Original Research Paper

Volume - 12 | Issue - 10 | October - 2022 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Paediatrics

CLINICAL PROFILE AND OUTCOME OF NEONATAL JAUNDICE: A TERTIARY CARE CENTER EXPERIENCE

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ABSTRACT **Background:** Neonatal jaundice is a leading cause of hospital admission and re-hospitalization in the first week of life globally. Timely and appropriate treatment is important to prevent serious complications. The present study was conducted to assess the clinical profile, various risk factors associated with development of neonatal jaundice and its outcome. Material & **Methods:** This was a prospective observational study of 300 neonates with jaundice admitted in neonatal intensive care unit of tertiary care hospital over a period of 15 months. Detailed history, physical examination and laboratory work-up were done. The data collected was entered in MS excel, compiled, analyzed and subjected to statistical tests done using SPSS. **Results:** In the present study 300 newborns were included, out of which 58% were males and 42% were females. Out of 300, 64% of neonates born at term, 36% were preterm. Out of 300, cause of jaundice was physiological in 71.30% while pathological in 28.70%. The most common etiological factor for pathological jaundice was due to ABO incompatibility in 9.7%, followed by cephalohematoma 5.3%, Rh incompatibility 5% and sepsis 5%, birth asphyxia 0.7%, while in 3% of cases the etiology could not be found. Phototherapy was the most common treatment and was used in 28.7% of neonates, 3.3% received both phototherapy and exchange transfusion. Out of 300, 292 neonates were discharged after improvement and there were 8 mortalities. **Conclusion:** Our study concluded that physiological jaundice accounted for the bulk of cases of neonatal jaundice, this was followed by ABO incompatibility, cephalohematoma, Rh incompatibility. This denotes the importance of monitoring of neonates with this underlying risk factor for an early diagnosis and decreases the morbidity, mortality associated with neonatal jaundice. Phototherapy is an effective in most cases but exchange transfusion should also be considered, when it failed.

KEYWORDS : Neonatal jaundice, Pathological jaundice, ABO incompatibility, Rh incompatibility

INTRODUCTION

Neonatal jaundice is the most common problem in the first week of life worldwide. It is observed in 60% of term neonates and 80% of preterm babies in the first week of their life[1]. It is a leading cause of hospital admission and re-hospitalization[2,3]. Although, only 5–10% of the newborns needs treatment due to pathological jaundice. Etiology of hyperbilirubinemia is not only important for optimal management of the neonates but also it may have implications for subsequent pregnancies. Hemolytic disease of the newborn (HDN) is one of the most common pathologic cause of jaundice during the early neonatal period, mostly due to Rhesus (Rh) incompatibility, ABO incompatibility, G6PD deficiency, and rarely due to other alloimmune antibodies. Timely and appropriate treatment with phototherapy and/or exchange transfusion are effective in reducing excessive bilirubin levels in the affected infants[4,5]. Otherwise, severe hyperbilirubinemia may progress to acute bilirubin encephalopathy (ABE) or kernicterus with a significant risk of morbidity and mortality in newborns[6]. The present study was conducted to assess the clinical profile, various risk factors associated with development of neonatal jaundice and its outcome.

MATERIAL & METHODS:

This prospective observational study was conducted in the department of paediatrics, Dr.V.M. Goverenment Medical College, Solapur, Maharashtra, India over a period of 15 months of duration. The study was approved by the ethical committee of Dr.V.M. Goverenment Medical College, and Shri.C.S.M. General Hospital, Solapur, Maharashtra, India.

A total of 300 inborn neonates were admitted in NICU with jaundice were included in the study. Outborn babies, neonates having surgical causes of jaundice were excluded from the study. Patients were enrolled within the study after taking written and informed consent from parents. Detailed history was taken. General data including age, birth weight, age at detection of jaundice, breast feeding status, family history of jaundice, maturity, cephalhematoma, and presence of acute bilirubin encephalopathy (ABE) were noted. Thorough clinical examination of every neonate was carried out and all the necessary investigations for hyperbilirubinemia were carried out. Further investigations were not carried out on those babies who were having physiological jaundice. Blood grouping and Rh typing of neonate and mother were done. Cord blood haemoglobin and bilirubin, 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. 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. Diagnosis of sepsis was done when blood culture is positive for organism or sepsis screen was positive (any two of the five screen parameters, total leukocyte count <5000/mm^3, reduced absolute neutrophil count, immature to total neutrophil ratio ≥20%, CRP ≥10 mg/L and raised micro-ESR of ≥15 mm in first hour). Babies were treated according to need by phototherapy and exchange transfusion.

The data collected was entered in MS excel, compiled, tabulated, analyzed and subjected to statistical tests done using SPSS. The data collected was evaluated using standardized statistical methods i.e. Mean, Standard Deviation, Pearson Chi-square test in order to derive a logical conclusion.

RESULTS

Results were expressed as percentages and ratios. A total of 300 neonates met the inclusion criteria admitted for jaundice during the study period. Out of these, 58% were males and 42% were females. Out of 300 study subjects, majority of neonates 56.3% were admitted between fourth to seventh day of life, followed by 37.4% neonates admitted between 24 to 72 hours of life, followed by 6% neonates admitted within 24 hours of life and only 0.3% of neonates was admitted beyond seventh day of life. Among 300 jaundiced neonates, 64% were born at term and the remaining 36% were preterm babies. Out of 300 neonates studied, majority had birth weight more than 2500gms were 50.3%, 48% neonates were low birth weight (LBW) (1500 to < 2500) and only 1.7% were very low birth weight (VLBW).

Neonatal jaundice was found to be physiological in 71.3% while 28.7% cases were pathological. The most common etiological factor for pathological neonatal jaundice was due to ABO incompatibility 9.7%. This was followed by cephalohematoma 5.3%, Rh incompatibility 5% and sepsis 5%. Lesser common cause was birth asphyxia 0.7% while in 3% of cases the etiology could not be found (Table 1). Mean total serum bilirubin (TSB) was maximum amongst

Rh incompatibility 22.73±5.65 mg/dL followed by cephalohematoma 17.38±1.75 mg/dL, idiopathic 17.33±1.94 mg/dL, ABO Incompatibility 17.1±2.54 mg/dL, sepsis 16.8±1.86 mg/dL and birth asphyxia 13±4.24 mg/dL. The difference was statistically significant (p value=0.004) (Table 2).

Phototherapy was the most common treatment and was used in all neonates with pathological jaundice(28.7%), mean duration of phototherapy was 2.78 ± 0.76 days. 10 neonates (3.3%) received both phototherapy and blood exchange transfusion. All the neonates who received blood exchange transfusion suffered from Rh incompatibility. In the present study, the mean TSB before phototherapy was 17.17 ± 2.66 mg/dL while mean TSB after phototherapy was 3.34 ± 1.04 mg/dL and the difference was statistically significant (p value=0.005). Mean TSB before exchange transfusion was 26.0 ± 2.26 mg/dL while mean TSB after exchange transfusion was 5.70 ± 1.57 mg/dL and the difference was statistically significant (p value=0.004) (Table 3). In the present study, 292 neonates (97.3%) were discharged after improvement and there were 8 (2.7%) mortalities. Amongst the mortalities were 6 neonates had sepsis and 2 had birth asphyxia.

Table 1: Different etiological factors in development of neonatal jaundice

Etiological	Frequency	Percent
Physiological Jaundice	214	71.3
ABO Incompatibility	29	9.7
RH Incompatibility	16	5.3
Cephalohematoma	15	5.0
Sepsis	15	5.0
Idiopathic	09	3.0
Birth Asphyxia	02	0.7
Total	300	100

Table 2: Correlation between different etiological factors in pathological jaundice and its mean TSB

Etiological Factors	Number of cases (n=86)	TSB Mean±SD	Percent (%)	p value
Rh Incompatibility	15	22.73±5.65	5.0	0.004
Cephalohematoma	16	17.38±1.75	5.3	
Idiopathic	09	17.33±1.94	3.0	
ABO Incompatibility	29	17.10 ±2.54	9.7	
Sepsis	15	16.80 ±1.86	5.0	
Birth Asphyxia	02	13±4.24	0.7	

Table 3: Total Serum Bilirubin (TSB) in mg/dl before and after therapy

	TSB before Phototherapy	TSB after Phototherapy	TSB before Exchange Transfusion	TSB after Exchange Transfusion
Mean	17.17	3.34	26.00	5.70
Standard deviation	2.66	1.04	2.26	1.57
	p value 0.005		p value 0.004	

DISCUSSION

Neonatal jaundice is a leading cause of hospital admission and re-hospitalization in the first week of life globally. Timely and appropriate treatment is important to prevent serious complications. The present study was conducted to assess the clinical profile, various risk factors associated with development of neonatal jaundice and its outcome.

Of the 300 neonates, majority 58% were males and 42% were females which is comparable to a study conducted by Valiyat S et al[7] where 63% were males and only 37% were females. In the present study, majority 56.3% neonates were admitted between fourth to seventh day of life, followed by 37.4% admitted between 24 to 72 hours of life, followed by 6% within 24 hours of life and only 0.3% neonates were admitted beyond seventh day of life. Contrary to the findings of our study, Jamir et al[8] revealed a higher percentage of neonates 19% admitted within 24 hours of life and 66% beyond seventh day. This was explained by our study group having more of physiological jaundice, which usually occurs between third to seventh day of life. It is well known that there is marked geographic variations in the pattern of etiological factors in neonatal jaundice.

Among 300 jaundiced neonates, 64% were born at term and the remaining 36% were preterm babies. These findings are similar to a study done by Valiyat S et al[7] Jamir et al[8]. Studies by Bhutani et al[9] and Singhal et al[10] had found a higher percentage of premature babies in their studies. Out of 300 neonates studied, majority had birth weight more than 2500gms were 50.3%, 48% neonates were low birth weight (LBW)(1500 to < 2500) and only 1.7% were very low birth weight (VLBW). These findings are comparable to the findings of Jamir et al[8] and D Nepal et al[11] who found most of the babies 51.3% had adequate birth weight.

Neonatal jaundice was found to be physiological in 71.3% while pathological in 28.7% cases. Singhal et al[10] had also shown high incidence of physiological jaundice in their studies. This was followed by ABO incompatibility as the next leading cause of neonatal jaundice of about 9.7%. This is very similar to the findings by Valiyat S et al[7] that ABO incompatibility contributed to 22.6% of cases. Cephalohematoma contributing to jaundice was found in 5.3% of our cases. This is comparable to the study by Valiyat S et al[7] and Narang et al[12] which found an incidence of 6.4% and 6.3%. Rh incompatibility was responsible for 5% of cases in our study. Bajpai PC et al[13] reported an incidence of 1.6% for Rh incompatibility. Our finding is comparable with the study by Singhal et al[10] and Valiyat S et al[7] where Rh incompatibility was present in 8.1% and 8% of neonates. Thus ABO incompatibility was more common than Rh incompatibility. The occurrence of Rh isoimmunization has decreased as a result of the administration of Anti D immunoglobulin to Rh negative mothers. Sepsis constituted 5% of the cases studied. This is in concordance with earlier studies which showed a similar trend. Sepsis was found to be the cause of jaundice in 10% by Valiyat S et al[7] and in 9.6% by Narang et al[12]. No known cause could be established in 9 cases (3%). This finding was consistent with the findings of Mallick PK et al[15] where 4% of cases were idiopathic.

In the present study, the mean TSB was maximum in Rh incompatibility 22.73 ± 5.65 mg/dL followed by cephalohematoma 17.38 ± 1.75 mg/dL, idiopathic 17.33 ± 1.94 mg/dL, ABO Incompatibility 17.1 ± 2.54 mg/dL, sepsis 16.8 ± 1.86 mg/dL and birth Asphyxia 13 ± 4.24 mg/dL. These findings were consistent with the findings of Jamir et al[8].

In the present study, phototherapy was the most common treatment and was used in all neonates with pathological jaundice 28.7%, 3.3% received both phototherapy and blood exchange transfusion. All the neonates who received blood exchange transfusion suffered from Rh incompatibility. Rasul CH et al[15] reported that the most treatment in their study was phototherapy 62.6% while ET was used only in 5.2% cases. 61% patients required only phototherapy in a study conducted by Khaton S et al[16].

Our study, the mean TSB before and after phototherapy was 17.17 ± 2.66 mg/dL and 3.34 ± 1.04 mg/dL. Similar findings by Adhikari et al[17] found that the mean TSB before and after phototherapy was 19.33 ± 3.1 mg/dL and 12.2 ± 2.06 mg/dL. Mean TSB before and after exchange transfusion was 26.0 ± 2.26 mg/dL and 5.70 ± 1.57 mg/dL. This is similar to the study by PiushKanodia et al[18] found that the mean TSB before and after exchange transfusion was 24.12 ± 4.01 mg/dL and 13.51 ± 3.93 mg/dL.

In the present study, 292 neonates (97.3%) were discharged after improvement and there were 8 (2.7%) mortalities. These findings are comparable to the findings of Rasul CH et al[19] there were 2.8% mortalities due to septicemia and birth asphyxia stage III.

CONCLUSION

Our study concluded that physiological jaundice accounted for the bulk of cases of neonatal jaundice, this was followed by ABO incompatibility, cephalohematoma, Rh incompatibility. This denotes the importance of monitoring of neonates with this underlying risk factor for an early diagnosis and decreases the morbidity, mortality associated with neonatal jaundice. Phototherapy is an effective in most cases but exchange transfusion should also be considered, when it failed.

REFERENCES

1. Burke BL, Robbins JM, Mac Bird T, Hobbs CA, Nesmith C, Tilford JM. Trends in hospitalizations for neonatal jaundice and kernicterus in the United States, 1988–2005. Pediatrics. 2009;123(2):524-32.
2. Tomashek KM, Crouse CJ, Iyasu S, Johnson CH, Flowers LM. A comparison of morbidity rates attributable to conditions originating in the perinatal period among newborns discharged from United States hospitals, 1989–90 and 1999–2000. Paediatric and perinatal epidemiology. 2006;20(1):24-34.
3. Hyperbilirubinemia AAoPSo. Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. Pediatrics. 2004;114(1):297.

4. Rennie J, Burman-Roy S, Murphy MS, Group GD. Neonatal jaundice: summary of NICE guidance. BMJ. 2010;340(7757):c2409.
5. English M, Ngama M, Musumba C, Wamola B, Bwika J, Mohammed S, et al. Causes and outcome of young infant admissions to a Kenyan district hospital. Archives of disease in childhood. 2003;88(5):438-43.
6. Hameed NN, Vilms R, Bhutani VK. Severe neonatal hyperbilirubinemia and adverse short-term consequences in Baghdad, Iraq. Neonatology. 2011;100(1):57-63.
7. Valiyat S et al. Int J ContempPediatr. 2017 Jul; 4 (4):1169-1172.
8. Jamir et al. 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).
9. Bhutani VK. Evidence based issues regarding neonatal hyperbilirubinemia. Paediatrics review 2005;114:130-53.
10. 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.
11. Nepal D, Banstola D, Dhakal AK, Mishra U and Mahaseth C. Neonatal hyperbilirubinemia and its early outcome. JIOM 2009;31(3):17-20.
12. Narang A, Ghatwala G, Kumar P. Neonatal jaundice, an analysis of 551 cases. Indian paediatrics, 1996;34:429-32.
13. Bajpai PC, Mishra PK, Agarwal M. An aetiological study of neonatal hyperbilirbinemia. Indian J Pediatr. 1971;38:424-9
14. Mallick PK, Alam B. Aetiological study of neonatal hyperbilirubinemiaA hospital based prospective study. Medicine Today 2012;24(2):73-4.
15. 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.
16. Khaton S, Islam MN. Neonatal jaundice-clinical profile of 140 cases. Bang J Child Health. 1993;17:158-63.
17. Adhikari KM, Mathai SS, Moorthy SM, Chawla N, Dhingra S. Efficacy of different types of phototherapy units on neonatal hyperbilirubinemia. J Mar Med Soc 2017;19:99-102.
18. PiushKanodia et al. Clinical profile and outcome of newborns sent for …Sri Lanka Journal of Child Health, 2016;45(4):267-270.
19. 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.