

Original Research Article

Study of incidence of breastfeeding failure jaundice in cases of neonatal hyperbilirubinemia in a suburban hospital

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ABSTRACT

Background: Neonatal jaundice is the most common cause of readmission after discharge from birth hospitalization. Breastfeeding failure jaundice (BFFJ) is an important subtype of pathological neonatal jaundice. It typically occurs with lactation failure during the first postnatal week that leads to insufficient intake, dehydration, weight loss and sometimes hypernatremia. Incidence of breast-feeding failure is expected to rise as the exclusive breast-feeding rates are rising. This problem is not well studied especially in Indian setting hence study was conducted.

Methods: This was retrospective observational study done in Department of Pediatrics from the April 1, 2016 to March 31, 2018. 179 neonates, who presented with jaundice as main complaint with total bilirubin value above the age & risk factor matched cut off, were sampled and their clinical data was analyzed.

Results: Breast feeding failure jaundice contributed 31.8% (N = 57) cases, second to the exaggerated physiological hyperbilirubinemia (48% N = 86), followed by hemolytic (13.8%, N = 25). BFFJ presented at median age of 6.8 days and had mean duration of hospital stay of 3 days. Incidences of exaggerated physiological jaundice and BFFJ were found to be higher in winter months i.e. 6.7% (N = 48/716) compared to summer months i.e. 4.1% (N = 28/679) significantly (p value = 0.045).

Conclusions: Breast feeding failure jaundice (BFFJ) contributed to one third of cases of neonatal pathological jaundice requiring re-admission and is the second most common cause after exaggerated physiological jaundice. The high incidence of BFFJ in the study warrants focused efforts for a structured program of breast-feeding education, training and surveillance.

Keywords: Breast feeding failure jaundice, Exaggerated physiological jaundice, Neonatal jaundice, Seasonal variation

INTRODUCTION

Neonatal jaundice is the visible manifestation of hyperbilirubinemia. Almost all neonates (60% term and 80% preterm) will have bilirubin greater than 5 mg/ dl in the first week of life and about 6% of term babies will have levels exceeding 15 mg/ dl. It is the most common morbidity in the first week of life. Neonatal jaundice is the most common cause of readmission after discharge from birth hospitalization.¹ High serum bilirubin levels

carry a potential to cause neurological impairment with serious consequences in a small fraction of jaundiced babies. In most cases, jaundice is benign and no intervention is required. Approximately 5-10% of them have clinically significant jaundice that requires treatment to lower serum bilirubin levels in order to prevent neurotoxicity.

Physiological jaundice refers to the jaundice which is attributable to physiological immaturity of neonates to

handle increased bilirubin production. Beyond physiological range, jaundice is said to be pathological jaundice. In general, total serum bilirubin level more than 5 mg/dL on first day, 10 mg/dL on second day, and 12-13 mg/dL thereafter in term neonates.² Any TSB value of 17 mg/dL or more should be regarded as pathologic and should be evaluated for the cause, and possible intervention, such as phototherapy.³

Common causes of pathological jaundice:

- Hemolysis: blood group incompatibility such as those of ABO, Rh and minor groups, enzyme deficiencies such as G6PD deficiency, autoimmune hemolytic anemia.⁴
- Decreased conjugation such as prematurity
- Increased enterohepatic circulation such as lack of adequate enteral feeding that includes insufficient breastfeeding or the infant not being fed because of illness, GI obstruction.⁵
- Extravasated blood: cephalhematoma, extensive bruising etc.⁶

Excess physiologic jaundice (bilirubin level >12 mg/dL) develops in 4% of bottle-fed newborns, compared to 14% of breastfed newborns. Exaggerated physiologic jaundice (bilirubin level >15 mg/dL) occurs in 0.3% of bottle-fed newborns, compared to 2% of breastfed newborns.^{7,8}

Breastfeeding failure jaundice

Infants who are breastfed have higher bilirubin levels on day 3 of age compared to formula-fed infants. Breastfeeding failure jaundice typically occurs with lactation failure during the first postnatal week that leads to insufficient intake, with weight loss and sometimes hypernatremia. Hyperbilirubinemia is attributed mainly to poor feeding leads which leads to decreased caloric intake, dehydration, and increased enterohepatic circulation, resulting in higher serum bilirubin concentration.⁹

Problem of breast-feeding failure jaundice is underestimated and often they are treated as exaggerated physiological jaundice, symptomatically by phototherapy, breast feeding issues are neglected. As with promotion of the Baby friendly hospital initiative (BHFI), exclusive breast-feeding rate has increased worldwide.

So, the incidence of breast-feeding difficulties and failure also has increased in the first postnatal week, as baby and mother try to adapt for each other for successful breast feeding.

Success of breast feeding also depends on training and enthusiasm of mother and health care workers. Incidence of breast-feeding failure jaundice is not studied well especially in Indian setting. Hence, we have conducted study to understand the magnitude of problem of breast-

feeding failure jaundice along with common causes of pathological jaundice.

Aims and objectives

- To study the incidence of breastfeeding failure jaundice in cases of neonatal hyperbilirubinemia in a suburban hospital.
- To find incidences of other common causes of neonatal hyperbilirubinemia.
- To study the average age of presentation and average duration of stay in neonatal hyperbilirubinemia due to various common causes.
- To study the seasonal variation in incidence of breast-feeding failure jaundice and exaggerated physiological neonatal hyperbilirubinemia.

METHODS

This was a retrospective observational study, done in the department of pediatrics from 1st April 2016 to 31st March 2018. Neonates (≤ 28 days of life), who presented with neonatal jaundice as main complaint with total bilirubin value above the age and risk factor matched cut off (as per guidelines for phototherapy in hospitalized infants of 35 or more weeks' gestation by American Academy of Pediatrics Subcommittee on Hyperbilirubinemia), were sampled for study.^{10,11}

Preterm, neonates admitted for other indications or with direct hyperbilirubinemia were excluded. Their data was analyzed for the cause of jaundice, feeding details, clinical details, age of presentation, the duration of hospital stay and seasonal variation of incidence. Data was analyzed by using the Statistical package for social sciences (SPSS) version 21 chi square test. P-value of less than 0.05 was considered as statistically significant. The study was conducted after getting ethical approval from the Bhaktivedanta Hospital and Research Institute, Mira road, Thane.

RESULTS

In the present study, 179 neonates with neonatal hyperbilirubinemia were included who are admitted from 1st April 2016 to 31st March 2018 in the Department of pediatrics, Bhaktivedanta hospital, Mira Road, Thane. Out of 179 patients, 107 were males and 72 were females. 20 preterm neonates were excluded from study.

Table 1 shows frequency, mean and median age of presentation, mean duration of stay of various common causes of pathological neonatal jaundice in the study.

Exaggerated physiological jaundice (48%) was most common cause followed by breast feeding failure jaundice (BFFJ) (31.8%), hemolytic jaundice (13.8%), sepsis (4.4%) and least commonly cephalhematoma (1.7%).

Within BFFJ, they were segregated in 2 groups based on presence and absence of significant weight loss. Hemolytic group consisted of 3 sub-groups-ABO

incompatibility, Rh incompatibility and G6PD deficiency in descending frequency. There were 5 males but 1 female neonate in G6PD deficiency group.

Table 1: Cause wise clinical data of pathological neonatal jaundice patients.

Cause of neonatal jaundice	N	%	Age of presentation (in days) (mean±SD) (median)	Duration of hospital stay (In days) (mean±SD)
Exaggerated physiological jaundice	86	48.0%	7.4±2.6 (6.9)	2.3±1.4
Breast feeding failure jaundice (BFFJ) (overall)	57	31.8%	8.0±3.8 (6.8)	3.0±2.2
2a BFFJ with mild feed inadequacy	33	18.4%	8.1±3.1 (7.2)	2.9±1.8
2b BFFJ with moderate to severe feed inadequacy	24	13.4%	8.0±4.7 (6.1)	3.4±3.0
Hypernatremia (Na>150 mg/dl)	10	5.5%	-	-
Hemolytic jaundice	25	13.8%	6.4±2.4 (5.7)	3.5±2.0
3a ABO incompatibility	13	7.2%	6.6±2.7 (5.8)	3.1±1.7
3b Rh incompatibility	6	3.3%	6.0±2.5 (5.7)	4.0±1.6
3c G6PD deficiency	6	3.3%	6.3±2.0 (6.0)	4.1±3.2
Sepsis	8	4.4%	7.4±4.1 (5.8)	3.5±1.3
Cephalhematoma	3	1.7%	(6.0)	2.9±1.8
Total	179	100%		

Hemolytic group presented earliest by average age of 6.4 days and BFFJ presented late, at mean age of 8 days. Hemolytic group had maximum duration of stay as expected.

significant with two-sided P value of 0.045 (Chi-square Test).

DISCUSSION

Neonatal jaundice is the most common cause of readmission after discharge from birth hospitalization.¹ Breastfeeding failure jaundice is an important subtype of pathological neonatal jaundice. It typically occurs with lactation failure during the first postnatal week that leads to insufficient intake, dehydration (decrease urine output), significant weight loss (>10% of birth weight) and sometimes hypernatremia. Exclusive breast-feeding rate has increased worldwide and consequently the incidence of breast-feeding failure also appears increasing. This study was conducted to find out its magnitude in a suburban hospital.

Total 179 neonates were taken into study after excluding 20 neonates as they were preterm with other comorbidities. There was male preponderance with 59.7% (N = 107/179). Neonates with bilirubin level above the age and risk factor matched cutoff (according to AAP charts) without any identifiable cause or feeding problem were classified as exaggerated physiological hyperbilirubinemia.¹² It was found to be most common cause of neonatal jaundice requiring admission, contributing to half of the total cases (48%, N = 86). In a study of 1998 from Karachi, 27.2% of patients were labeled as exaggerated physiological jaundice. In the same study hemolytic jaundice comprised 19.9% and G6PD deficiency accounted for 2% of the study group.¹³

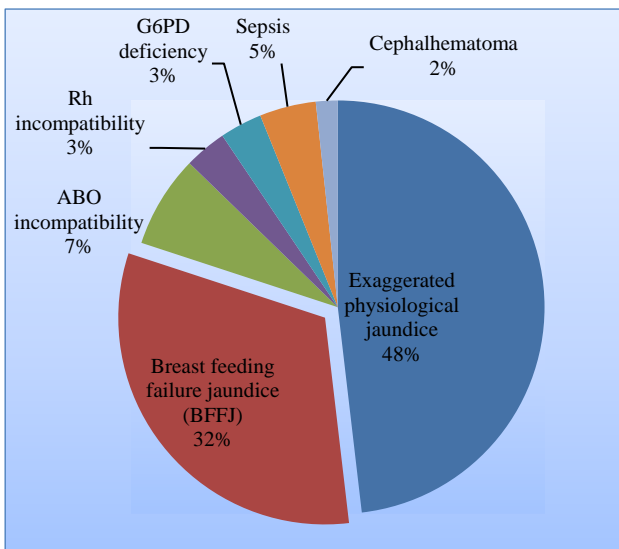


Figure 1: Incidence of various causes of neonatal jaundice.

Incidences of exaggerated physiological jaundice and breast-feeding failure jaundice were found to be higher in winter months i.e. 6.7% (N=48/716) compared to summer months i.e. 4.1% (N= 28/679) in over the 2-year study period. This difference was found to be statistically

Neonates with pathological jaundice with breast feeding related problem (breast feeding related maternal/neonatal factors or latching problems) with feed inadequacy as the only identifiable cause (after ruling out other common causes on clinical examination and investigations) were classified as breast feeding failure jaundice.

In current study, one third [31.8% (N= 57)] cases had breast feeding failure jaundice (BFFJ). It was second largest group. Among breast feeding failure jaundice, 18.4% (N= 33) of total cases had dehydration (decrease urine output) without significant weight loss/hyponatremia suggestive of mild feed inadequacy. In May, 2014, AAP published study which said practitioners can be reassured that it is normal for 20% to 30% of predominantly breastfed infants to be jaundiced at age 3 to 4 weeks and for 30% to 40% of these infants to have bilirubin levels >5 mg/d.¹⁴ But 13.4% (N=24) cases had dehydration with significant weight loss (> 10 % of birth weight) ± hyponatremia suggestive of moderate to severe feed inadequacy. 5.5% (N=10) neonates in this subgroup had hyponatremia (Na<150 mg/dl). Hemolytic causes of neonatal jaundice (ABO/Rh incompatibility, G6PD deficiency) contributed to 13.8% (N = 25), third largest group, comparable to Karachi study.¹³

Sepsis was least common cause of jaundice. Only 3 cases were related to cephalhematoma. In a study published in 1992 by Singhal PK et al, about one-third of cases (34.6%), no cause could be identified despite detailed investigations s/o exaggerated physiological jaundice and nearly three-fifth of infants (62.5%) had hyperbilirubinemia due to hemolytic causes.¹⁵ Hence incidences of hemolytic jaundice in neonates have gone down probably due to better availability of Anti D injections.

Neonates with hemolytic etiology presented earliest with mean and median age of 6 day with the range of 3.5 to 10 days. Neonates with exaggerated physiological jaundice presented on mean age of 7.4 day of life. Breast feeding failure jaundice neonates presented on mean age of 8 day and median age of 6.8 day of life with the range of 3.4 to 19.6 days.

Exaggerated physiological jaundice neonates had minimum duration of stay (Mean = 2.3 days with SD = 1.4) as expected. Breast feeding failure jaundice group has mean duration of stay of 3 day with SD = 2.2 days. Within this group, neonates with significant feeding problems and weight loss required 0.5-day higher duration of stay to recover. Hemolytic group had maximum duration of stay (mean = 4 days).

Incidences of exaggerated physiological jaundice and breast-feeding failure jaundice were found to be higher in winter months i.e. 6.7% (N=48/716) compared to summer months i.e. 4.1% (N= 28/679) in over the 2-year study period, contrary to expectations of higher incidence in summer months due to dehydration. This difference was

found to be statistically significant with two-sided P value of 0.045 (Chi-square Test). No identifiable cause was found explaining this correlation. In a Spanish study published in 1996, they found more pathologic hyperbilirubinemia during the fall and less in winter, but these differences between seasons were not statistically significant.¹⁶

In an Indian study from Haryana published in 2015 found that Serum bilirubin was higher in males in summers and mainly comprised unconjugated bilirubin while direct bilirubin was higher in females in winters.¹⁷ Findings of both the past studies were contrary to our study.

Breast feeding failure jaundice (BFFJ) contributed to one third of total cases requiring re-admission in the study. This increases preventable morbidity and health care cost in the society and it also exposes the lacunae in current system of breast-feeding education and training of mothers and health care workers. All need to be sensitized about the magnitude of the breast-feeding problems and their consequences in neonates, and focused efforts should be made to structure a program for breast feeding education, training, surveillance and trouble shooting in the line of BFHI (baby friendly hospital initiative).¹⁸⁻²⁰

CONCLUSION

Breast feeding failure jaundice (BFFJ) contribute to one third (31.8%) of total cases of neonatal pathological jaundice requiring re-admission and is the second most common cause. It presents at median age of 6.8 days with mean duration of hospital stay of 3 days. The high incidence of BFFJ in the study warrants focused efforts for a structured program of breast-feeding education, training and surveillance.

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