

Research Article

A study on effect of phototherapy on platelet count in neonates with neonatal hyperbilirubinemia in a tertiary care rural hospital

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ABSTRACT

Background: Phototherapy is one of the most common and invasive methods in treatment of unconjugated hyperbilirubinemia of the neonate. Adverse effects of phototherapy include loose stools, skin rash and dehydration. There are very few studies which show the effect of phototherapy on platelet count. So, this study was done to show the effect of phototherapy on platelet count.

Methods: This is a prospective hospital based comparative study on 100 eligible neonates admitted in the Neonatal Intensive Care Unit receiving phototherapy at Adichunchanagiri Institute of Medical Sciences and research hospital, a rural tertiary care hospital, B. G. Nagara, Nagamangala Taluk, Karnataka from December 1st 2013- November 30th 2014. Two samples were taken before and after phototherapy, were taken and analysis was done. The results were analysed statistically.

Results: A total of 100 neonates were included in our study of which 55(55%) were males and 45(45%) were females. The mean (+/-SD) platelet counts were 2.23+/-0.28 lak before phototherapy and 1.82+/-0.01 lak after phototherapy. There was a decline in the mean platelet count after phototherapy but it was not statistically significant ($p=0.150$). However there was a significant decline in mean platelet count in LBW babies.

Conclusions: In our study there was a decline in mean platelet count after phototherapy but it was not statistically significant except for LBW babies. The treating Doctor should keep other causes of thrombocytopenia when the patient is receiving phototherapy.

Keywords: Phototherapy, Unconjugated Hyperbilirubinemia, Platelet count

INTRODUCTION

Neonatal hyperbilirubinemia (NH) is commonest abnormal physical finding during the first week of life. Over two third of newborn babies develop clinical jaundice. The physical finding like yellowish discoloration of the skin and sclera in newborns is due to accumulation of unconjugated bilirubin. In most infants, unconjugated hyperbilirubinemia reflects a normal physiological phenomenon.¹

NH nearly affects 60% of term and 80% of preterm neonates during first week of life. 6.1% of well term newborn have a serum bilirubin over 12.9 mg%. Serum bilirubin over 15 mg% is found in 3% of normal term newborns. Nevertheless untreated, severe unconjugated hyperbilirubinemia is potentially neurotoxic and conjugated hyperbilirubinemia is a harbinger of underlying serious illness.²

NH is a reflection of liver's immature excretory pathway for bilirubin and is the most common reason for readmission of neonates in first week of life in current era

of postnatal discharge from hospital.³ Neonatal hyperbilirubinemia is a cause of concern for the parents as well as for the pediatricians.⁴

Premature babies have much higher incidence of neonatal jaundice requiring therapeutic intervention than term neonates. Hyperbilirubinemia was found to be the most common morbidity 65% among 137 extremely low birth weight neonates born over a period of 7 years in AIIMS.⁵

Elevated levels of unconjugated bilirubin can lead to bilirubin encephalopathy and subsequently kernicterus, with devastating, permanent neurodevelopment handicaps.⁶ Conjugated hyperbilirubinemia indicates potentially serious hepatic disorders or systemic illnesses. Hence appropriate management of neonatal hyperbilirubinemia is of paramount importance.

Hyperbilirubinemia can be treated either by phototherapy or exchange transfusion or pharmacologic agents. Phototherapy plays a significant role in prevention and treatment of hyperbilirubinemia. The main demonstrated value of phototherapy is that it reduces the need for exchange transfusion. As any treatment has its side effects, phototherapy also have its adverse effects like hyperthermia, feed intolerance, loose stools, skin rashes, retinal changes, dehydration, hypocalcemia, redistribution of blood flow and genotoxicity.^{4,5,7}

Unlike other side effects, a very few studies are currently available that depicts the effect of phototherapy on platelet count with controversial results. Hence the present study is undertaken to find if phototherapy has any significant effect on the platelet count.

METHODS

We conducted a prospective hospital based comparative study on 100 eligible neonates admitted in the Neonatal Intensive Care Unit receiving phototherapy at Adichunchanagiri Institute of Medical Sciences and research hospital, a rural tertiary care hospital, B. G. Nagara, Nagamangala Taluk, Karnataka from December 1st 2013- November 30th 2014. The study was approved by the Research Ethics Committee of AIMS, Mandya. A predesigned proforma has aided the enrolment of newborns into the study.

The Term and Preterm Neonates receiving phototherapy for unconjugated hyperbilirubinemia without any comorbidities like Birth asphyxia, septicemia, renal failure, etc. were included in the study. Neonates with comorbidities like Birth asphyxia, Septicaemia, Renal failure and abnormal platelet count detected pre phototherapy were excluded from the study.

Venous blood samples were collected from the neonates included in the study and sent for total bilirubin, direct bilirubin, platelet count and blood group. Total and direct bilirubin is measured by diazo method (Diazotized

sulphanilic test). Platelet count was measured by auto analyser (SisII). Blood group of newborn analysed by antisera method.

Platelet count was checked at 0 hours and at discontinuation of phototherapy (second sample). The first sample was considered as control. Comparative study was made between these groups to determine the changes in platelet counts. Proportions will be compared using chi-square test. All data of various groups will be tabulated and statistically analysed using suitable statistical tests (Student's t test). P value less than 0.05 was considered to be moderately significant and p value <0.01 as strongly significant.

RESULTS

A total of 100 neonates were included in our study of which 55(55%) were males and 45 (45%) were females. 28 neonates were having weight <2.5kg of which 12 (21.8%) were males and 16 (35.6%) were females. The mean birth weight in our study group was 2.83+/-0.3kg. 17 (17%) neonates were preterm and 83(83%) neonates were term. Of the 17 preterm 8 (46.4%) were males and 9(20%) were females. Mean gestational age was 38.49+/-1.5 weeks. Sixty five (65%) of the neonates were born to primiparous mothers and thirty five (35%) are born to multipara.

Table 1: Mean platelet count before and after phototherapy.

Platelet count (lak/cumm)	Before phototherapy	After phototherapy	P value
Mean +/- SD	2.23+/-0.28	1.82+/-0.01	P=0.150 t=1.451

The mean (+/-SD) platelet counts were 2.23+/-0.28 lak before phototherapy and 1.82+/-0.01 lak after phototherapy. There was a decline in the mean platelet count after phototherapy but it was not statistically significant (p=0.150) Table 1. However there was a statistically significant decline in mean platelet count in LBW babies where the mean platelet count was 1.93+/-0.03 lak and 1.79+/-0.04 lak before and after phototherapy respectively (p<0.001).

In our study Incidence of thrombocytopenia (platelet count<1.5lak/cumm) was 2% and was seen in 2 babies of which one was preterm and one was term.

DISCUSSION

In our study 100 neonates were included of which only two neonates showed thrombocytopenia (platelet count<1.5lak/cumm). In our study there was a decrease in mean platelet count after phototherapy but was not statistically significant (p=0.150). However the decrease in mean platelet count was statistically significant in LBW babies (p<0.001) while in normal birth weight

babies there was a decline but not statistically significant ($p=0.194$).

Harold M et al where the first to study on the effect of phototherapy on platelet count where they studied on low birth weight infants and found out that there is a fall in platelet count in 12 out of 31 babies receiving phototherapy. This study was in correlation with our study where there was a significant difference in mean platelet value in LBW babies ($p<0.001$).⁸

Pishva et al in his study found that 49.5% babies had decreased levels of platelet count after phototherapy, where as in our study 91.5% babies had decreased platelet count post phototherapy. He also found out that in 19.8% babies the platelet count was below one lakh, but in our study there was no babies with platelet count less than one lakh.⁹

Sanjeev et al found out that 35% of his study group had thrombocytopenia. This study was not in correlation with our study which showed that only 2% had thrombocytopenia.¹⁰

Modanlou et al, Sakha K et al, Alireza Monsef et al, Ahmadpour et al in their respective studies showed that there will be an increase in the platelet count after phototherapy which all were in contrast to our study which showed a decline in the platelet count after phototherapy.¹¹⁻¹⁴

CONCLUSION

The present study shows that there will be a decline in platelet count after phototherapy but which is not significant except in LBW babies. In case of thrombocytopenia during phototherapy the practitioner should keep other causes of thrombocytopenia in mind and the cause should be evaluated.

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