ORIGINAL ARTICLE

Risk Factors ff Jaundice in Neonates at DHQ Teaching Hospital Dera Ghazi Khan

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ABSTRACT

Background: Jaundice is the yellow discoloration of skin, sclera and mucous membrane caused by high concentration of circulating bilirubin. Neonatal jaundice is still the leading cause of preventable brain damage, physical and mental handicap, and early death among infants in many communities.
Aim: To calculate the frequency of different causes of jaundice in neonates presenting to DHQ/Teaching Hospital D.G Khan.
Setting: Department of Paediatrics DHQ Teaching Hospital D.G Khan
Duration: Six months from 13-9-2014 to 12-3-2015.
Methods: Neonates presenting with jaundice and fulfilling inclusion and exclusion criteria were included in the study.
Results: Among the 100 cases studied, 60 (60%) were males while 40 (40%) were females. Hemolytic hyperbilirubinemia including Rh-isoimmunization (16%), ABO-isoimmunization (8%) and G-6PD deficiency (4%) accounted for 28% cases. Non-hemolytic hyperbilirubinemia was found in 72% of the cases and it comprised of idiopathic group (28%), sepsis 22%) and prematurity (14%). In hemolytic group jaundice appeared at the younger age, peak bilirubin levels were higher and were attained at a significantly earlier age as compared to non-hemolytic group. Moreover, hemolytic group required phototherapy at the earlier age and for significantly prolonged period. Similarly exchange transfusion was performed more frequently in hemolytic group. Kernicterus developed in two cases of Rh-isoimmunization, due to delayed arrival. Overall mortality in the present study was 16%.
Conclusion: It was concluded from the study that the incidence of hyperbilirubinemia was 8.5% of the total admissions. Male to female ratio was 1.5:1. In hemolytic group jaundice appeared at the younger age, peak bilirubin levels were higher and were attained at a significant earlier age as compared to non-hemolytic group.
Keywords: Jaundice, Kernicterus, Phototherapy.

INTRODUCTION

Jaundice is the yellow discoloration of skin, sclera and mucous membrane caused by high concentration of circulating bilirubin. Neonatal jaundice is still the leading cause of preventable brain damage, physical and mental handicap, and early death among infants in many communities[1,2]. It is one of the most commonly encountered clinical problems approximating 2.3rd of all neonates[3].

Unconjugated hyperbilirubinemia being the most common clinical problem in neonatal period occurs when there is excessive bilirubin formation along with insufficiency of liver to conjugate bilirubin[4]. It is mostly due to physiological cause[5], however at times it can be very serious. Its then timely detection and optimal management becomes crucial to prevent kernicterus[6,7] as well as to avoid long term neurological sequalae like cerebral palsy and mental retardation[8]. Conjugated hyperbili-rubinemia, though non-neurotoxic, but is always pathological.

The usual causes of jaundice in neonates include physiological jaundice, Rh incompatibility, ABO incompatibility[9], sepsis, breast milk jaundice, G6PD deficiency[10] and hypothyroidism. Rare causes include biliary atresia, neonatal hepatitis, spherocytosis, pyruvate kinase deficiency, and congenital conjugation defects of liver and TORCH infection.

About 30 to 40 neonates per month are admitted in Paediatric Department of DHQ/Teaching Hospital Dera Ghazi Khan with jaundice. This shows a big magnitude of the problem. The consequences of condition are very serious leading to brain damage ultimately resulting in handicap later in life. The topic has been selected because it was never studied in DHQ/Teaching Hospital Dera Ghazi Khan. Results of this study will help us in formulating the prevention, early treatment and changing pattern of jaundice neonatorum over time.

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The objective of the study is to calculate the risk factors of jaundice in neonates presenting to DHQ Teaching Hospital D.G Khan.

MATERIAL AND METHODS

Neonates presenting with jaundice and fulfilling inclusion and exclusion criteria were included in the study. Detailed history, clinical examination and laboratory investigation i.e. haemoglobin level, serum bilirubin level, blood group of baby and mother, Coomb's test, retic count and peripheral film were done by consent of parents/guardians.

RESULTS

Among the 100 cases studied, 60(60%) were males while 40(40%) were females, so the male to female ratio was 1.50:1 (Table I).

Out of the 100 cases, no definite diagnosis could be made in 28 cases inspite of full diagnostic evaluation, so the idiopathic group with 28(28%) cases was on the top of the list in the present study. The second most common cause was sepsis with 22(22%) cases, while Rh-hemolytic disease was the next common cause, 16 (16%) cases as shown in table II.

In majority of septic cases jaundice appeared between 4-7 days, while in 4 cases it was noticed on 3rd day of life. There were only 2 cases of sepsis in which jaundice appeared on the 9th day. Jaundice in prematures was late to appear, in majority it appeared between 4-7 days of life, while in one case it was noticed after 7th day. In both the 4 cases of neonatal cholestasis jaundice was noticed in the 2nd week of life as shown in Table III.

In the 12 cases in which jaundice appeared within the first 24 hours average age at admission was 1.5 days and all the cases were admitted between 1-3 days of life. In 38 cases in which jaundice was seen between 2-3 days of life, average age at admission was 4.75 days. Seven days was average age at admission in 38 cases in which jaundice was noted between 4-7 days of life. In 12 cases showing jaundice after the first week of life, average age at admission was 12.5 days (Table IV).

Peak serum bilirubin levels achieved in hemolytic causes was much higher as compared to non-hemolytic group. It was highest in G-6PD deficiency (31.5mg/dl), while in case of Rh and ABO incompatibilities peak levels achieved were 28.5 and 23.5 mg/dl respectively. Only in two cases of septic jaundice peak serum bilirubin level of 23.3 mg/dl was achieved, while the maximum level in idiopathic jaundice was 21mg/dl (Table V).

Out of the 100 cases studied, 86 were term infants with average weight of 2850 gm and mean bilirubin level of 18.5 mg/dl at admission. Six prematures were less than 34 weeks of gestational age with average weight and bilirubin levels of 1400 gm and 15.5 gm/dl respectively.

In the present study, 82 (82%) of the mothers and 90(90%) of the babies were Rh-positive while 18 (18%) mothers and 10 (10%) of the babies were Rh-negative. Commonest ABO blood group among the mothers was "B" in 34 (34%) followed by "O" in 30 (30%). Commonest ABO blood group among the babies was "O" in 36 (36%) followed by "B" in 32 (32%) cases.

Out of the 16 cases of the Rh incompatibility, both the direct and indirect Coomb's test were positive in 12 cases, while 4 cases of negative Coomb's test were diagnosed upon the clinical and laboratory evidences. In only two cases ABO incompatibility, direct Coomb's test was positive, while the diagnosis of other 3 cases was made with the support of other clinical and laboratory tests.

Out of the 16 cases of Rh incompatibility, 14(87.5%) required phototherapy. The average age of starting phototherapy was 1.5 days and the average duration of phototherapy was 4.5 days. Out of the 8 cases of ABO incompatibility, 6 (75%) required phototherapy with average of starting and average duration of phototherapy of 1.5 and 4.5 days respectively. Both the 4 cases of G-6PD deficiency required phototherapy for an average duration of 5 days. Out of non-hemolytic causes, jaundiced premature babies required phototherapy at an average age of 5.5 days and for an average duration of 4 days. Jaundice due to hemolytic cause required phototherapy at younger age and for prolonged duration as compared to non-hemolytic group. Phototherapy was given in 66 cases (66%).

Out of the 16 cases of Rh incompatibility, 12(75%) required exchange transfusion. It had to be done thrice in two cases, twice in 6 cases and once in the remaining 4 cases, with an average number of exchange transfusion per neonate was 1.83 times. Of the 8 cases of ABO incompatibility, 6(75%) required exchange transfusion and there was 2 cases who had to be gone for exchange transfusion twice. All the 4 cases (100%) of G-6PD deficiency required exchange transfusion and in 2 cases it had to be repeated. Two premature (14.2%), 2 septic (9.09%) and 2 undiagnosed cases (7.14%) required exchange transfusion. Exchange transfusion was done in 28 cases (28%). Antibiotics were given to the all septic babies.

All the patients were treated according to the protocol already mentioned. Out of the 100 cases, 84

(84%) were cured while 16(16%) expired. No other significant complication was observed.

Out of the 100 cases studied, 16 cases expired with an overall mortality of 16%. Maximum mortality was observed in septic jaundice. Out of the 22 cases of sepsis, 10 (45.45%) expired; most of these cases were received in serious condition. Second common cause of death was Rh incompatibility, 4 cases (25%) out of 16 expired; all were died due to kernicterus.

Graph I: Gender distribution (n=100)

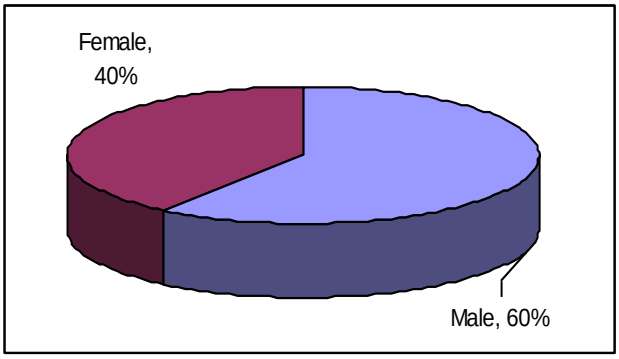

Table I: Risk factors of neonatal jaundice (n=100)

Diagnosis	n	%age
Undiagnosed	28	28
Sepsis	22	22
Rh-HDN	16	16
Prematurity	14	14
ABO-HDN	08	08
G6PD deficiency	04	04
Neonatal hepatitis syndrome	04	04
Biliary atresia	02	02
Cephalhematoma	02	02

Table II: Time of appearance of neonatal jaundice (n=100)

Etiology	1st 24 hrs	2-3 days	4-7 days	After 7 days	Total
Idiopathetic	-	16	10	2	28
Sepsis	-	04	16	02	22
Rh-HDN	10	06	-	-	16
Premature	-	-	12	02	14
ABO-HDN	02	06	-	-	08
G6PD deficiency	-	04	-	-	04
Neonatal hepatitis syndrome	-	-	-	04	04
Biliary atresia	-	-	-	02	02
Cephalhematoma	-	02	-	-	02

Table III: Average age on admission with relation of appearance of jaundice (n=100)

Time of appearance of jaundice	n	Average age on admission	Average serum bilirubin (mg/dl)
24 hours	12	01.50 days	22.4
2-3 days	38	04.75 days	18.2
4-7 days	38	07.00 days	17.3
After 7 days	12	12.50 days	14.5

Table IV: Mean and peak bilirubin level due to various causes (n=100)

Etiology	n	Mean mg%	Peak level
Idiopathetic	28	14.2	21.2
Sepsis	22	17.2	23.3
Rh-HDN	16	22.5	28.5
Premature	14	16.4	18.0
ABO-HDN	08	20.5	23.5
G6PD deficiency	04	27.5	31.5
Neonatal hepatitis syndrome	04	12.5	15.5
Biliary atresia	02	14.8	14.8
Cephalhematoma	02	14.9	14.9

Table V: Average bilirubin levels in relation to gestational age and weight (n=100)

n	Gestational age	Average weight(gm)	Average serum bilirubin (mg/dl)
06	< 34 weeks	1400	15.50
08	34-36 weeks	2200	17.07
86	37 weeks & above	2850	16.13

DISCUSSION

In the present study, which was conducted over a period of six months, 100 cases with significant hyperbilirubinemia (>12mg/dl) were admitted in the neonatal unit, which constituted 8.5% of the total admission. This is comparable to the incidence of 4-8% of pathological hyperbilirubnemia reported in a study[11].

The male to female ratio in the present study was 1.5:1. Similar findings of more significant hyperbilirubinemia in males were also reported in a study[12].

Pathological hyperbilirubinemia can be divided into two categories i.e. hemolytic and non-hemolytic. Hemolytic hyperbilirubinemia including Rh and ABO isoimmunization and G-6PD deficiency accounted for 28% cases as compared to non-hemolytic causes which accounted for the remaining 72% cases. This is comparable to the respective incidence of 36.8% and 63.2% as described in a study[11]. The highest peak value of 31.5 mg/dl was seen in a case of G-6PD deficiency.

Idiopathic group with 28 cases (28%) was the commonest group among various causes. This is comparable to the 23% incidence of idiopathic hyperbilirubinemia in Asians living in United States as described by Newman and Easterling et al[14]. In the idiopathic group, patients were neither anemic nor having hepatosplenomegaly, blood groups were compatible, Coomb's tests were negative, blood counts were in the normal range and blood cultures were negative. More than 3/4th (75%) were receiving exclusive breast-feeding. It was reported that 82.7% of the neonates having idiopathic hyperbilirubinemia were on exclusive breast feeding[15],

Sepsis with 22 cases (22%) was the second common cause of jaundice and is comparable with the 25% incidence of septic jaundice in the study conducted by Khan and Ahmad at Mayo Hospital, Lahore[16]. Rh isoimmunization with 16 cases (16%) was the 3rd common cause and is comparable to 15% in the study conducted by Khan[16].

The 4th common cause was prematurity with 14 cases (14%) in the present study and is comparable with 16.7% in another study[17]. ABO incompatibility was present in 8(8%) cases. It is comparable to the 5% incidence in the study conducted by Khan[16]. Direct Coomb's test was positive in 2 cases only. In rest of the cases, diagnosis was made on ABO blood group incompatibility.

The spectrophotometeric quantification of enzyme is advisable in such circumstances if there is strong clinical suspicion of enzyme deficiency in male babies. It is of interest to note that our local data showed 16 G6PD deficient male babies of a total of 252 enzyme deficient infants[17]. There is considerable evidence to believe that G6PD deficiency in Pakistan is not a rarity as various population based studies have shown a prevalence ranging from 8%[18]. The spectrophotometeric quantification of enzyme is advisable in such circumstances if there is strong clinical suspicion of enzyme deficiency in male babies.

Overall mortality in the present study was 16%, which is comparable to the mortality of 20.5% in a study conducted by Khan[16]. Maximum mortality was seen in septic jaundice, 10 cases (45.45%). In the present study, 4 cases (25%) of Rh incompatibility died due to the development of acute bilirubin encephalopathy. Mortality rate in acute bilirubin encephalopathy is high as described by Connolly and Volpe[13].

CONCLUSION

It was concluded from the study that the incidence of hyperbilirubinemia was 8.5% of the total admissions. Male to female ratio was 1.5:1. In hemolytic group jaundice appeared at the younger age, peak bilirubin levels were higher and were attained at a significant earlier age as compared to non-hemolytic group. Moreover, hemolytic group required phothotherapy at the earlier age and for significantly prolonged period. Similarly exchange transfusion was performed more frequently in this group. Kernicterus developed in two cases of Rh-isoimmunization, due to delayed arrival. Overall mortality in the present study was 16%. Mortality was more observed in septic jaundice, while two cases of Rh-isoimunization also died of kernicterus. One premature baby also expired due to the development of respiratory distress syndrome.

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