

Rebound Hyperbilirubinaemia Following Intensive Phototherapy

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Abstract

This prospective study was conducted in tertiary care hospital attached to Department of pediatrics, Mahadevappa Rampure Medical college Kalburgi. *Aims:* To determine the incidence of post phototherapy rebound hyperbilirubinemia in neonates subjected to phototherapy. *Materials and Methods:* All babies with hyperbilirubinemia admitted to nicu were included in the study. A total of 200 neonates among which 122 were males and 78 were females. Repeat serum bilirubin was measured 24 hours after stopping phototherapy. *Statistical analysis:* Data entry analysis were done using SPSS. *Results:* The general incidence of significant rebound hyperbilirubinemia requiring reinitiation of phototherapy was 9.5%. Birth weight and gestation age has significant impact on rebound hyperbilirubinemia. *Conclusion:* it is necessary to measure rebound bilirubin levels after 24 hrs of stoppage of phototherapy in high risk neonates like premature babies, birth weight <2kg.

Keywords: Bilirubin; Phototherapy; Significant Rebound.

Introduction

Neonatal jaundice is a common problem in newborn, 60% of term newborn and 80% premature infant develop clinical jaundice [1]. Severe jaundice can cause encephalopathy resulting in handicap or death. Intensive Phototherapy is used worldwide for the treatment of neonatal jaundice, resulting in reduced need of exchange transfusion.

Due to alteration in bilirubin production, excretion may persist and cause rebound hyperbilirubinemia after stopping phototherapy. This issue has been addressed previously by some studies, which were retrospective review charts than prospective [2].

This is a Prospective Study

Aims & Objectives

1. To determine the incidence of post phototherapy rebound hyperbilirubinemia in neonates subjected to phototherapy

2. To determine the incidence of significant hyperbilirubinemia
3. To determine the risk factors associated with significant hyperbilirubinemia

Materials and Methods

This study was conducted in tertiary care hospital attached to Department of Pediatrics, Mahadevappa Rampure Medical College kalaburgi.

Study Period

August 2015 to December 2016.

Sample

All babies with hyperbilirubinemia admitted in neonatal intensive care unit at tertiary care hospital attached to department of Paediatrics, Mahadevappa Rampure Medical college Kalaburagi, were included in the study.

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A total of 200 neonates among which 122 were males and 78 were females.

The criteria for starting and of phototherapy were based on American Academy of Pediatrics clinical practice guidelines and subcommittee on Hyperbilirubinemia. Management of hyperbilirubinemia in the newborn >35weeks of Gestation [3].

For premature infants - infants less than 1 kg phototherapy was started with in 24 hrs, between 1 to 1.5kg -phototherapy at bilirubin levels of 7 to 9mg/dl. Between 1.5 to 2kg -10 to 12mg/dl, 2 to 2.5kg -13 to 15mg/dl [4] Significant bilirubin rebound was defined as postphototherapy bilirubin level needing reinstatement of phototherapy [2].

Repeat Serum bilirubin was measured 24 hours after stopping phototherapy

Inclusion Criteria

1. All term babies
2. All preterm babies
3. Birth asphyxia
4. Sepsis
5. Exchange transfusion

Exclusion Criteria

1. Major congenital anomalies

Method of Collection of Data

An informed consent was obtained from the parents of the newborn before enrolling them in the study. Serum bilirubin estimation was done by Diazo method.

Blood samples for bilirubin were collected from the baby at discontinuation and after 24 hours of stopping of phototherapy. A 'p' value <0.05 was considered statistically significant.

Data Analysis

Data was analysed, continuous variables were compared using student's t test. categorical data using chi square or fisher exact test. Data entry analysis were done using SPSS.

Results

Studies reveal that out of 200 babies subjected to phototherapy, 42 babies developed rebound bilirubinemia, of which 19 cases required reinitiation of phototherapy. This accounts to 9.5% (Table 1).

Table 1: Mean Sr.bilirubin count

Phototherapy	Sr.bilirubin Mean ± SD	Paired t-test value	P-value & significant
Sr.bilirubin Initiation of phototherapy N=42	17.52 ± 3.85	t= 12.25	P<0.001, Highly significant
Sr.bilirubin stopping phototherapy N=42	10.67 ± 2.87	t= 9.12	P<0.001, Highly significant
Sr.bilirubin after 24 hours of phototherapy N=42	13.8 ± 2.87	t= 3.75	P<0.01, Significant
Sr.bilirubin Reinitiation of phototherapy who required N=19	15.12 ± 3.30		

Table 2: Association between risk factors required reinitiation of phototherapy

Risk factors	Initiation of phototherapy cases N= 42(%)	Required Reinitiation of phototherapy cases N=19	χ ² -test & t-test values P-value & significance
Mode of delivery			
LSCS	08(19.0%)	03(15.8%)	χ ² =0.09, P>0.05
NVD	34(81.0%)	16(84.2%)	Not Significant
Obstetric H/o			
Primi	26(62.0%)	12(63.2%)	χ ² =0.02, P>0.05
Multigravida	16(38.0%)	07(36.8%)	Not Significant
Hb			t= 1.74, P>0.05
Mean± SD	16.6 ± 2.8	15.1 ± 3.3	Not Significant
HCT in %			t= 1.01, P>0.05
Mean± SD	46.4 ± 18.72	40.74 ± 21.9	Not Significant
Birth weight in kgs.			
< 2.0	14(33.3%)	11(58.0%)	χ ² =6.57, P<0.05
2.0 - 2.5	09(21.4%)	04(21.0%)	Significant
≥ 2.5	19(45.3%)	04(21.0%)	P>0.05 Not significant
Gestational age			
Preterm	15(35.7%)	12(63.2%)	χ ² =4.03, P<0.05
Term	27(64.3%)	07(36.8%)	Significant

Mode of delivery, gravidity, maternal, haemoglobin, didn't have impact on rebound hyperbilirubinemia. Birth weight and gestation age has significant impact on rebound hyperbilirubinemia (Table 2).

Discussion

Even though hyperbilirubinemia is common problem among neonates precise data regarding post phototherapy rebound hyperbilirubinemia, significant hyperbilirubinemia and its risk factors is inadequate.

Many studies report have been flawed by retrospective chart reviews [3].

Previous reports in literature have indicated that rebound hyperbilirubinemia is rare and therefore it is unnecessary to keep an infant in the hospital after phototherapy has been discontinued [2,5].

Factors reported to influence incidence of rebound hyperbilirubinemia include proportion of premature neonates and hemolytic jaundice, severity and onset of hyperbilirubinemia, mode of feeding and presence of other risk factors like G6PD deficiency [2,6].

The AAP Subcommittee on Hyperbilirubinemia now recommends a follow up bilirubin measurement within 24 hours of discharge for those cases in which phototherapy was used for neonates with haemolytic diseases, initiated early, or discontinued before the infant is 3-4 days old.

Specific recommendations on the initiation of phototherapy are well described. On the contrary, criteria for discontinuation of phototherapy are less well described [3].

In the study by Anuradha Bansal et al a total of 17 neonates out of 232 (7.3%) developed significant rebound hyperbilirubinemia. Our study is comparable with this study with incidence of 9.5%

In the study by Lee et al total of 7 babies out of 154 babies (4.5%) had a rebound jaundice which shows much lower incidence in their study compared to our study [7].

M Kaplan et al showed incidence of 13.3% 236 neonates out of which 30 developed significant rebound, which has higher incidence than our study

In our study group, risk factors associated with significant rebound were preterm babies and birth weight less than 2kg which is comparable with Anuradha Bansal et al.

Maisels and Kring et al. determined the incidence for rebound hyperbilirubinemia after stopping

phototherapy; And they do recommend repeated serum bilirubin checks 24 hours after discharge only if phototherapy was stopped at higher levels adopted in their study [8].

AL- Saedi et al measurement of serum bilirubin level is not required after termination of phototherapy and adds unnecessary expense, prolongs hospitalization. Which is contrary to our study [9].

Neurotoxic levels of bilirubin may vary with postnatal age, maturity of blood brain barrier, serum albumin concentration, according to Stets, Chung et al. [10].

Conclusion & Recommendations

1. Considering the neurotoxic effects of hyperbilirubinemia on the neonate. We recommend that it is mandatory to measure rebound bilirubin levels after 24 hours of stoppage of phototherapy in high risk neonates like premature babies, birth weight <2 kg.
2. Serum Bilirubin measurement after 24 hours reduces readmission in turn saving the difficulties of caretakers.

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