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Clinical-Epidemiological Study of Neonatal Hyperbilirubinemia at a Tertiary care center in Rajasthan

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Abstract

Background: Hyperbilirubinemia is a common problem in neonates, being noticed during the first week of life in 60% of term infants and 80% of preterm infants[1]. Objectives were to study the incidence, causes and risk factors associated with neonatal hyperbilirubinemia.

Methods: The study was a hospital based descriptive observational study undertaken at New-born unit of Rajkiya Mahila Chiktsayla Ajmer affiliated to JLN Medical College Ajmer (central rajasthan) from June 2018 to May 2019.

Results: Out of total 1480 live new-borns 570 neonates were with clinical jaundice over one year so Incidence of neonatal jaundice was 38.5%. Among 570 neonates with jaundice 333 were male (58%) 237 were female (41%). Males slightly outnumbered females. 147 neonates (25.7%) were preterm, 216 neonates (37.8%) were late preterm and 207 neonates (36.3%) were term. Jaundice was more observed in preterm neonates compared to terms neonates. Low birth weight babies had higher incidence (56.1%) cases of clinical jaundice than normal birth babies (44%) Most of the neonates (59.7%) had age of onset of jaundice between 3-5 days. Normal vaginal delivery was statistically associated with more neonatal jaundice. Oxytocin injection was given during 352 deliveries (61.6%) and its use was associated with increased chances of neonatal jaundice. Most common cause of neonatal jaundice in our study was ABO incompatibility followed by probable sepsis. About half (47.9%) of neonates with neonatal jaundice were exclusively breast fed.

Conclusions: Early identification of risk factors and causes is necessary to prevent the development of severe hyperbilirubinemia and its serious consequences like kernicterus.

Keywords: Neonatal hyperbilirubinemia

Introduction

Hyperbilirubinemia is a common problem in neonates, being noticed during the first week of life in 60% of term infants and 80% of preterm infants[1]. Pathophysiologic mechanism of Neonatal jaundice is imbalance between bilirubin production and conjugation which leads to increase in bilirubin levels[2]. This imbalance is mainly due to immature liver functions of bilirubin uptake, conjugation, excretion and rapid haemolysis of red blood cells which can be of multiple reasons[2,3]. Clinically neonatal jaundice

becomes evident first on face when serum bilirubin is more than 5 mg/dl to 7 mg/dl and progresses in a cephalocaudal fashion which is assessed clinically by Kramer's rule. In physiological jaundice serum bilirubin rises up to peak of 12mg/dl from day 3 to day 5 and then starts falling. Non physiologic jaundice is labelled when onset of jaundice within 24 hr of age, any elevation of total serum bilirubin requiring phototherapy, rising serum bilirubin more than 0.2mg/dl per hour or 5mg/dl per day and persistence of jaundice beyond 2weeks in terms and 3 weeks in preterm[5].

ABO incompatibility, Rh incompatibility, low birth weight, sepsis, internal haemorrhage (Cephalohematoma, liver or spleen hematoma), G6PD enzyme deficiency are common causes of pathological neonatal jaundice. Finding the underlying causes of neonatal jaundice would help in optical management of the cases. There are a number of risk factors associated with neonatal jaundice including maternal diabetes, race, prematurity, polycythaemia, male sex, birth trauma, maternal drugs, Trisomy 21, inadequate breastfeeding, delayed meconium passage, family history of severe neonatal jaundice, delayed cord clamping, oxytocin use during delivery and birth asphyxia [6]. So identification of various associated risk factors to prevent the development of severe hyperbilirubinemia and its serious consequences are important.

Methods

The study was a hospital based descriptive observational study to know the incidence, causes and risk factors associated with neonatal jaundice presenting at New-born unit of Rajkiya Mahila Chiktsayla Ajmer affiliated to JLN Medical College Ajmer from June 2018 to May 2019.

Inclusion and exclusion criteria:

1. All neonate with clinical jaundice admitted in new born unit of Rajkiya Mahila Chiktsayla hospital were included.
2. Babies over 28 days and whose parents denied consent were excluded.

All babies admitted in newborn unit were screened consecutively for clinical jaundice by Kramer rule and those meeting the inclusion / exclusion criteria of the study were subjected to further evaluation by detailed history and physical examination. Clinical jaundice was confirmed with DMSO calorimetric method of biochemical estimation of serum indirect and direct jaundice. Other investigations done for enrolled neonates were complete blood count, peripheral blood smear for RBC morphology, blood grouping (ABO and Rh) of mother and baby. Cases having blood group incompatibility either ABO or Rh were subjected to additional investigation like reticulocyte count, direct Combs test. other investigation like micro ESR, CRP CSF, urine examination, blood culture, LFT, x ray chest, USG cranium, abdomen was done if indicated.

Data analysis was done using SPSS version 20 (IBM SPSS Statistics Inc., Chicago, Illinois, USA) Windows software program. quantitative data were presented in the form of mean, SD, and range. Qualitative data were presented in the form numbers and percentages.

Results

Total number of live newborn from June 2018 to May 2019 was 1480 out of which 570 neonates were found to have clinical jaundice thus incidence of neonatal jaundice during this period was 38.5% as shown in Table no. 1. Among 570 neonates with jaundice male gender (58%) outnumbered the female shown in (Table no.2.) . Jaundice was observed to be statistically

more in preterm (63.5%)than terms neonates (36.3%) as depicted in Table no. 3

Among 570 neonates with jaundice, 237 neonates (41.6%) were of wt. 1.5-2.5 kg, 234 neonates (41.1%) were of wt. 2.5-3.5 kg, <1.5kg were 14.5 % and >3.5 kg were 2.9%. Collectively low birth weight (<1.5 kg and 1.5 to 2.5 kg) babies had statistically higher percentage (56.1%) of cases who developed clinical jaundice than normal birth babies (44%) as depicted in Table No. 4. Most of the neonates i.e. 341 neonates (59.7%) had age of onset of jaundice between 3-5 days (Table no. 5)

Among 570 studied patient neonatal jaundice because of ABO incompatibility was found in 261 neonates (45.8%), probable sepsis was in 118 neonates (20.8%), polycythaemia was in 71 neonates (12.5%), Rh incompatibility was in 57 neonates (10.15%), maternal diabetes mellitus in 35 neonates (6.1%), Cephalohematoma was in 28 neonates (4.9%). Thus most common cause of neonatal jaundice in our study was ABO incompatibility followed by probable sepsis as shown in Table no. 6

Table No 7 shows that Among 570 neonates with jaundice, 292 neonates (51.1%) were delivered vaginally, 237 neonates (41.5%) by LSCS and 41 neonates (7.36%) by assisted delivery (vacuum assisted, forceps delivery). Normal vaginal delivery was statistically associated with more neonatal jaundice. Among 570 neonates 240 neonates (42.1%) had normal >7 Apgar score at 1 minute whereas 232 neonates (40.7%) had <4 Apgar score at 1-minute No statistically significant association of low Apgar score and neonatal jaundice was found. Neonatal jaundice was more in exclusively breast fed (49%) than top feeding (30.4%) and mixed feeding (20.6%). Among 380 neonates with jaundice who had sibling only 43 neonates (11.3%) had history of neonatal jaundice in sibling. (Table no .8)

Table No 9 shows Oxytocin injection was given to mothers during 352 deliveries (61.6%) out of 570 neonates presenting with neonatal jaundice. (Table no. 9)

Discussion

The results of the study showed that the incidence of clinical jaundice was 38.52%, which is lower than studies done by the various workers i.e., M. Singh et al[7] (77%), Anand V R et al [8] (74%) and Baj Pai et al[9] (54.56%) and nearby similar to Sahoo M et al (48%). Among 570 neonates with jaundice 333 were male (58%) and 237 were female (41%) males slightly outnumbered females. This is comparable to study done by Effiong et al[11], Narang et al[12]. In our study, as per gestational age (63.5%)were preterm and 207 (36.3%) were term delivered babies. Similarly, Bhutani et al[13], Bajpai et al[9], Singhal et al[14] in their studies found out that prematurity was a significant risk factor for hyperbilirubinemia probably more because of physiological handicaps in premature babies.

In our study jaundice was detected maximum on 3rd to 5th day. 59.7% neonates had jaundice onset between 3rd to 5th day The results in our study are similar to work done by Anand et al[15], where the highest incidence of jaundice was on 3rd (45%) post-natal day followed by 4th day (35.5%). In our study 56.1% of neonates with had low birth weight which is much higher compared to studies done by M. Singh et al[7] (29.5%) and Anil Narang et al[12] (34.5%). Low birth weight is one of the contributing factors for hyperbilirubinemia.

In present study it was observed that ABO incompatibility was 46.8%%. Simillarly Sgro M et al[16]concluded that ABO incompatibility was the most

common cause 51.6%). Farhad et al[17] accounted for 38.1% cases of ABO incompatibility.

The present study reported Rh incompatibility in 13.1%. Various Indian studies have reported incidence ranging from 1.6% by Bajpai P C et al[9] to 9.8% by Verma M et al[18].

In present study 5.7% newborns were admitted with hyperbilirubinemia due to Cephalohematoma. Anand V. R et al and Baj Pai et al reported 4% cases of Cephalohematoma. Narang et al found that 6.3% cases were having Cephalohematoma. Majority of babies (47.9%) in this study were exclusively breast fed, similarly Olusanya et al[19] from Nigeria reported that 90.4% babies were exclusively breast fed, Meharban singh et al[7] found that 67% babies were exclusively breast fed. It may be possible due to high frequency of breast feeding in population studied. Breast feeding leads to substantial elevation of bilirubin level during first few days of life due to physiologic inadequacy of lactation leading to dehydration and increase in bilirubin level so called breast feeding jaundice.

In present study, 237 cases were born by caesarean delivery (41.5%) and 292 cases by natural delivery (51.1%), 41 cases by assisted vaginal delivery (7.36%). Similarly studies of Ashraf et al[20] and Emailpoor et al [21] also reported that number of cases delivered by normal vaginal delivery were 62.6% and 53.5% respectively.

Conclusion: Early identification of risk factors and causes is necessary to prevent the development of severe hyperbilirubinemia and its serious consequences like kernicterus.

Ethical approval: This research study was approved by institute ethical committee

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Legends Table and Figure

Table 1: Incidence of neonatal jaundice

Table 2: Gender wise distribution of studied neonates

	Frequency	Percentage
Females	237	41.6
Males	333	58.4

Period	Total live newborn	Neonatal jaundice	Prevalence
June 2018 to May 2019	1480	570	38.5%
Total	570		100.0

Table 3: Gestation age wise distribution of neonates

	Frequency	Percentage
<34	147	25.7
34-37	216	37.8
37-40	207	36.3
Total	570	100.0

Table 4: Weight wise distribution of studied patients

	Frequency	Percentage
<1.5	83	14.5
1.5-2.5	237	41.6
2.5-3.5	234	41.1
>3.5	16	2.9
Total	570	100.0
Mean ± SD	2.41±0.7	

Table 5: Age at the onset of jaundice among studied neonates

Age in days	Frequency	Percentage
1-2	217	38.15
3-5	341	59.7
5-8	12	2.1
Total	570	100.0

Table 6: Percentage wise distribution of causes of neonatal jaundice among studied neonates.

S.N.	Causes of jaundice	No of Newborns	Percentage
1.	ABO incompatibility	261	45.8%
2.	Probable sepsis	118	20.8%
3.	Polycythemia	71	12.5%
4.	Rh incompatibility	57	10.15%
5.	Maternal Diabetes mellitus	35	6.1%
6.	Cephalohematoma	28	4.9%
	Total	570	100%

Table 7: Risk factor association of mode of delivery, apgar score and mode of feeding with neonatal jaundice

Mode of Delivery	Normal Vaginal Delivery	Caesarean section	Assisted Delivery	Total
Frequency, (%)	292 (51.1%)	237 (41.5%)	41(7.36%)	570 (100%)
Apgar Score	< 4	4-7	>7	Total
Frequency (%)	232 (40.7%)	98 (17.1%)	240 (42.1%)	570 (100%)
Mode of feeding	Exclusive Breast Feeding	Top feeding	Top + Breast feeding	Total
Frequency 100%)	279 (49%)	170 (30.4%	117 (20.6)	570 (100%)

Table 8: History of neonatal jaundice in sibling

	Frequency	Percentage
No	337	88.7
Yes	43	11.3
Total	380	100.0

Table 9: Oxytocin injection given during deliveries in studied neonates.

	Frequency	Percentage
Oxytocin not given	218	38.4
Oxytocin given	352	61.6
Total	570	100.0

Figure 1: Percentage wise distribution of causes of neonatal jaundice

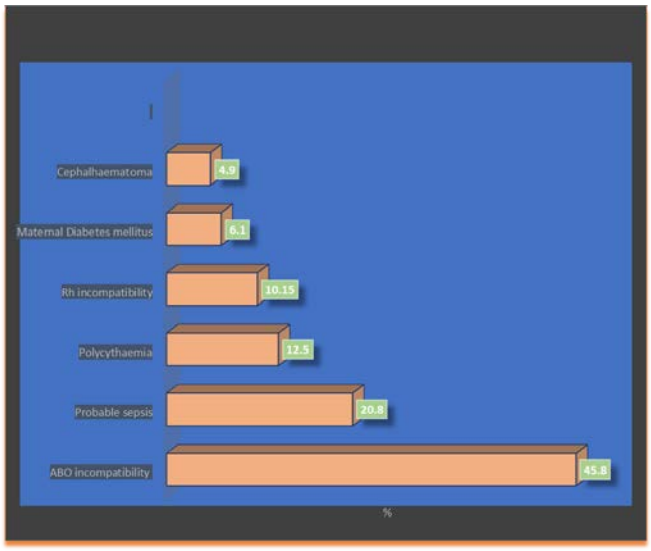

Figure 2: Gestation age wise distribution of studied patients

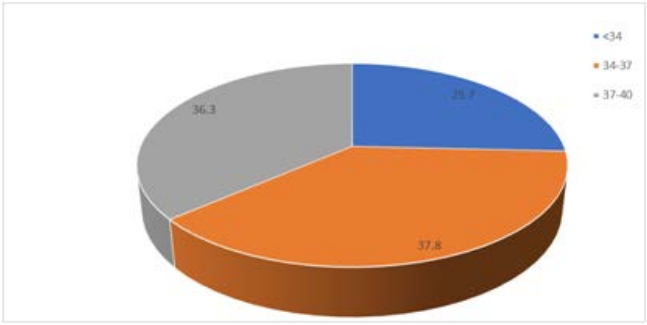

Figure 3: Weight wise distribution of studied patients