AGE OF PRESENTATION OF JAUNDICE IN G6PD DEFICIENT NEONATES

Neelum Ahmad[1], Safia Rahman[2], Samiyah Rahman[3], Muhammad Asghar[4], Noor Rehman[5]

ABSTRACT

Neonatal jaundice is a very common disease in the neonatal period. Glucose-6-phosphate dehydrogenase enzyme deficiency decrease red blood cells (RBCs) membrane defense against oxidants and makes the patients prone to hemolysis and neonatal jaundice. Objective of the study was to determine the age of presentation of jaundice in G6PD deficient neonates.

Methods: it is a descriptive cross sectional study in which 292 jaundiced neonates of age 0 days to 28 days were selected at Department of Pathology, Hayatabad medical Complex, Peshawar. Serum bilirubin level, direct and indirect, blood groups of baby and mother, G6PD decolorization time were done in every neonate with jaundice. Age of the onset of jaundice in G6PD deficient neonates was recorded.

Results: Out of 292 neonates 211 (72.5%) were males, 81 (27.5%) were females. Majority of neonates 274 (94%) age ranged from 0-10 days, while only 17 (6%) neonates were in the age range of 11-20 $\pm$ 3.07507 days. Out of 292 neonates 41(14%) were found to be G6PD deficient. The most common age of appearance of jaundice in G6PD deficient babies was 3 days in 12 (28.12%), 2 days in 9 (22%), 4 days in 10 (24%) babies.

Conclusion: The most common age of presentation of jaundice in G6PD deficient patients was between 2 days to 4 days.

INTRODUCTION

Glucose-6-phosphate dehydrogenase deficiency is an inherited condition due to defect or defects in the gene that code for enzyme, Glucose-6-phosphate dehydrogenase (G6PD).[1] It is also known to be associated with neonatal jaundice, kernicterus and even death.[2]

Neonatal jaundice is a very common disease in the neonatal period. Glucose-6-phosphate dehydrogenase enzyme deficiency decrease red blood cells (RBCs) membrane defense against oxidants and makes the patients prone to hemolysis and neonatal jaundice.[3,4,5]

In Pakistani newborn babies, causes of neonatal jaundice are; physiological jaundice, low birth weight and immaturity, infection, ABO isoimmunization, Rh isoimmunization, enclosed hemorrhage, and miscellaneous (mainly obstructive). About 20-25% of neonatal admissions due to jaundice have been reported from some special care baby nurseries with distressingly high rates of bilirubin encephalopathy[6].

In Pakistan neonatal jaundice is a relatively common physical finding observed in approximately two third of all newborns. It is the second most common cause of hemolytic anemia. [7]

In a study conducted in Thailand, out of two hundred and twenty-five Glucose-6-phosphate dehydrogenase (G6PD) deficient subjects, neonatal jaundice was detected in 85% of patients [8].

The prevalence of neonatal hyperbilirubinemia is twice that of the general population in males who carry the defective gene and in homozygous females. It rarely occurs in heterozygous females [9]. The incidence of severe neonatal hyperbilirubinemia is higher in Asians than in whites.[10]

The aim of the study is to determine the age of presentation of jaundice in G6PD deficient neonates presented at Department of Pathology, Hayatabad Medical Complex, Peshawar.

MATERIAL AND METHODS

It was a descriptive cross sectional study conducted at Department of pathology, Hayatabad Medical Complex, Peshawar from January 2011 to January 2012. After taking informed consent, a sample of 292 patients with prior diagnosis of jaundice from age 0 days to 28 days were selected through non-probability convenient sampling technique. The jaundiced neonates having other causes of jaundice were excluded after investigations e.g Rh and ABO incompatibility. The patient was declared G6PD deficient if glucose-6-phosphate

[1] Hematologist, Khyber Teaching Hospital, Peshawar
[2] Assistant Professor, Khyber Medical College, Peshawar
[3] Demonstrator Pathology, Khyber Medical College, Peshawar
[4] Assistant Professor, Khyber Medical College, Peshawar
[5] Microbiologist KTH Peshawar

Address for correspondence:
Dr. Safia Rahman
Assistant Professor, Department of Pathology Khyber Medical College, Peshawar
Contact #: 0335-9793682
Email: safia.rahman@hotmail.com

dehydrogenase decolorization time is more than 60 minutes (normal range is between 30-60 minutes) using sigma diagnostic G6PD reagent. The data collected was recorded on purposefully designed proforma and analayzed via SPSS version 17.

RESULTS

The study was conducted in Department of Pathology, Hayatabad Medical Complex, Peshawar. A total of 292 neonates with jaundice were included in the study.

Out of these 292 neonates 211 (72.5%) were male while 81 (27.5%) were female. The overall male to female ratio was 2.63: 1 (Figure No. 1).

Out of these 292 neonates 41(14%) were found to be G6PD deficient. (Table No. 2)

The most common age of appearance of jaundice in G6PD deficient babies was 3 days in 12 (28.12%) neonates, followed by 2 days in 09(22%) neonates, 4 days in 10(24%) babies. The break up of age reveals that 31(75%) babies developed jaundice between 2 to 4 days age. Five days in 3 (6.25%) babies, 7 days in 2(4.87%) babies, 1 day in 3 (6.25%) babies, 9 days and 12 days in 1 (31.25%) each baby respectively (Table No. 3).

Out of 292 babies, jaundice was noticed on second day of life in majority 93 (32%) babies. In 90(31.5%) babies on 3rd postnatal day, in 35 (12%) babies on 4th day, in 35 (12%) babies on 1st day of life, in 17 (6%) on 5th day, in 6 (2%) babies on 9th postnatal day, in 4 (1.5%) neonates on 7th day, in 3 (1%) neonates on 8th postnatal day and in 1 (0.5%) baby, jaundice appeared on 6th, 10th, 11th, and 12th postnatal day respectively (Table No. 4).

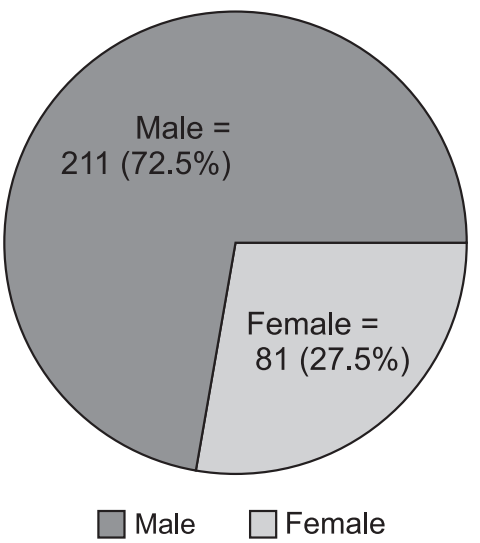

Figure No 1: Sex-Wise Distribution of Patients (n=292)

Table no. 2: Frequency of G6pd Deficiency in Neonatal Jaundice (n=292)

Frequency	No. of Cases	Percentage
Normal	251	86%
G6PD deficient	41	14%
TOTAL	292	100%

Table No. 3: Age of Onset of Jaundice In G6pd Deficient Neonates (N=46)

Age of onset	No. of Cases	Percentage
03 days	12	28.12%
02 days	9	22%
04 days	10	24%
05 days	03	6.25%
07 days	02	4.87%
08 day	03	6.25%
09 days	01	3.12%
12 days	01	3.12%
TOTAL	41	100%

Table No. 4: Age of onset of Jaundice in all Neonates with Jaundice (n=292)

Age of onset	No. of Cases	Percentage
2nd day	94	32%
3rd day	91	31.5%
4th day	36	12%
1st day	36	12%
5th day	19	6%
9th day	06	02%
7th day	04	1.5%
8th day	03	1%
6th day	01	0.5%
11th day	01	0.5%
12th day	01	0.5%
TOTAL	292	100%

Table no. 9: Serum Bilirubin levels in Neonates with Jaundice (n=292)

Minimum serum bilirubin level	Maximum serum bilirubin level	Mean serum bilirubin level	Standard deviation
6.80 mg/dl	43.10 mg/dl	18.27 mg/dl	+ 7.04421

In 292 neonates with jaundice, minimum serum bilirubin level was 6.80, maximum was 43.10 with mean serum bilirubin of 18.2750 $\pm$ standard deviation of 7.04421 (Table No. 9).

DISCUSSION

Neonatal jaundice is the most common medical problem affecting babies in the first week of life.[11] Jaundice in the newborn is a problem because elevation of serum bilirubin is potentially toxic to infant's developing central nervous system.[12] An elevation of serum bilirubin concentration is often detected during the first several days of life. Sixty five percent of newborn are clinically jaundiced.[13]

G6PD deficiency is the second most common cause of hyperbilirubinemia and hemolytic anemia in our country.[14]

The children who are G6PD deficient may present in the later life with chronic hemolytic anemia or acute hemolytic crisis if they are exposed to certain oxidant drugs or chemicals.[15] To prevent all these complications G6PD status of the person must be known.[16]

In this study of 292 neonates with jaundice, the frequency of G6PD deficiency was 14%. It correlates with the studies done by Khan A et al[17] who reported a frequency of 13% and Rehman G et al[18] reported its frequency as 14%.

In 292 neonates with jaundice, the age at presentation of jaundice and admission to the hospital ranged from 1 to 12 days, while the commonest age of onset of jaundice ranged from 24 to 96 hours (2-4 days) of life. Almost similar results were obtained by other worker like Hamid MH et al.[19] and Uko EK et al[20], Ding G et al.[21] Kaplan M et al[22] mentioned in his study that the commonest age of appearance of jaundice due to G6PD deficiency is in early neonatal life.

Males were affected more than females in our study. Overall 72.5% were male while 27.5% were females with male to female ratio of 2.6: 1. Muzaffer MA et al[23] states the same figure in his study. This ratio slightly lower than the figure mentioned by Rehman G et al[18] in his study, which states it 9.5:1. This observation further supports the X-linked recessive mode of inheritance of this enzymopathy. The occurrence in female is possible due to being homozygous for G6PD deficiency.[24]

In our study mean serum bilirubin level was 19.14 gm/dl, while Mahajan G et al[25] has reported mean serum bilirubin level of 16.6 mg/dl in his study.

Every neonate presenting with jaundice in first week of life should be screened for G6PD deficiency by medical community.

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