Indo American Journal of Pharmaceutical Sciences

CODEN [USA]: IAJPBB **Research Article**

http://doi.org/10.5281/zenodo.3236374

ANALYSIS OF USE OF INTENSIVE PHOTOTHERAPY IN MANAGEMENT OF TRANSFUSION IN JAUNDICE

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Article Received: March 2019 **Accepted:** April 2019 **Published:** June 2019

Abstract:

Introduction: *Jaundice refers to the yellow appearance of the skin that occurs with the deposition of bilirubin in the dermal and subcutaneous tissue.* ***Aims and objectives:*** *The basic aim of the study is to analyse the use of intensive phototherapy in management of transfusion in jaundice.* ***Material and methods:*** *This cross sectional study was conducted in PIMS Islamabad during October 2018 to January 2019. This study was conducted to analyse the use of phototherapy for the management of transfusion in jaundice. The data was collected from 100 patients of both genders. In this study we done the liver function test for all the patients after giving phototherapy. Blood sample was drawn for the biochemical analysis of serum. Blood was centrifuged at 4000rpm and serum was separated. Then we done the micronutrients level and ALT levels of all patients.* ***Results:*** *The data was collected from 100 hepatitis patients. The mean age was 36.5 + 10.1 years and BMI of the patients was 21.7 ± 2.7 (kg/m^2). The mean duration of HIV was 38 ± 43.8 months. There were non-significant relationship present in diseased group treated with different therapies like interferon and glutathione as as $p<0.05$. The level of micronutrients become decreases in diseased group.* ***Conclusion:*** *It is concluded that phototherapy is the best treatment for the management of jaundice. Long-term follow-up trials should be performed to evaluate the long-term effects in newborn infants with severe indirect hyperbilirubinaemia who are treated with this therapeutic modality.*

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Please cite this article in press Sahibzada Aneesullah et al., ***Analysis Of Use Of Intensive Phototherapy In Management Of Transfusion In Jaundice.,*** *Indo Am. J. P. Sci, 2019; 06(06).*

INTRODUCTION:

Jaundice refers to the yellow appearance of the skin that occurs with the deposition of bilirubin in the dermal and subcutaneous tissue. Normally in the body, bilirubin is processed through the liver, where it is conjugated to glucuronic acid by the enzyme uridine diphosphate glucuronyl transferase (UGT). This conjugated form of bilirubin is then excreted into the bile and removed from the body via the gut [1]. When this excretion process is low following birth, does not work efficiently, or is overwhelmed by the amount of endogenously produced bilirubin, the amount of bilirubin in the body increases, resulting in hyperbilirubinemia and jaundice [2].

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 [3].

The most common cause of jaundice in the first 24 hours of life due to haemolytic disease of newborn (HDN) is rhesus (Rh) haemolytic disease followed by ABO incompatibility that may cause elevated levels of bilirubin and anaemia but less severe than Rh haemolytic disease.
For preventing the kernicterus and other complications of hyperbilirubinemia, jaundice should be managed by phototherapy or exchange transfusion (ECT). Phototherapy is a useful method because it is easily available and devoid of all complications of double volume ECT [3]. The efficacy of phototherapy depends on the dose and wavelength of light used and the surface area exposed. Despite ECT being an effective method in decreasing TSB level after failing phototherapy, ECT remains an invasive procedure with associated morbidity and mortality. ECT should be considered only when the benefit of decreasing TSB level to prevent kernicterus outweighs the complications associated with the procedure [4].

Aims and objectives

The basic aim of the study is to analyse the use of intensive phototherapy in management of transfusion in jaundice.

MATERIAL AND METHODS:

This cross sectional study was conducted in PIMS Islamabad during October 2018 to January 2019. This study was conducted to analyse the use of phototherapy for the management of transfusion in jaundice. The data was collected from 100 patients of both genders. In this study we done the liver function test for all the patients after giving phototherapy. Blood sample was drawn for the biochemical analysis of serum. Blood was centrifuged at 4000rpm and serum was separated. Then we done the micronutrients level and ALT levels of all patients.

Statistical analysis

The data was collected and analysed using SPSS version 20.0. All the values were expressed in mean and standard deviation.

RESULTS:

The data was collected from 100 hepatitis patients. The mean age was 36.5 + 10.1 years and BMI of the patients was 21.7 ± 2.7 (kg/m^2). The mean duration of HIV was 38 ± 43.8 months. There were non-significant relationship present in diseased group treated with different therapies like interferon and glutathione as as $p<0.05$. The level of micronutrients become decreases in diseased group.

Table 02: Analysis of micronutrients in diseased group

	F	Sig.		t	df	Sig. (2-tailed)	Std. Error Difference
Zinc	1.668	.208		3.798	25	.001	31.206435
				3.531	15.155	.003	33.564560
Iron	24.927	.000		4.189	25	.000	.321750
				3.336	10.037	.008	.404044
Siliniu m	1.592	.219		17.193	25	.000	.340691
				16.431	16.498	.000	.356485

DISCUSSION:

The goal of hyperbilirubinemia treatment is to avoid bilirubin concentrations that may result in kernicterus. Phototherapy remains an effective therapeutic intervention that decreases bilirubin concentrations, thereby preventing elevated bilirubin levels associated with permanent sequelae [5]. The effectiveness of phototherapy is related to the area of skin exposed, and the radiant energy and the wavelength of the light. Phototherapy acts on

unconjugated bilirubin to a depth of 2 mm from the epidermis. Phototherapy changes the bilirubin through structural photoisomerization into water-soluble lumirubin that is excreted in the urine [6]. The fall in bilirubin level is proportionately greater in the skin than in the serum. Therefore, the infant receiving phototherapy should have as much skin as possible exposed to the lights. More intense phototherapy may be achieved by using multiple sources of phototherapy; double or triple phototherapy is recommended to optimize the skin surface exposed and, therefore, the efficacy of phototherapy [7].

Although jaundice in new-borns 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 new-borns if they are at risk of rising to or have already reached potentially dangerous levels [8]. Phototherapy is safer and less expensive than ECT. 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 [9]. Bilisphere 360 is a novel neonatal phototherapy device designed to maximise the irradiance and treatment area coverage. The current study evaluated its effectiveness on 188 new-borns 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 [10]. 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 ($p<0.05$). The results are in agreement with previous reports proving that serum bilirubin levels in newborns may be controlled more effectively with high-intensity phototherpy than with conventional modalities [11].

CONCLUSION:

It is concluded that phototherapy is the best treatment for the management of jaundice. Long-term follow-up trials should be performed to evaluate the long-term effects in newborn infants with severe indirect hyperbilirubinaemia who are treated with this therapeutic modality.

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