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OUTCOME OF VARIOUS RISK FACTORS AFTER EARLY DIAGNOSIS AND MANAGEMENT OF UNCONJUGATED HYPERBILIRUBINEMIA IN LATE PRETERMS, TERM AND POST TERM NEONATES IN TERTIARY CARE RURAL HOSPITAL OF MAHARASHTRA.

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ABSTRACT

Background-Hyperbilirubinemia is defined as a serum total bilirubin concentration greater than 95th centile for hour of life. Neonatal hyperbilirubinemia is a common clinical problem encountered during the neonatal period, especially in the first week of life. Clinical jaundice is seen in 60-70% of term and about 80% of preterm newborns. 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. Depending on the form of bilirubin present in serum, hyperbilirubinemia can be further classified as unconjugated (indirect) or conjugated (direct). Unconjugated hyperbilirubinemia (albumin-bound) usually results from increased production, impaired hepatic uptake, and decreased conjugation of bilirubin. **Materials and Methods -** The Prospective cross sectional study was conducted in Dr.Vitthalrao Vikhe Patil Pravara Rural Hospital, Loni over a period of two years June 2022 to June 2024.**Results -** Across all Gestational ages and Birth places, there are 52 females (41.60%) and 73 males (58.40%). Among neonates with a previous sibling who had jaundice, 9 (40.91%) and 13 (59.09%) delivered late preterm and term respectively. One (25%) newborn with ABO incompatibility with DCT positive required an exchange transfusion, 3 (75%) newborns with ABO incompatibility but with DCT negative required an exchange transfusion. The mean serum bilirubin level is slightly higher than the mean Transcutaneous bilirubin level.**Conclusion -** Based on results of the study we concluded to use Transcutaneous bilirubinometer as it was showing reliable results as of serum bilirubin and can reduce the sampling procedure. In regards of our present study Early detection and use of LED phototherapy has magnificiently decreased the need for exchange transfusion.

Keywords – Hyperbilirubinemia ,Transcutaneous bilirubinometer, Exchange transfusion, Phototherapy

INTRODUCTION-

Hyperbilirubinemia is defined as a serum total bilirubin concentration greater than 95th centile for hour of life. Neonatal hyperbilirubinemia is a common clinical problem encountered during the neonatal period, especially in the first week of life.[1]

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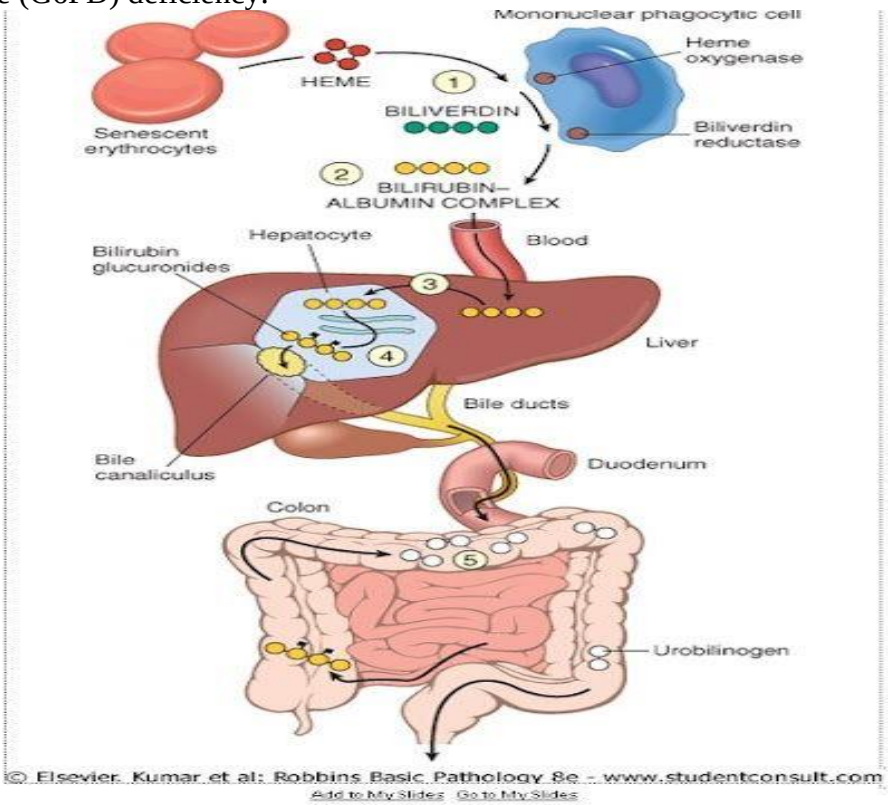
Clinical jaundice is seen in 60-70% of term and about 80% of preterm newborns.[2] 6.1% of well term newborn have a serum bilirubin over 12.9 mg%. Serum bilirubin over 15 mg% is found in 3% of normal term newborns.[3]

Depending on the form of bilirubin present in serum, hyperbilirubinemia can be further classified as unconjugated (indirect) or conjugated (direct). Unconjugated hyperbilirubinemia (albumin-bound) usually results from increased production, impaired hepatic uptake, and decreased conjugation of bilirubin.[4]

EPIDEMIOLOGY

The etiological factors may be affected by the population characteristics, sex, gestational age, maternal medication, feeding status and the geographical variations. However, in some cases even the most sophisticated investigations fail to reveal any etiological factors and these cases are then labeled as idiopathic. Several types of bilirubinemia have been reported in neonates including physiological jaundice, pathological jaundice, jaundice due to breastfeeding or breast milk and hemolytic jaundice including three subtypes due to Rh factor incompatibility, AB blood group incompatibility and Jaundice associated with Glucose-6-phosphate dehydrogenase (G6PD) deficiency.[5]



PHYSIOLOGICAL JAUNDICE

Jaundice attributable to physiological immaturity which usually appears between 24-72 h of age and between 4th and -5th days can be considered as its peak in term neonates and in preterm at 7th day, it disappears by 10-14 days of life.[6] The transient unconjugated hyperbilirubinemia observed in all newborn infants during the first 5 days of life is

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usually referred to as physiologic hyperbilirubinemia and is believed to result from delayed development of the hepatic glucuronide conjugating system,[7,8],particularly glucuronyl transferase.[5] Glucuronyl transferase catalyzes the transfer of glucuronic acid from uridine di- phosphate glucuronic acid (UDPGA) to bilirubin and other receptors to form the corresponding glucuronides. Inhibition of glucuronyl transferase activity could theoretically result in unconjugated hyperbilirubinemia.

PATHOLOGICAL JAUNDICE

Appearance of jaundice within 24 h due to increase in serum bilirubin beyond 5 mg/dL/day, peak levels higher than the expected normal range,presence of clinical jaundice more than 2 weeks and conjugated bilirubin (dark urine staining the clothes) would be categorized under this type of jaundice.

BREAST FEEDING AND BREAST MILK JAUNDICE

Exclusively infants with breastfeeding have a different physiological pattern for jaundice compared with artificially feed babies.[5]Jaundice in breast fed babies usually appears between 24-72 h of age, peaks by 5-15 days of life and disappears by the third week of life. Higher bilirubin levels have been reported in these infants. Breast milk jaundice occurs later in the newborn period, with bilirubin levels usually peaking in the 6 to 14 days of life. This late-onset jaundice may develop in up to one-third of healthy breastfed infants.

HEMOLYTIC JAUNDICE

The most common causes of hemolytic jaundice include (a) Rh hemolytic disease, (b) ABO incompatibility and (c) G-6-PD deficiency and minor blood group incompatibility. Jaundice may occur with the breakdown of red blood cells due to hemolytic disease of the newborn (Rh disease), or from having too many red blood cells that break down naturally and release bilirubin.

METHODS

Study Design: Prospective Cross Sectional Observational Study
Period Of Study: JUNE 2022-MAY 2024(2 yrs)
Type of sampling - Purposive Sampling Source of data - Baby admitted in NICU in Dr.BVP hospital, Loni.

Inclusion Criteria

1. Late preterms, terms and post terms with Unconjugated Hyperbilirubinemia.
2. Parents willing to give consent for the Study.

Exclusion Criteria

1. Neonates with conjugated hyperbilirubinemia.
2. Neonates with sepsis.
3. Neonates with Surgical conditions.

RESULTS –

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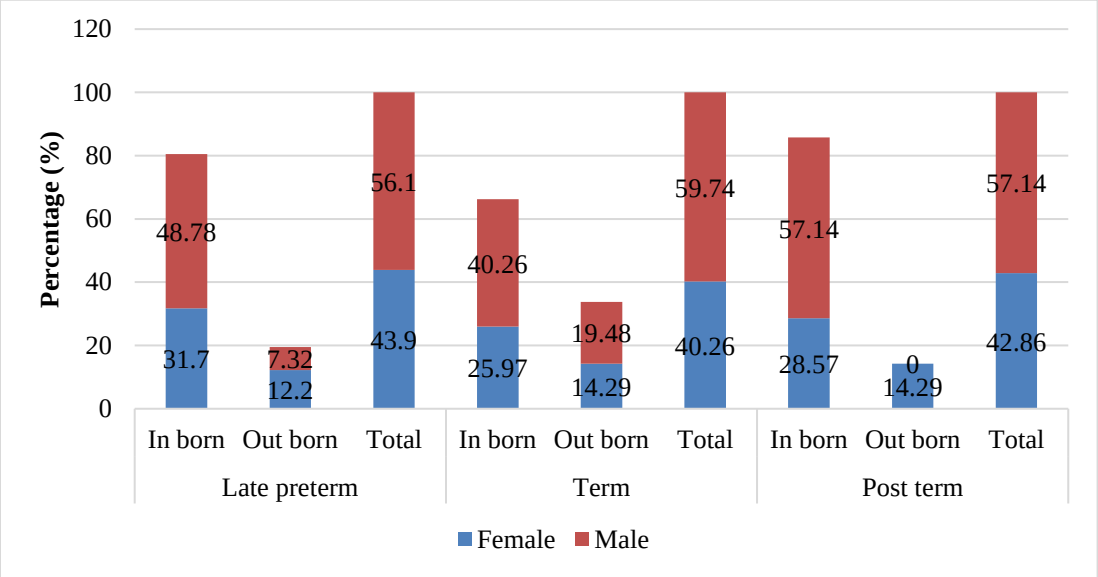
These are the results done on a Prospective Cross sectional study involving inborn and outborn neonates with hyperbilirubinemia during the period of june 2022 to june 2024 . A total of 125 neonates were enrolled in our study.

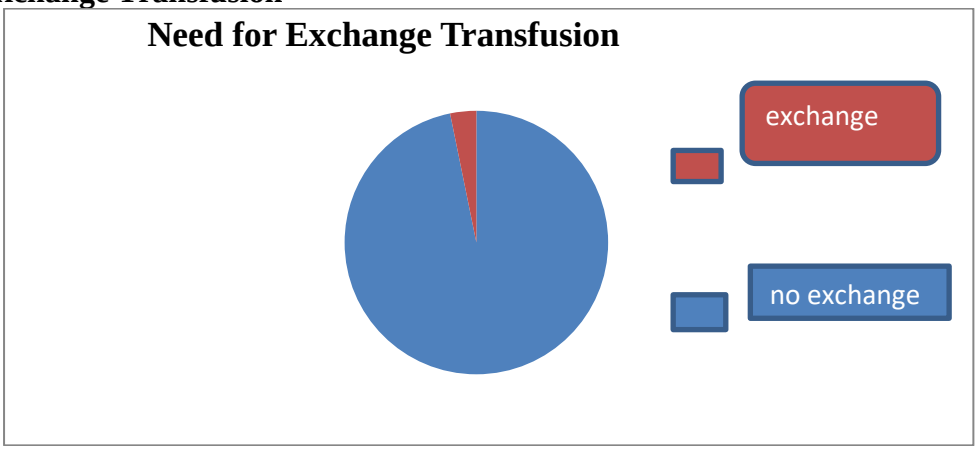
Distribution of Hyperbilirubinemia subjects according to Sex



Graph 1. Distribution of Hyperbilirubinemia subjects according to sex and Inborn , outborn

Across all Gestational ages and Birth places, there are 52 females (41.60%) and 73 males (58.40%).

Need of Exchange Transfusion



Graph 2. Distribution of subjects according to Need of Exchange transfusion

One (25%) newborn with ABO incompatibility with DCT positive required an exchange transfusion, 3 (75%) newborns with ABO incompatibility but with DCT negative required an exchange transfusion (P=0.8000).

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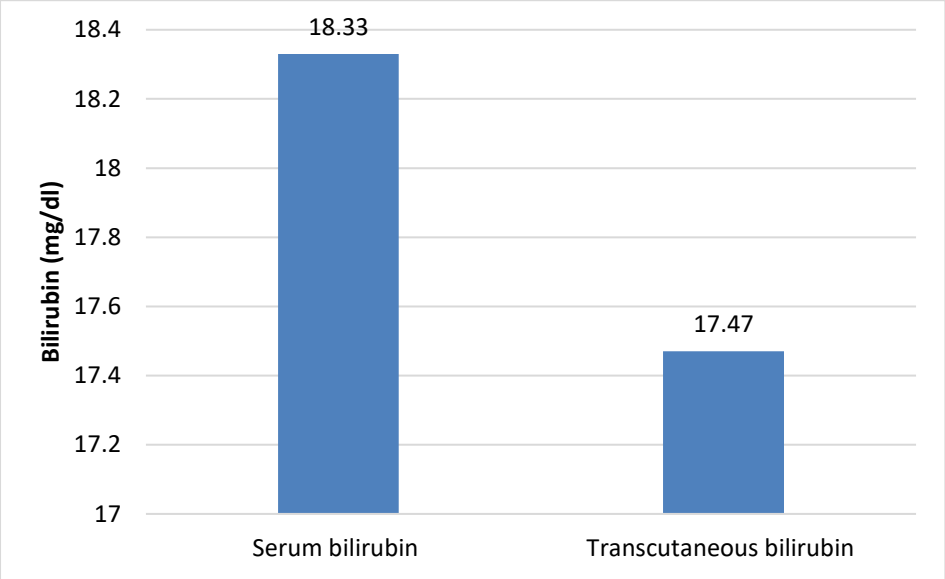
Serum Bilirubin vs Transcutaneous Bilirubin



Graph 3. Comparison of serum bilirubin and transcutaneous bilirubin

The mean serum bilirubin level is slightly higher than the mean Transcutaneous bilirubin level. The p-value of 0.0124 indicates a statistically significant difference between the serum and transcutaneous bilirubin measurements.

DISCUSSION

SEX PREDISPOSITION

Studies	Male	Female
Mohammad KI et al [9]	57.5%	42.5%
Asaye S et al [10]	62.2%	37.8%
Present study	58.4%	41.6%

In our study showed predominance of males in late preterms, term and post terms , which was similar to studies by Mohammad KI et al [9] which showed male with 57.5% and Asaye S et al [10] which also showed male with 62.2%, showing male gender as statistically significant risk factor.

Need for exchange transfusion

	Need for exchange transfusion	MEAN SERUM BILIRUBIN
Present study	3.2%	25.5 ± 3.41 mg/dl
Najib et al [11]	35.5%	-
Emel o Kulu et al [12]	2.3%	24.9 ± 9.1 mg/dl

In our study exchange transfusion was done in 4 neonates out of which 1 had ABO Incompatibility with DCT positive and other 3 with ABO incompatibility with DCT negative with mean serum bilirubin value about 25.85±3.41mg/dl and did not show any statistical

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significance. In Najib et al [11] study 35.5% neonates with severe hyperbilirubinemia needed exchange transfusion. In Emel o Kulu et al [12] 2.3% required exchange transfusion with mean serum bilirubin level of 24.9±9.1mg/dl .Our study showed there is decrease in need in exchange transfusion due to use of LED phototherapy and early detection of hyperbilirubinemia and treating it.

CORRELATION OF TRANSCUTANEOUS BILIRUBIN AND SERUM BILIRUBIN

In our study mean serum bilirubin was relatively higher than transcutaneous bilirubinometer but did not show any significant difference between them and was statistically significant.

Similar results were seen in Maruthi Prasad et al [13], Rodriguez-Capote et al [14] and simsek FM [15] et al showed linear relationship between transcutaneous bilirubinometer and serum bilirubin levels.

CONCLUSION

1. Across all Gestational ages, there are 52 females (41.60%) and 73 males (58.40%).our study showed Male sex as one of the risk factor to develop hyperbilirubinemia.
2. In our study we shown that need for exchange transfusion was only 3.2% which has been significantly reduced due to use of LED phototherapy with multiple surfaces and Intensive phototherapy ,early detection of hyperbilirubinemia and treating accordingly and Anti -D being administered to Mothers in previous pregnancies.
3. In our study mean serum bilirubin was relatively higher than transcutaneous bilirubinometer but had neglible difference in predicting the bilirubin level.our study concludes to use trancutaneous bilirubinometer and decrease the invasive procedure to test serum bilirubin multiple times.

Conflict of interest: We have no conflict of interest

Funding: No funding sources

Ethical approval: The study was approved by the Institutional Ethics Committee.

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