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Research Article

**EFFICACY OF INTENSIVE PHOTOTHERAPY IN
MANAGEMENT OF TRANSFUSION IN JAUNDICE****Dr Ali Haider Tariq¹, Dr. Tayyaba Shahbaz², Dr Aiman Rasheed³**¹Jinnah Hospital Lahore²Ex-House Officer Allama Iqbal Memorial Teaching Hospital Sialkot³Mayo Hospital, Lahore**Article Received:** August 2020**Accepted:** September 2020**Published:** October 2020**Abstract:**

Introduction: Jaundice is observed during the 1st week after birth in approximately 60% of term infants and 80% of preterm infants. The yellow color usually results from the accumulation of unconjugated, nonpolar, lipid-soluble bilirubin pigment in the skin. **Aims and objectives:** The basic aim of the study is to analyze efficacy of intensive phototherapy in management of transfusion in jaundice. **Material and methods:** This cross sectional study was conducted at Jinnah Hospital, Lahore during June 2019 to January 2020. This study was consist of two groups one was including neonates with indirect hyperbilirubinaemia near the level of ECT and second was retrospective group who had been treated with conventional therapy. **Results:** The data were collected from 50 patients. Regarding gestational age, sex, mode of delivery, birth weight, and age on admission there was no statistically significant difference between the two groups. According to American Academy of Pediatrics guidelines our studied cases were classified into high, intermediate and low risk categories, in group 01 it was found that 28 (56%) cases in the high risk category; 12 cases (24%) in the intermediate risk category and 10 cases (20%) in the low risk category. **Conclusion:** It is concluded that use of intensive phototherapy in the management of pathological hyperbilirubinaemia is very effective in lowering total serum Bilirubin when its level is within 2-3 mg/dl (34-50 μ mol/l) of the exchange transfusion level and in reducing the use of the invasive maneuver of exchange transfusion with its serious neurological complications.

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INTRODUCTION:

Jaundice is observed during the 1st week after birth in approximately 60% of term infants and 80% of preterm infants. The yellow color usually results from the accumulation of unconjugated, nonpolar, lipid-soluble bilirubin pigment in the skin. Although bilirubin may have a physiologic role as an antioxidant, elevations of indirect, unconjugated bilirubin are potentially neurotoxic. Even though the conjugated form is not neurotoxic, direct hyperbilirubinemia indicates a potentially serious hepatic disorders or a systemic illness [1].

Neonatal jaundice is one of the most common diagnoses in the neonatal period; it is estimated to occur in 60% of term newborns in the first week of life. In rare instances, the Total Serum Bilirubin (TSB) reaches levels that can cause kernicterus, a condition characterized by bilirubin staining of neurons and neuronal necrosis involving primarily the basal ganglia of the brain and manifested in athetoid cerebral palsy, hearing loss, dental dysplasia, and paralysis of upward gaze [2].

Regardless of the cause, the goal of therapy is to prevent neurotoxicity related to indirect-reacting bilirubin while not causing undue harm. Phototherapy and, if it is unsuccessful, exchange transfusion remain the primary treatment modalities used to keep the maximal total serum bilirubin below pathologic levels [3]. Maximal intensive phototherapy should be used when indirect bilirubin levels approach certain levels. Such therapy includes using “special blue” fluorescent tubes, placing the lamps within 15-20 cm of the infant, and putting a fiberoptic phototherapy blanket under the infant’s back to increase the exposed surface area. The use of phototherapy has decreased the need for exchange transfusion in term and preterm infants with pathological jaundice [4].

Aims and objectives

The basic aim of the study is to analyze efficacy of intensive phototherapy in management of transfusion in jaundice.

MATERIAL AND METHODS:

This cross sectional study was conducted at Jinnah Hospital, Lahore during June 2019 to January 2020. This study was consist of two groups one was including neonates with indirect hyperbilirubinaemia near the level of ECT and second was retrospective group who had been treated with conventional therapy. Detailed history, demographical status and investigations were taken from both groups. Total and direct serum bilirubin on admission and 6 hours after exposure to phototherapy, Complete blood count (CBC), Reticulocyte count, Blood group and Rh of mother and neonate were estimated for all cases on admission.

Statistical Analysis

Chi-square test and fisher exact test used to compare between categorical variables where compare between continuous variables by unpaired t-test. A two-tailed p.

RESULTS:

The data were collected from 50 patients. Regarding gestational age, sex, mode of delivery, birth weight, and age on admission there was no statistically significant difference between the two groups. According to American Academy of Pediatrics guidelines our studied cases were classified into high, intermediate and low risk categories, in group 01 it was found that 28 (56%) cases in the high risk category; 12 cases (24%) in the intermediate risk category and 10 cases (20%) in the low risk category. In group 02 it was found that 31 cases (62%) were in the high risk category; 9 cases (18%) in the intermediate risk category and 10 cases (20%) in the low risk category (table 02). The Total Serum Bilirubin decline rate 6 h after admission was significantly more in intensive phototherapy group than the controls (p<0.01).

Table 1: Demographic data.

Risk category	Group 1	Group 2	P. Value
High risk	28 (56%)	31 (62%)	NS
Intermediate risk	12 (24%)	9 (18%)	NS
Low risk	10 (20%)	10 (20%)	NS

Table 2: Risk categories.

Rate of S.Bilirubin decline	Group 1	Group 2	P. Value
Mean ± 2SD	0.56 ± 0.12 mg/dl/h	0.17 ± 0.05 mg/dl/h	<0.001**

Table 3: Rate of serum bilirubin decline 6 hours after intensive phototherapy.

Duration (days) of phototherapy	Group 1	Group 2	P. Value
Mean \pm 2SD	2.5 \pm 1.5 days	2.5 \pm 1.5 days	<0.001**
Exchange transfusion			
Number	16	31	0.003**
%	32	62	

DISCUSSION:

Although jaundice in newborns is common and generally benign, very high TSB levels can injure the newborn's central nervous system. Phototherapy and/or ECT remain the main lines of treatment in jaundiced newborns if they are at risk of rising to or have already reached potentially dangerous levels. Phototherapy is safer and less expensive than ECT [5]. In addition, ECT requires more complex level of care and specific professional expertise. High-intensity phototherapy has been shown to be effective in rapidly decreasing TSB levels and reducing the need for ECT. Bilisphere 360 is a novel neonatal phototherapy device designed to maximise the irradiance and treatment area coverage [6]. The current study evaluated its effectiveness on 188 newborns with severe indirect hyperbilirubinaemia and compared it to a historical control group consisting of 177 neonates treated with conventional phototherapy. Both groups were comparable regarding all of the pre-treatment demographic, clinical and laboratory parameters [7].

Bilisphere 360 was more effective in decreasing bilirubin levels; the overall bilirubin decline rate from admission to 48 hours was significantly greater in Bilisphere group than the controls ($p < 0.05$) [8]. The results are in agreement with previous reports proving that serum bilirubin levels in newborns may be controlled more effectively with high-intensity phototherapy than with conventional modalities [9]. In comparing the bilirubin decline rate between Bilisphere group and the control group, it was found that there was no statistically significant difference between them from admission to 6 hours [10].

CONCLUSION:

It is concluded that use of intensive phototherapy in the management of pathological hyperbilirubinaemia is very effective in lowering total serum Bilirubin when its level is within 2-3 mg/dl (34-50 μ mol/l) of the exchange transfusion level and in reducing the use of the invasive maneuver of exchange transfusion with its serious neurological complications. It has also succeeded in reducing the duration of phototherapy and subsequently the duration of hospital stay and economic burden.

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