.8%) and females were 89 (36.2%). Distribution of cases by baby's blood group as follows: A +ve 92 (37.4%), A –ve 10 (4.1%), AB +ve 22 (8.9%), AB –ve 1 (0.4%), B +ve 92 (37.4%), B –ve 8 (3.3%), O +ve 18 (7.3%), O –ve 3 (1.2%). Distribution of cases by mother's blood group

as follows: A +ve 60 (24.4%), A –ve 11 (4.5%), AB +ve (13.8%), B +ve 64 (26.0%), B –ve 12 (4.9%), O +ve 54 (22%) and O –ve 11 (4.5%). ABO incompatibility was found in 65 cases (26.4%). Conclusion: It is concluded that neonate with ABO incompatibility had more chances of having hyperbilirubinemia than those babies with O '+ve' blood group. It is suggested that there is a need of continuous monitoring of bilirubin level in the hospital particularly amongst neonates with ABO incompatibility.

***Keywords*---**frequency, ABO incompatibility, neonatal jaundice.

Introduction

Neonatal jaundice is a common problem encountered by neonatologists [1]. After prevention of Rh-isoimmunization ABO incompatibility has become the most common cause of hemolysis [2]. For infants delivered of 35 weeks gestation or later ABO incompatibility have been found to be the major risk factors for development of severe hyperbilirubinemia [3]. ABO incompatibility occurs exclusively in infants who have blood group A or B, carried by the mother having blood group 'O' [4]. Maternal antibodies are formed against fetal red blood cell antigens. 'B' types mothers form antibodies against infants with blood group A and vice versa. These antibodies are usually IgM which do not cross placenta to produce hemolysis. Only IgG antibodies can cross placenta. In ABO type, maternal antibodies are formed spontaneously with out any sensitization so hemolytic disease of newborn can be present in first child. Jaundice appears during first 24 hours [5]. 39-40% of 'O' type mothers have IgG antibodies along with IgM. ABO incompatibility occurs in 15-20% of pregnancies and hemolytic disease of newborn develops in 10% of these instants [6]. The incidence of hemolytic disease of newborn is 1:150-1:3000 births [7]. 20% of ABO incompatible infants develop total serum bilirubin level greater than 12.8mg/dl. The risk of moderate hyperbilirubinemia, total serum bilirubin greater than 13mg/dl, increases two times in infants having ABO incompatibility and positive direct coomb's test. Severe hyperbilirubinemia although uncommon with ABO incompatibility but can occur and leads to kernicterus [8] Blood group and coomb's test in every infant of the mother with group 'P' should be done as these infants have increased risk of developing hemolytic disease of newborn [9]. Since the introduction of Rho-gam, Rh incompatibility has become an uncommon cause of neonatal jaundice and ABO incompatibility has become the most common cause of neonatal jaundice which if not detected and timely managed can cause severe complications. The purpose of this study is to determine the ABO incompatibility as cause of jaundice in our area and guide the use of appropriate intervention in the form of blood grouping of newborn, monitoring of serum bilirubin, keeping a low threshold of phototherapy and exchange transfusion to prevent serious complications.

Materials and Methods

The current study was Cross-sectional descriptive study carried out at the Neonatal units of Ayub teaching hospital, Abbottabad. Study was carried out over

a period of six months from 01-06-2011 to 30-11-2011. The calculated sample size based on using the WHO software was 246 patients.

Inclusion Criteria

1. All patients admitted in neonatal care unit with serum bilirubin more than 5mg/dl.
2. Either gender
3. Age less than 28 days

Exclusion Criteria

Neonates having jaundices with congenital anomalies and syndromes (Meningocoele myelomeningocoele, encephalocoele, down syndrome) were not included in the study.

Data collection procedure

Approval of ethical committee was taken. Informed written consent was taken from the parents/guardians. Details of patients, like gender, name, age, , hospital registration number was documented on the proforma. Age of the neonate was confirmed from parents by asking date of birth. Detailed history of the patient regarding time of onset of jaundice, and phototherapy and exchange transfusion in other siblings was taken by researcher. Physical examination was performed by researcher like examination of skin and pallor. Investigations were done regarding mother and baby's blood group, serum bilirubin levels (total, direct and indirect). All the data of patients were recorded on the proforma designed for this project.

Data analysis

Data was entered into computer using SPSS version 10. Numerical variable like age and serum bilirubin described as mean and standard deviation. Categorical variable such as sex, blood groups (ABO incompatibility was computed as frequency and percentages.

Results

A total of 246 neonates were included in this study. Regarding age distribution, 187 neonates (76.0%) were between 1-5 days of age, 39 neonates (15.9%) were 6-10 days old and 20 neonates (8.1%) were 11-28 days of age. Mean age of the neonates was 4.62±4.09. (Table-1) Males were 157 (63.8%) and females were 89 (36.2%) (Table-2).

Distribution of cases by baby's blood group as follows: A +ve 92 (37.4%), A –ve 10 (4.1%), AB +ve 22 (8.9%), AB –ve 1 (0.4%), B +ve 92 (37.4%), B –ve 8 (3.3%), O +ve 18 (7.3%), O –ve 3 (1.2%) (Table-3).

Distribution of cases by mother's blood group as follows: A +ve 60 (24.4%), A –ve 11 (4.5%), AB +ve (13.8%), B +ve 64 (26.0%), B –ve 12 (4.9%), O +ve 54 (22%) and

O –ve 11 (4.5%) (Table-4). ABO incompatibility was found in 65 cases (26.4%) (Table-5).

Table-1: Distribution of cases by age

Age (day)	Number	Percentage
1-5	187	76.0
06-10	39	15.9
11-28	20	08.1
Total	246	100.0
Mean±SD	4.62±4.09	

Table-2: Distribution of cases by gender

Gender	Number	Percentage
Male	157	63.8
Female	89	36.2
Total	246	100.0

Table-3: Distribution of cases by baby's blood group

Baby blood group	Number	Percentage
A +ve	92	37.4
A –ve	10	04.1
AB +ve	22	08.9
AB –ve	01	00.4
B +ve	92	37.4
B –ve	08	03.3
O +ve	18	07.3
O –ve	03	01.2
Total	246	100.0

Table-4: Distribution of cases by mother's blood group

Baby blood group	Number	Percentage
A +ve	60	24.4
A –ve	11	04.5
AB +ve	34	13.8
AB –ve	-	-
B +ve	64	26.0
B –ve	12	04.9
O +ve	54	22.0
O –ve	11	04.5
Total	246	100.0

Table-5: Distribution of cases by ABO incompatibility

ABO incompatibility	Number	Percentage
Yes	065	26.4
No	181	73.6
Total	246	100.0

Discussion

A major issue during the first week of life is jaundice. It is a cause of anxiety for the parents and concern for the doctor. Even in term neonates, high bilirubin levels have the potential to be harmful to the developing central nervous system and to result in neurological damage. Within the first week of life, over 60% of term newborns have visible jaundice [10]. Most of the time, there is no need for action since it is benign. A clinically severe hyperbilirubinemia affecting 5–10% of them requires phototherapy [11]. Pathological jaundice is characterized by bilirubin levels that are out of range and need treatment. Pathological jaundice is characterized by the onset of jaundice within 24 hours, a rise in serum bilirubin over 5 mg/dl/day, peak values beyond the predicted normal range, the persistence of clinical jaundice for more than 2 weeks, and conjugated bilirubin [12]. Infants delivered to mothers with the O blood type should have their jaundice constantly checked and then be released after 72 hours. There is a choice to test the cord blood for the baby's blood type and direct antibody test if the mother's blood is group O, Rh-positive, but it is not necessary as long as there is enough follow-up, risk assessment, and monitoring. ABO incompatibility-related jaundice often manifests during the first 24 hours. In article [13], a method for phototherapy and ET has been described. Neonatal jaundice, which often appears in newborns around the second day after delivery and lasts until day 8 in cases of normal births or until day 14 in cases of preterm births, is mostly harmless. Without any intervention, serum bilirubin often falls to a low level; jaundice is likely the result of postpartum metabolic and physiological changes. Kernicterus, a brain-damaging illness that may cause severe permanent impairment, can happen under extreme circumstances. There are worries that the increase in this illness in recent years is a result of insufficient neonatal hyperbilirubinemia identification and care. Early therapy often involves subjecting the infant to intense phototherapy [14]. The most frequent medical condition affecting newborns in their first week of life is neonatal jaundice. Jaundice often presents 2-4 days after delivery and disappears on its own after 1- 2 weeks in around 50% of term newborns and 80% of preterm babies. The buildup of bilirubin in the skin is what causes jaundice. Enhanced red cell destruction and reduced bilirubin excretion are the main causes of jaundice in newborn newborns [15]. In present study, most of neonates 76% presented with jaundice between day 1-5 of their life followed by These results are comparable with Skae et al [15] in which it is also mentioned that neonatal jaundice usually appears 2-4 days after birth. ABO incompatibility and glucose-6-phosphate dehydrogenase (G6PD) deficiency are the most common causes of hemolytic anemia. If these conditions are present, phototherapy and exchange transfusion may be considered at lower TSB levels because these conditions can cause 14 predictably severe hyperbilirubinemia. In current study,

out of 246 neonates ABO incompatibility was present in 26.4% neonates. Our results are consistent with studies of Moerschel et al and Khattak et al [16]. Comparable results also reported by two other local studies carried out by Waheed et al [17] and Masood et al [18]. Hemolysis is caused by ABO incompatibility. Increased fetal erythrocyte breakdown leads to higher bilirubin generation. The shorter fetal erythrocyte life span and greater erythrocyte ass in newborns are the causes of this. The results of prior investigations [19, 20, 21] confirm this conclusion. Similar to this, Heier et al [22] discovered that ABO-incompatible children born to blood type 'O' Positive mothers had a twofold chance of developing jaundice that requires treatment and a 5–10 times greater risk of exchange transfusion [22].

Conclusion

It is concluded that neonate with ABO incompatibility had more chances of having hyperbilirubinemia than those babies with O '+ve' blood group. It is suggested that there is a need of continuous monitoring of bilirubin level in the hospital particularly amongst neonates with ABO incompatibility.

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