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Original Research Article

Clinico-etiological profile of neonates with jaundice in a tertiary care hospital of Northernmost India

Bashir U. Zaman[1]*, Parvez Ahmed Lone[1], Irtika[2], Naseer Yousuf Mir[3]

[1]Department of Pediatrics, Government Medical College Srinagar, Jammu and Kashmir, India
[2]Department of Obstetrics and Gynecology, Government Medical College Srinagar, Jammu and Kashmir, India
[3]Department of Pediatrics, Government Medical College, Handwara, Jammu and Kashmir, India

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***Correspondence:**
Dr. Bashir U. Zaman,
E-mail: drbashiruzaman@gmail.com

ABSTRACT

Background: Neonatal jaundice is the most common problem in the first week of life leading to delayed hospital discharges and readmissions. Recognizing early neonatal hyperbilirubinemia plays a pivotal role in preventing serious complications. The aim of this study was to study the clinical profile and etiological factors leading to neonatal jaundice.
Methods: This prospective observational study was conducted in the neonatal intensive care unit (NICU), department of pediatrics, government medical college, Srinagar, Jammu and Kashmir, India over a period of 6 months (August 2023 to January 2024). A total of 400 cases were enrolled for the study. Data collection was done by history taking, clinical examination and relevant laboratory investigations.
Results: In this study, out of 400 jaundiced neonates, 236 (59%) were males and 164 (41%) were females, 342 (85.5%) were born at term and remaining 58 (14.5%) were preterm babies. Among 400 neonates studied, majority (80%) had birth weight ≥2500 gm. Only 80 (20%) had birth weight less than 2500 gm. Physiological jaundice was seen in 162 (40.5%) of the total cases. This was followed by ABO incompatibility (20%), Rh incompatibility (16.5%), sepsis (8%), idiopathic (5%), prematurity (4%), cephalhematoma (4%) and breastfeeding jaundice (2%).
Conclusions: This study concludes that physiological jaundice is the most common cause of neonatal jaundice in our hospital. This was followed by ABO incompatibility, Rh incompatibility and sepsis. This highlights the importance of appropriate monitoring of neonates with these underlying risk factors.

Keywords: ABO incompatibility, Neonatal hyperbilirubinemia, Physiological jaundice, Rh incompatibility

INTRODUCTION

Jaundice is yellowish discoloration of the skin, sclera and mucous membranes resulting from deposition of bilirubin. Neonatal jaundice is defined as total serum bilirubin greater than 5 mg/dl.[1] Jaundice is the most common problem in the first week of life worldwide. It is observed in 60% of full-term infants and 80% of preterm babies in the first week.[2] Jaundice is also the commonest reason for delayed hospital discharge and readmissions in the first week of life.[3,4] Newborns especially preterm babies have higher rates of bilirubin production than full term because they have red cells with higher turnover and shorter life span.[5]

Neonatal hyperbilirubinemia occurs due to a variety of factors. It may be physiological or pathological. Physiologic hyperbilirubinemia is seen in neonates due to multiple factors.[6,7] Neonates especially preterm babies have higher rates of bilirubin production due to increased number of red cells with a shorter life span prone for

hemolysis. Also, neonates have increased enterohepatic circulation due to decreased gastrointestinal tract motility during initial few days of life, causes bilirubin reabsorption. Physiologic volume restriction due to the low volumes of breast milk is also seen in neonates. Introduction of delayed cord clamping can also be a risk factor. Few pathological causes of hyperbilirubinemia in neonates are ABO incompatibility, rhesus incompatibility, sepsis, asphyxia, and exposure to hemolytic agents. However, the etiology of neonatal hyperbilirubinemia may remain obscured in more than half of the cases.[8]

Although, only 5-10% of the newborns need to be treated due to pathological hyperbilirubinemia, the threat of neurologic damage always remains, especially with very high bilirubin level, in presence of certain risk factors and in cases where management remains inappropriate.[9,10] Severe neonatal jaundice has the potential to cause bilirubin encephalopathy which can further lead to permanent and chronic neurologic sequelae. Survivors suffer from severe neurological handicaps, such as cerebral palsy, gaze palsies and deafness.[3,4] Sequela is not reversible but it can be prevented by early diagnosis and appropriate neonatal jaundice management. Identification of etiological and risk factors is of utmost importance for the management of neonatal jaundice. The incidence, etiological and contributory factors in neonatal jaundice vary according to ethnic and geographic differences.[11] As a result of racial, cultural and environmental differences, in developing countries, these factors may be different from those of developed nations. To identify additional risk factors that may be particular, the need for more robust epidemiological studies in low- and middle-income studies was highlighted.[12] Present study was undertaken to study the clinical profile and etiological factors leading to neonatal jaundice at our tertiary care centre.

METHODS

This prospective, observational study was conducted in the NICU, department of pediatrics, government medical college, Srinagar, Jammu and Kashmir, India. The study was conducted over a period of 06 months (August 2023 to January 2024). A total of 400 cases were enrolled for the study. Proper approval was taken from institutional ethical committee.

Inclusion criteria

Neonates with jaundice admitted in NICU or neonatology ward during study period, with serum bilirubin more than 10 mg/dL were included.

Exclusion criteria

Neonates with jaundice not admitted in NICU, attending outpatient department only, neonates with jaundice opted discharge against medical advice and parents not willing to participate in this study were excluded.

The purpose of the present study was explained to parents and a written consent was taken for participation. Detailed history was taken for all babies along with maternal, antenatal and delivery details. Thorough physical examination was done and the relevant investigations were carried out. General data including age, birth weight, age at detection of jaundice, breast feeding status, family history of jaundice was noted. Jaundice was ascertained by clinical methods. This was confirmed with the help of biochemical tests. Serum bilirubin was estimated by Van den Bergh method. Further investigations were not carried out on those babies who were having physiological jaundice. Blood grouping and Rh typing of baby and mother were done. Cord blood bilirubin and haemoglobin, direct Coomb's test (DCT) and bilirubin monitoring were done whenever there was a setting for Rh incompatibility. In case of ABO incompatibility, DCT was done and bilirubin monitored. Other investigations like haemoglobin level, peripheral smear and reticulocyte count were done when indicated. If these tests showed features of haemolysis and there was no blood group incompatibility, G6PD assay, sickling test, haemoglobin electrophoresis and osmotic fragility test were done wherever appropriate. G6PD was done by fluorescent technique, 2% sodium metabisulphite was used for sickling test. Osmotic fragility test using serial dilutions of sodium chloride was done. Neonates who were suspected to have sepsis were investigated by complete blood count, septic screen and blood and urine cultures.

Results were expressed as percentages and ratios.

RESULTS

There was no comparative group in this study.

During study period, 400 newborns were considered for present study, as they were satisfying inclusion and exclusion criteria. Out of 400 jaundiced neonates, 236 (59%) were males and 164 (41%) were females as depicted in Figure 1.

Among 400 newborns studied, 342 (85.5%) were born at term gestation and the remaining 58 (14.5%) were preterm babies as shown in Table 1.

Table 2 shows that out of 400 newborns included in this study, majority of the babies had birth weight ≥2500 gm (80%). Only 40 babies had birth weight <2500 gm (20%).

Table 3 shows that physiological jaundice constituted the major (40.5%) etiological factor in neonatal jaundice. This was followed by ABO incompatibility which constituted 20%. of these 50% were due to OA incompatibility and 50% were due to OB incompatibility. Other common causes were Rh incompatibility (16.5%),

sepsis (8%), idiopathic (5%) and prematurity (4%). Neonatal jaundice was attributed to cephalhematoma in 16 (4%) cases. Breastfeeding jaundice was found in 8 (2%) cases.

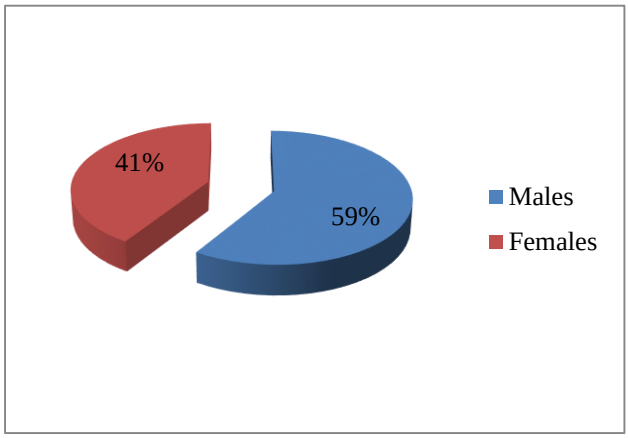

Figure 1: Sex distribution of neonates with Jaundice, (n=400).

Table 1: Distribution of Jaundiced neonates according to gestational age, (n=400).

Gestational age (weeks)	N	Percentage (%)
>37	342	85.5
34-36	38	9.5
30-34	20	5
Total	400	100

Table 2: Distribution of jaundiced neonates according to birth weight, (n=400).

Birth weight (gm)	N	Percentage (%)
1000-1499	20	5
1500-2499	60	15
≥2500	320	80
Total	400	100

Table 3: Etiology of neonatal jaundice.

Etiology	N	Percentage (%)
Physiological jaundice	162	40.5
ABO incompatibility	80	20
Rh incompatibility	66	16.5
Sepsis	32	8
Idiopathic	20	5
Prematurity	16	4
Cephalhematoma	16	4
Breastfeeding jaundice	8	2
Total	400	100

DISCUSSION

Neonatal jaundice is one of the most common causes of hospitalization of neonates in the first month after birth. In most cases, neonatal jaundice is transient and usually resolving at the end of the first week after birth. But when severe hyperbilirubinemia is present, there is a potential risk for acute bilirubin encephalopathy and kernicterus. This can lead to death in the first months, and infants who are still alive often suffer from mental retardation, movement and balance disorders, seizures, hearing loss at high frequencies, and speech impairment. So, timely diagnosis and treatment of neonatal jaundice are very important to prevent further complications.

In this study, out of the total 400 neonates with jaundice, 59% were males and only 41% were females. The results match the earlier studies done by Effiong et al, Narang et al and Korejo et al where majority of the babies were males.[13-15] Majority of the babies studied were of term gestation. Only 14.5% were born preterm. A higher percentage of premature babies was found in studies done by Bhutani et al and Singhal et al.[16,17] In the present study, majority of the babies had birth weight ≥2500 gm. Only 20% of the babies had birth weight less than 2500 gm. As our study had 85.5% term babies, majority (80%) had normal birth weight.

In this study, physiological jaundice was found to be the major etiological factor i.e., 162 out of the total 400 babies (40.5%). This is in concordance to the study done by Bahl et al, wherein the physiological jaundice was observed in majority of the patients (63.8%).[18] Studies done by Singhal et al and Merchant et al observed physiological jaundice in 16.7% and 25.3% of the total cases respectively.[17,19] This was followed by ABO incompatibility as the second leading cause of neonatal jaundice in our study (20%). This is in concordance to the studies done by Verma et al and Merchant et al, wherein ABO incompatibility contributed to 22.6% of the cases.[19,20] The number of OA and OB incompatibility cases was equal in this study. Bahl et al had reported a higher incidence of OA incompatibility (60%) whereas Bajpai PC et al had observed higher percentage of OB incompatibility.[18,21] After ABO incompatibility, Rh incompatibility was found to be responsible for 16.5% of the total cases. Bajpai PC et al reported an incidence of 1.6% for Rh incompatibility while Verma et al observed Rh incompatibility in 9.8% of the total cases. Thus, ABO incompatibility was more prevalent than Rh incompatibility. This is in concordance with older studies done abroad.[22,23] Similar findings were reported from India too.[17,19,20]

In this study, sepsis constituted 8% of the total cases studied. This is in concordance to earlier studies which showed a similar trend. Sepsis was found to be the cause of neonatal jaundice in 8% of neonates by Merchant et al, 11.6% by Verma et al and in 9.6% of neonates by Narang et al.[19,20,14] No known cause could be established in 5% of the total causes. Studies done by Singal et al and Bahl et al observed that idiopathic jaundice was present in 8.8% to 57% of the total cases.[17,18] Prematurity as a cause of neonatal jaundice was found in 4% of the total cases. Cephalhematoma was 4% of the cases with neonatal

jaundice. This is comparable to the study done by Narang et al which found that cephalhematoma was responsible for 6.3% of the total cases with neonatal jaundice.[14] There were 8 (2%) cases of breastfeeding jaundice which regressed after improving the frequency of breastfeeding.

Limitations

There were some limitations to this study. It is well known that there may be marked geographic variations in the pattern of etiological factors in neonatal jaundice. Therefore, our findings may not be reflective of the pattern in other regions. Another drawback was that some etiological factors leading to neonatal jaundice like Gilbert syndrome and Criggler-Najar syndrome were not investigated. Hence there is a possibility that some of the cases classified as idiopathic may have this underlying diagnosis.

CONCLUSION

This study concludes that physiological jaundice is the most common cause of neonatal jaundice in our hospital. This is followed by ABO incompatibility, sepsis, Rh incompatibility and idiopathic cases. Less common causes are cephalhematoma, breast feeding jaundice and haemolytic anaemia. Understanding the aetiological and risk factors for neonatal jaundice in our setting helps in prioritizing the group of neonates who require more intensive monitoring for early identification and timely management of this condition.

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