

## CORRELATION OF NEONATAL HYPERBILIRUBINAEMIA IN INFANTS WITH NEONATAL HYPERBILIRUBINAEMIA IN SIBLINGS

Dhanyatha<sup>1</sup>, Adarsh E<sup>2</sup>, Sherin<sup>3</sup>, Darshan<sup>4</sup>, Niveditha<sup>5</sup>, Manjunath<sup>6</sup>

<sup>1</sup>Postgraduate Student, Department of Paediatrics, Rajarajeshwari Medical College and Hospital.

<sup>2</sup>Professor and HOD, Department of Paediatrics, Rajarajeshwari Medical College and Hospital.

<sup>3</sup>Postgraduate Student, Department of Paediatrics, Rajarajeshwari Medical College and Hospital.

<sup>4</sup>Postgraduate Student, Department of Paediatrics, Rajarajeshwari Medical College and Hospital.

<sup>5</sup>Postgraduate Student, Department of Paediatrics, Rajarajeshwari Medical College and Hospital.

<sup>6</sup>Postgraduate Student, Department of Paediatrics, Rajarajeshwari Medical College and Hospital.

### ABSTRACT

#### BACKGROUND

Aim- To assess the risk of hyperbilirubinaemia in infants whose siblings had hyperbilirubinaemia.

Objective- To assess the usefulness of hyperbilirubinaemia in siblings to predict hyperbilirubinaemia in infants.

#### MATERIALS AND METHODS

Two hundred and fifty term neonates born in the study period from January 2015 to January 2016 were included in the study after obtaining written informed consent from the parents. Demographic details, drugs used during delivery, birth weight, blood group of mother and baby, feeding details and total serum bilirubin were recorded. Maternal variables like history of jaundice, mode of delivery and use of drugs during pregnancy were collected. Medication during labour, details of delivery, maternal blood groups were collected from the maternal case file. Babies were examined daily and looked for evidence of jaundice, sepsis, illness or birth trauma. Weight of the newborn was recorded and gestational age calculated. All the babies were followed up daily for the first five postnatal days, because peak serum bilirubin occurs between third to fifth days.

#### RESULTS

In our study, out of 250 babies 204 babies had siblings, among them 60 babies had siblings with history of hyperbilirubinaemia out of which 21 (85.7%) babies had hyperbilirubinaemia. There is significant statistical difference in peak serum bilirubin levels and hyperbilirubinaemia in siblings. Hence, babies whose siblings had hyperbilirubinaemia had higher incidence of hyperbilirubinaemia.

#### CONCLUSION

There is significant statistical correlation between hyperbilirubinaemia in siblings and peak serum bilirubin levels.

#### KEYWORDS

Hyperbilirubinaemia, Jaundice, Kernicterus.

**HOW TO CITE THIS ARTICLE:** Dhanyatha, Adarsh E, Sherin, et al. Correlation of neonatal hyperbilirubinaemia in infants with neonatal hyperbilirubinaemia in siblings. Journal of Evolution of Research in Paediatrics and Neonatology 2017; Vol. 3, Issue 1, Jan-June 2017; Page: 8-10.

#### BACKGROUND

Health is a fundamental right.<sup>(1)</sup> In spite of our independence, completing 69 years and with so many health programs infant mortality rate is high compared to other developing countries. A developing country like ours must be fully aware of its limitations in the development of neonatal care. Best possible results can be obtained by introducing appropriate technologies. Ultimate aim is to benefit maximum number of babies with improved survival and reduced morbidity.

Jaundice is the visible manifestation in skin and sclera of elevated serum concentration of bilirubin. Neonatal jaundice affects up to 70% term and 80% preterm infants. This is due to imbalance between bilirubin production and its elimination.

Immature newborn brain is susceptible for toxicity from unconjugated bilirubin, resulting in neurodevelopmental or intellectual handicaps and finally kernicterus. Chemical hyperbilirubinaemia [serum bilirubin more than 2 mg/dL] is universal in newborns.<sup>(2)</sup> 6.1% of term newborns have a serum bilirubin of more than 12.9 mg%, while 3% of neonates have serum bilirubin over 15 mg%. Since 1991, several reports have been published on emergence of kernicterus in full-term newborn.<sup>(3,4,5)</sup> It is suggested that a combination of two factors, i.e. decreased concern about jaundice in full term breast fed neonates along with shortened hospital stay has accounted for emergence of severe hyperbilirubinaemia and kernicterus.<sup>(3)</sup>

Hence, early detection and appropriate management of neonatal jaundice is of paramount importance. There have been reports of correlation between infants with hyperbilirubinaemia and their siblings with hyperbilirubinaemia. There has been a paucity of studies on this hypothesis from India. Hence, keeping this in mind the present study is designed to determine the correlation of hyperbilirubinaemia in infants with hyperbilirubinaemia in siblings.

Financial or Other, Competing Interest: None.

Submission 10-02-2017, Peer Review 18-03-2017,

Acceptance 27-03-2017, Published 05-04-2017.

Corresponding Author:

Dr. Adarsh E,

#150/C, 2<sup>nd</sup> Cross, BEML Layout,

8<sup>th</sup> Main Basaveshwaranagar,

Bangalore.

E-mail: dradarsh@gmail.com



**MATERIALS AND METHODS**

Method of collection of data: Two hundred and fifty term neonates born in study period from January 2015 to January 2016 were included in the study after obtaining written informed consent from the parents.

**Inclusion Criteria**

All healthy full term newborns.

**Exclusion Criteria**

1. Low birth weight infants or gestation age less than 37 weeks.
2. Major congenital malformations.
3. Conjugated hyperbilirubinaemia.
4. Those who lost for followup before completion of 5 days of life.
5. Rh incompatibility.

Data was collected as per the proforma. Questionnaire method, maternal case file and examination of the newborn were used to obtain the required data. Maternal variables like history of jaundice in sibling, mode of delivery and use of drugs during pregnancy were collected. Medication during labour, details of delivery, maternal blood groups were collected from the maternal case file. Babies were examined daily and looked for evidence of jaundice, sepsis, illness or birth trauma. Weight of the newborn was recorded and gestational age calculated. All the babies were followed up daily for the first five postnatal days, because peak serum bilirubin occurs between third to fifth day.<sup>(2)</sup> Blood was drawn on fifth post-natal day. Peripheral venous blood was used to measure serum bilirubin. Blood sample collected was stored away from light. The sample was refrigerated 2 - 8 degree Celsius till serum bilirubin estimation was done. Serum bilirubin was done within 12 hours of sample collection by Diazo test. Auto analyser-Microline 25 with reagent with Agappe Diagnostics was used in serum bilirubin estimation.

**Principle**

Sulfanilic acid react with sodium nitrite to produce diazotized sulfanilic acid in the presence of methyl sulfoxide to produce azobilirubin. This can be measured at 532/546 nm. Blood was drawn for serum bilirubin estimation at birth from cord, on day 1 and day 5.

The main outcome of the study was inferred in terms of hyperbilirubinaemia, serum bilirubin level of  $\geq 15$  mg/dL. Maternal neonatal and natal variables were compared between neonates with 5 days of followup.

**Statistical Analysis**

Data was entered into Microsoft Excel data sheet and was analysed using SPSS 22 version software. Categorical data was represented in the form of frequencies and proportions. Chi-square test of Fisher's exact test (for 2 x 2 tables only) was used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation. Graphical representation of data: MS Excel and MS Word was used to obtain various types of graphs such as bar diagram, pie diagram and scatter plots. Pearson correlation or Spearman's correlation was done to find the correlation between two quantitative variables and qualitative variables respectively. P value (probability that the result is true) of  $< 0.05$  was

considered as statistically significant after assuming all the rules of statistical tests. MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data. EPI Info (CDC Atlanta), Open Epi, MedCalc and Medley's desktop were used to estimate sample size, odds ratio and reference management in the study.

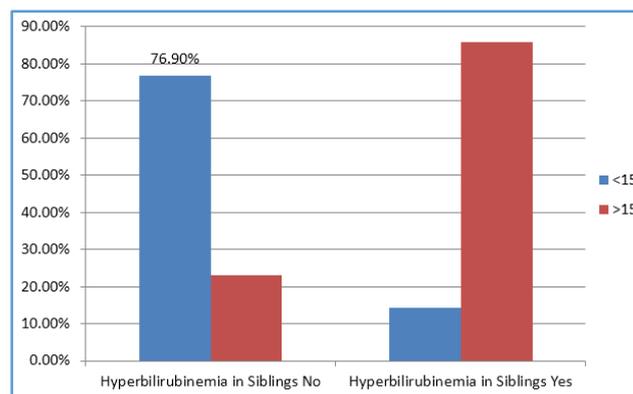
**RESULTS**

The following observations were made from the study. The study group consisted of 250 healthy term newborns, who were followed up for the first five post-natal days. The study results were analysed using appropriate statistical analysis and compared with the previous studies.

		Peak Bilirubin			
		< 15		> 15	
		Count	%	Count	%
Hyperbilirubin- aemia in Siblings	No	141	76.9%	3	14.3%
	Yes	82	23.1%	18	85.7%
	<b>Total</b>	<b>183</b>	<b>100.0%</b>	<b>21</b>	<b>100.0%</b>

**Association between Hyperbilirubinaemia in Siblings with Peak Serum Bilirubin Values**

$\chi^2 = 54.52, df = 1, p < 0.001^*$



In our study, out of 250 babies 204 babies had siblings; among them 60 babies had siblings with history of hyperbilirubinaemia, out of which 21 (85.7%) babies had hyperbilirubinaemia. Hence, there is significant statistical difference in peak serum bilirubin levels and hyperbilirubinaemia in siblings.

**DISCUSSION**

Neonatal hyperbilirubinaemia is a complex metabolic state, which occurs as a result of both physiological and pathological processes in the neonatal period. Serious complications such as cerebral palsy, BIND, mental retardation can occur in these neonates. However, neurological manifestations complicating neonatal hyperbilirubinaemia is not seen in about 15% of babies with kernicterus. An increasing number of newborn infants are discharged from the hospital within 48 hours of birth due to economic constraints and medico-social issues. Therefore, hyperbilirubinaemia is detected before discharge less often than it was in the past. In view of these life-threatening complications, it is necessary to identify neonates at risk of developing hyperbilirubinaemia by using a sensitive method. This will help in following effective preventive measures and early treatment to reduce mortality and morbidity. A study done by Narasimhappa M Gundur et al<sup>(6)</sup> in

2010 shows that history of prolonged jaundice in siblings is an independent predictor of prolonged jaundice in newborns. A study done by Uthaya Kumaran et al<sup>(7)</sup> in 2016 shows that infants with siblings who had hyperbilirubinaemia did not require significant phototherapy.

#### Limitations of the Study

1. Only full term healthy newborns were included in the study. Application of the prediction test to preterm babies and sick babies were not studied.
2. Babies were followed up for five postnatal days. Hyperbilirubinaemia occurring after five days was not studied.

#### CONCLUSION

There is significant statistical correlation between hyperbilirubinaemia in siblings and peak serum bilirubin levels.

#### REFERENCES

- [1] Park K. Respiratory infections. Park's text book of preventive and social medicine. 16<sup>th</sup> edn. Banarsidas Bhanot Publishers, Jabalpur 2000:1-11.
- [2] MacMahon JR. Physiologic jaundice. In: David K, Tarush HW, Ballards RA. Avery's diseases of the newborn. 7<sup>th</sup> edn. W.B. Saunders company, part XII, 1998:995-1044.
- [3] Brown AK, Johnson L. Loss of concern about Jaundice and the reemergence of kernicterus in full term infants in the era of managed care. In: Fanaroff A, Klaus M. Year book of neonatology and perinatal medicine 1996:P 28.
- [4] Johnson L. Hyperbilirubinemia in the term infant: when to worry, when to treat. N Y State J Med 1991;91(11):483-9.
- [5] Sole A. Changes in clinical practice of bilirubin encephalopathy in healthy term newborns. *Pediatr Res* 1995;37:145A.
- [6] Kumaran U, Arya AK, Rakholia R. Study to predict newborn at risk of developing neonatal hyperbilirubinemia by measuring cord bilirubin. *J Evolution Med Dent Sci* 2016;5(31):1676-82.
- [7] Gundur NM1, Kumar P, Sundaram V, et al. Natural history and predictive risk factors of prolonged unconjugated jaundice in the newborn. *Pediatrics International* 2010;52(5):769-72.