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Clinico-etiological profile of neonates admitted with jaundice in a tertiary care NICU of Central India

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ABSTRACT

Background: Hyperbilirubinemia is a common problem and, in most cases, a benign problem in neonates. Jaundice is observed during the 1st week of life in approximately 60% of term infants and 80% of preterm infants.

Methods: In present study, total 187 newborns were enrolled prospectively over one and half year of study period from November 2015 to April 2017. Detailed patient information was taken at the time of admission in NICU. In this study all the newborns with age less than 28 days were included who had clinical jaundice, ascertained by Kramer's criteria and confirmed by biochemical methods. The investigations done were Serum bilirubin (total, direct and indirect) complete blood picture, reticulocyte count, G6-PD estimation (qualitative), Coombs' test, peripheral smear examination, blood group (ABO,Rh) of the mother and baby, CBC,CRP, thyroid function test.

Results: Total 187 newborns were enrolled for study. Maximum number of the babies have a pathological jaundice 108 (57.7%) whereas 79 (42.24%) were found to have exaggerated physiological jaundice. The commonest causes of pathological jaundice were found to be septicemia 63 (33.68%) followed by ABO incompatibility 25 (13.36%). Most of the babies had onset of jaundice between 24-72 hours (86.6%).

Conclusions: Health care providers working with neonates play a key role in identifying and assessing neonates at risk for pathologic jaundice. Parents counseling is required for bringing their babies early to healthcare centre preventing acute bilirubin encephalopathy and subsequent kernicterus.

Keywords: Hyperbilirubinemia, Jaundice, Neonates, NICU

INTRODUCTION

Hyperbilirubinemia is a common problem and, in most cases, a benign problem in neonates. Jaundice is observed during the 1st week of life in approximately 60% of term infants and 80% of preterm infants. The serum bilirubin level varies with birth weight, gestational age, chronological age and internal milieu of the body. When total serum bilirubin (TSB) level exceeds a critical limit, it crosses the blood brain barrier. ²

Neonatal hyperbilirubinemia (NNH) is a frequently encountered problem. Although, up to 60 percent of term new-borns have clinical jaundice in the first week of life, few have significant underlying disease.³ Bilirubin is not a bad molecule in itself but bilirubin, like uric acid, is an important antioxidant circulating in blood of new-born. However, very high bilirubin levels might be toxic for central nervous system development and can cause behavioural and neurological impairment (neurotoxicity or Kernicterus) in new-borns. 5-10% of new-borns, who

developed jaundice, required the management of hyperbilirubinemia. Some of the common causes of neonatal jaundice include physiological jaundice, breast feeding or non-feeding jaundice, breast milk jaundice, prematurity leading to jaundice and various pathological causes like hemolytic disease, liver dysfunction, neonatal sepsis, deficiency of glucose-6-phosphatase (G6PD) enzyme, Rh-incompatibility, hypothyroidism and rare conditions such as Gilbert's syndrome, Crigler-Najjar syndrome etc.⁴ The present study was conducted to assess the clinic-etiological profile of neonates admitted with jaundice in our NICU and to compare the result with current published national and international data.

METHODS

In present study, patients were enrolled prospectively over one and half year of study period from November 2015 to April 2017. Detailed patient information was taken at the time of admission in NICU. Study was done in Department of Paediatrics, People's College of Medical Sciences and Research Centre Bhopal, after getting informed consent from parents. Study was approved by institutional Ethics Committee. In this study all the new-borns with age less than 28 days were included who had clinical jaundice, ascertained by Kramer's criteria and confirmed by biochemical methods. Pre-defined proforma was filled to record antenatal, natal, postnatal history and thorough clinical examination. The investigations done were Serum bilirubin (total, direct and indirect) complete blood picture, reticulocyte count, G6-PD estimation (qualitative), Coombs' test, peripheral smear examination, Blood group (ABO, Rh) of the mother and baby, CBC, CRP, thyroid function test. Data was entered in excel sheet, cleaned and coded. Percentage were computed for categorical variables. Comparison was done by student t- test.

RESULTS

During the one and half years of study, total 187 newborn were enrolled. Three new-borns (1.6%) were born

with gestational age less than 32 weeks. Maximum number of the babies 126 (67.4%) were born between gestational age of 32-37 weeks and 58 (31%) were born as full-term babies (>37 weeks). Majority of the babies 121 (64.70%) were low Birth weight babies. Majority of the babies 118 (63.24%) were having a total bilirubin levels of <15, followed by 63 babies (33.69%) were having a total bilirubin levels in range of 15-20 (Table 1).

Table 1: Distribution of babies according to bilirubin level.

Total Bilirubin levels mg/dl		Frequency	Percent
	10-15	118	63.24
Total Bilirubin levels	15-20	63	33.69
	20-25	1	0.05
	>25	5	2.6
	Total	187	100.0

Table 2: Distribution according to causes of jaundice.

Causes of Jaundice	Frequency	Percentage
Physiological	79	42.24
Septicemia	63	33.68
ABO incompatibility	25	13.36
Rh incompatibility	10	5.27
Infant of Diabetic mother	6	3.20
Hypothyroidism	3	1.60
Breast milk jaundice	1	0.53

Table 3: Distribution according to onset of jaundice.

		Frequency	Percent
Onset of Jaundice	<24 hours	3	1.6
	24-72 hours	162	86.6
	>72 hours	20	10.7
	> 7 days	2	1.1
	Total	187	100.0

Table 4: Common clinical features associated with jaundice.

Symptoms				
General	Hypothermia	Hyperthermia	Poor feeding	Hypoglycemia
	40	35	15	20
CNS	Lethargy	Abnormal moro's reflex	Seizures	Hypotonia
	30	18	3	10
CVS	Tachycardia	Bradycardia	Cold clamy skin	Crt> 3sec
	50	10	32	21
Respiratory	Apnea	Grunting	Nasal flaring	Cynosis
system	4	22	43	12
GIT	Diarrhoea	Vomiting	Abdominal distension	Hepatomegaly
	4	27	18	9

No significant difference was found between the male (54.54%) and female (45.94%) group with respect to distribution of bilirubin levels. Maximum number of the babies have a pathological jaundice 108 (57.7%) whereas 79 (42.24%) were found to have exaggerated Physiological jaundice.

The commonest causes of pathological jaundice were found to be septicemia 63 (33.68%) followed by ABO incompatibility 25 (13.36%) (Table 2).

Most of the babies had onset of jaundice between 24-72 hours (86.6%) followed by >3-7 days (10.7%) (Table 3).

In both physiological and pathological jaundice, most of the babies were LBW (70.88% and 69.44% respectively) and preterm (67.08% and 63.8% respectively). Majority of babies, on general examination were found to have hypothermia, followed by hyperthermia, hypoglycaemia and poor feeding.

On systemic examination (of CNS) lethargy was the commonest symptom whereas CVS examination showed tachycardia as the commonest sign. Respiratory system examination revealed Nasal flaring as the commonest clinical feature (Table 4).

In our study 3 babies developed kernicterus. Common symptoms were found in these babies were lethargy followed by hypotonia, opisthotonus, abnormal moro's reflex, poor feeding and seizures.

DISCUSSION

In the present study, in majority of the babies, neonatal hyperbilirubinemia is a common problem in neonates with an incidence of about 60% in term babies and 80% in preterm babies. It is the commonest cause of admission to the hospitals in the new-born period.¹

In the present study, as per gestational age 126 (67.4%) were preterm and 58 (31%) were full term delivered babies which was comparable to study by other authors, but study by Ali et al reported that as per the gestational age, physiological jaundice was more common in the healthy full-term babies which is in contrast to the present study.⁵⁻⁷ 64.70% were born as low birth weight babies (<2.5 kg), which was comparable to study by Rasul et al.⁹ Majority of the babies 118 (63.24%) were found to have a total bilirubin levels of <15mg%, followed by 63 babies (33.69%), which were having a total bilirubin levels in range of 15-20mg% which was comparable to study by Jamir et al.¹⁰

In the present study (42.24%) babies were having physiological jaundice whereas (57.7%) were found to have pathological jaundice. Jamir et al did a similar study but result was contradictory. Similar incidence were also reported by Bahl et al. 11

Other studies reported incidence of physiological jaundice respectively as Singhal et al (16.7%) and Merchant et al (25.3%), which were lower than the present study.^{7,12} In the study by Bedowra et al physiological jaundice contributes to 53.3% as the most common cause in their study. It was marginally higher as compared to our study.¹³

Most common etiological factor for pathological neonatal hyperbilirubinemia was found to be septicaemia (33.68%) followed by ABO incompatibility (13.36%). This result were not similar with Jamir et al, who reported that the most common etiological factor for pathological neonatal hyperbilirubinemia was due to deficiency of enzyme G6PD (12%) followed by prematurity (8.7%) and sepsis (5.3%). In another study by Ali et al reported that the etiological factors in the causation of jaundice in the decreasing order of frequency were physiological (28%), ABO incompatibility (24.4%), Rh incompatibility (13.6%), much higher rate of ABO incompatibility (28%-51%) was reported by other authors. 8,14-16

We observed that most of the babies had onset of jaundice between 24-72 hours (86.6%) followed by (10.7%) babies in which onset was >72 hours. This observation is consistent with the study by Ali et al reported that the onset of jaundice was seen maximum between 24-72 hours (58%), followed by age group 72 hours-14 days (32%).⁸ The results in the present study are also similar to work done by Anand et al, where the highest incidence of jaundice was on 3rd (45%) post-natal day followed by 4th day (35.5%).¹⁷

CONCLUSION

Health care providers working with neonates play a key role in identifying and assessing neonates at risk for pathologic jaundice. Parents counselling is required for bringing their babies early to healthcare centre preventing acute bilirubrubin encephalopathy and subsequent kernicterus.

Clinicians need a systematic approach to identify the infants who may develop severe hyperbilirubinemia and keep them in follow up. Slightly higher incidence of septicaemia than the other causes in our study may reflect the lacunae in maintaining asepsis at natal and postnatal practices in developing countries.

To conclude, neonatal jaundice should be identified and assessed in babies within 24-72 hours after birth, especially in preterm and low birth weight babies to avoid life threatening and disabling complication of kernicterus.

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Institutional Ethics Committee

REFERENCES

- Kliegman RM, Behrman RE, Jensen HB, Stranton B. Neonates for early diagnosis and prevention of adverse consequence of neonatal hyperbilirubinemia Nelson Textbook Pediatrics. Elsevier; 2012:603-12.
- 2. Brown AK, Damus K, Kim MH. Factors relating to readmission of term and near-term neonates in the first-two weeks of life. J Perinat Med 1999;27(4):263-75.
- IAP-NNF guidelines 2006 on level II neonatal care. Jaundice in newborn; 2006;187-210. Available at: www.ijrr.com
- 4. Chib R, Bhandari B. Clinico-demographic profile of hyperbilirubinemia in neonates admitted to a tertiary care hospital. Int J Contemp Pediatr. 2016;3(2):328-33.
- Bhutani VK. Evidence based issues regarding neonatal hyperbilirubinemia. Pediatr Rev. 2005:114:130-53.
- Bajpai PC, Mishra PK, Agarwal M. An etiological study of neonatal hyperbilirbinemia. Indian J Pediatr. 1971;38:424-9.
- 7. Singhal PK, Singh M, Paul VK, Deorari AK, Ghorpade MG. Spectrum of neonatal hyperbilirubinemia: An analysis of 454 cases. Indian Pediatr. 1992;29:319-25.
- 8. Ali A, Tomar A. Etiological profile of neonatal hyperbilirubinaemia in the rural area of Rajasthan. Indian J Basic Applied Med Res. 2015;4(2):223-32.
- 9. Rasul CH, Hasan MA, Yasmin F. Outcome of neonatal hyperbilirubinemia in a tertiary care hospital in Bangladesh. Malaysian J Med Sci. 2010;17(2):40-4.
- 10. Jamir S, Ngangom AS. A study of neonatal hyperbilirubinemia in a tertiary care hospital in the

- north eastern region of India. Int J Cur Res Rev. 2016;8(20):26-9.
- Bahl L, Sharma R, Sharma J. Etiology of neonatal jaundice at Shimla. Indian J Pediatr. 1994;31:1275-8.
- 12. Merchant RH, Merchant SM, Babar ST. A study of 75 cases of neonatal jaundice. Indian Pediatr. 1975;12:889-93.
- 13. Zabeen B, Nahar J, Nabi N, Baki A, Tayyeb S, Azad K, et al. Risk factors and outcome of neonatal jaundice in a tertiary hospital. Ibrahim Med Coll J. 2010;4(2):70-3.
- 14. Sgro M, Campbell D, Shah V. Incidence and causes of severe neonatal Hyperbilirubinemia in Canada. CMAJ. 2006;175(6):587-90.
- 15. Heydarian F, Majdi M. Severe neonatal hyperbilirubinemia; causes and contributing factors leading to exchange transfusion at Ghaem Hospital in Mashhad. Acta Medica Iranica. 2010;48(6):399-402.
- Joshi BD, Dharan, Nepal HR, Mahato D. Bilirubinemia in term babies at B. P. Clinicolaboratory profile of neonatal hyper. JNHRC. 2004;(2):30-32.
- 17. Anand JS, Magotra ML. Neonatal jaundice: its incidence and etiology. Indian Paediatr. 1978;15:155-60.

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