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"CORRELATION BETWEEN TRANSCUTANEOUS BILIRUBIN (TCB) AND TOTAL SERUM BILIRUBIN (TSB) IN PRETERM NEONATES"

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Abstract- *Utility of TCB in preterm neonates (< 37 weeks gestation), and its use on neonates before phototherapy is not validated. Therefore, it is undertaken to find out the relation of TCB &TSB in preterm neonates before and during phototherapy. 1.To analyze the correlation between TCB readings at different areas such as forehead, sternum and pubic symphysis with TSB in preterm neonates before phototherapy. 2.To analyze the correlation between TCB readings on sternal region with TSB levels pre-phototherapy and during phototherapy in preterm neonates. 3.To determine correlation among the TCB & TSB levels of early & late preterm neonates. Preterm neonates satisfying the inclusion criteria with hyperbilirubinemia and treated by phototherapy are taken for the study with TCB levels and serum bilirubin levels measured and compared at different sites, then a photo resistant material is placed over sternum and TCB is measured over the same area before and during phototherapy, then there will be a comparison of these levels with serum bilirubin levels before and during phototherapy. TCB evaluation is almost similar to TSB evaluation in preterm neonates undergoing phototherapy hence it is a reliable indicator for assessment of hyperbilirubinemia. TCB is as reliable as TSB for assessment of hyperbilirubinemia.*

Keywords*-preterm neonate, bilirubin, phototherapy, transcutaneous bilirubin*

I. Introduction

Neonatal jaundice, which is usually self-resolving and physiological, is found in 60% of normal full term newborns and in 80% of preterm infant. The incidence of preterm birth in India is 7-9%. Incidence of NNH in preterm infants is 60% requiring phototherapy[1].

In some neonates, high bilirubin can cause neurological sequelae known as kernicterus and may result in death if untreated. Therefore, it is essential to have an early diagnosis with proper modality of treatment.

The gold standard of detecting hyperbilirubinemia is through measuring serum TSB, but on and off sampling associated with risk factors like pain, infection, and anemia[2].

Transcutaneous bilirubinometry is not an invasive and reliable technique for detecting hyperbilirubinemia which works on principle of spectrophotometry. These transcutaneous bilirubinometers analyses the optical spectrum signal that is reflected from the sub-cutaneous region, further this signal is converted to electrical signal with the

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help of a photocell. These signals are further analyzed by a micro-processor to give a bilirubin value on the Liquid Crystal Display(LCD)[3].

Currently, TCB measurements are used for the purpose of screening unconjugated hyperbilirubinemia in infants with a GA gestational age of more than 35 weeks [4]. There arises a question if TCB can be used to assess the efficacy of phototherapy in pre-term neonates with respect to TSB for screening purposes. Use of TCB (transcutaneous bilirubin)measurement in pre-term babies (< 37 weeks gestation), and its use on neonates before phototherapy is not validated. Therefore, this study is undertaken in Order to find out the co-relation of TCB & TSB in preterm babies before & during phototherapy . TCB correlates well with TSB in pre-term neonates before and during phototherapy irrespective of skin colour and weight of neonate [5-7].

Research Question:

Do TCB and TSB correlate well in preterm neonates before and during phototherapy?

II. Aim

To analyze the relation between trans-cutaneous bilirubin values with total serum bilirubin values in determining jaundice in pre-term babies who are more than or equal to 28 weeks to less than 37 weeks of gestation.

Objectives:

1.To analyze the correlation between TCB readings at different areas such as forehead, sternum and pubic symphysis with TSB in preterm neonates before phototherapy.

2. To analyze the correlation between TCB readings on sternal region with TSB levels pre-phototherapy and during phototherapy in preterm neonates.
3. To determine correlation among the TCB & TSB levels of early & late preterm neonates.

III. Methodology

Study Design/type of study: Prospective cross-sectional study.

Setting: NICU, AVBRH Sawangi (M), Wardha.

Study Period: August 2019 to July 2021- 2 years.

Study Participants: Preterm neonates =/>28weeks to <37 weeks of gestation requiring phototherapy

Sample size: 65

Inclusion criteria

Pre-term babies who are more than or equal to 28 weeks to less than 37 weeks of gestation upto 14days of life requiring phototherapy

Exclusion criteria

Denied consent

Statistical analysis

Correlation coefficients using Pearson correlation which is a parametric test or Spearman rank correlation which is a nonparametric test based on normal/non-normal distribution of data as appropriate. Scatter plot and Bland

Altmaan plots which will be used to illustrate the relation-ship between transcutaneous and total serum bilirubin measurement performed at the same time. A P value of

< 0 .05 will be considered as statistically significant.

Expected outcomes/Results:

Participants: All Preterm neonates with hyperbilirubinemia up to 14 days of life requiring phototherapy.

Outcome data: TCB done before and during phototherapy is as relevant as TSB before and during phototherapy, hence TCB is a reliable indicator as TSB in pre-term neonatal hyperbilirubinemia.

Main Result: Comparative analysis of TCB & TSB in preterm neonates which is suggestive that there is a positive correlation and TCB is a reliable indicator for diagnosing neonatal hyperbilirubinemia in preterm neonates. Pearson correlation and scatter plot are used in this study.

IV. Discussion

TCB measurement of bilirubin is as efficient as TSB in assessing neonatal hyperbilirubinemia in preterm neonates' up to 14days of life requiring phototherapy. Currently, TCB measurements are used for the purpose of screening unconjugated hyperbilirubinemia in infants with a GA gestational age of more than 35 weeks . A number of studies on related aspects of this study were reviewed [7-58].

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