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A STUDY OF NEONATAL HYPERBILIRUBINEMIA FROM A TERTIARY CARE HOSPITAL

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ABSTRACT

Aim: This objective of this study was to analyse the etiology, risk factors, and morbidity profile associated with neonatal hyperbilirubinemia in a tertiary care hospital. **Methods:** This retrospective study was conducted at neonatal intensive care hospital from March 2019 to August 2021. All the new-born babies with neonatal hyperbilirubinemia were included in the study. **Results:** Out of 290 new-born babies, 180 (62%) developed clinical jaundice. Out of 180 neonates with clinical jaundice, 62 (34%) neonates developed physiological jaundice and 118 (66%) neonates developed non physiological jaundice requiring therapeutic intervention in the form of phototherapy or exchange transfusion.

Conclusion: Present study concludes that the leading cause of pathological jaundice is more common than physiological, ABO incompatibility followed by idiopathic causes remains the commonest cause of pathological jaundice.

KEYWORDS : Neonate, Bilirubinaemia, Phototherapy, ABO incompatibility

INTRODUCTION

Neonatal hyperbilirubinemia or jaundice is defined as the yellowish discolouration of the skin. It is seen in more than 60% of term and 80% of preterm babies in the first week of life [1,2]. It is more often physiological; however, sometimes serum bilirubin levels cross the normal range and criterion (as per the recommended guidelines by the American Academy of Paediatrics [AAP] to become pathological[3,4]. Some of the most common causes of neonatal jaundice include physiological jaundice, breast feeding jaundice, breast milk jaundice, prematurity leading to jaundice & various pathological causes like haemolytic disease, neonatal sepsis, deficiency of G6PD enzyme, hypothyroidism , cephalhematoma and rare conditions such as Gilbert's syndrome, liver dysfunction etc[5,6]. Early detection and timely intervention with lesser invasive treatment modalities such as phototherapy, hydration, intravenous immunoglobulin G can avoid high risk interventions like exchange transfusion.[7]

In this study we have tried to find the common causes of neonatal hyperbilirubinemia in neonates but more studies are required from the different geographical areas to see the burden and causes of neonatal hyperbilirubinemia so that a collective effort can be made to decrease the burden of both morbidity & mortality resulting from the complications of neonatal hyperbilirubinemia.

MATERIALAND METHODS

Place of study:

The study was conducted in a teaching hospital in Jammu.

Study Design: Hospital based retrospective study

Duration Of Study: 18 months **(March 2019 to August 2021)**

Method Of Study:

Neonates that were born in the hospital over a period of 18 months who developed clinical jaundice requiring investigation or treatment were enrolled in the study. All the medical records were noted including age of onset of jaundice, sex, gestation age whether term or preterm/IUGR, investigations performed like serum bilirubin (done by Diazo method via fully automated analyser), CBC, CRP, serum TSH, ABO/RH, G6PD, direct coombs test and treatment received were also noted down. **Clinical jaundice** is visible yellowish discoloration of skin of new-borns in the day light. **Significant hyperbilirubinemia** was defined as the value of bilirubin according to AAP guidelines in term neonates and Cockington's charts in preterm, above which phototherapy or exchange transfusion or both are required[8,9]. The following situations suggest **pathological jaundice** and require evaluation:

a. Onset of jaundice before 24 hours of age,
b. Elevation of serum bilirubin requiring phototherapy,
c. Rate of rise in serum bilirubin levels ≥ 5mg/dl/day,
d. Signs of underlying illness in any infant (vomiting, lethargy, hypoglycemia, poor feeding, excessive weight loss, apnea, tachypnoea or temperature instability),
e. Jaundice persisting after 8 days in a term baby or after 14 days in a premature infant [8].

Exclusion Criteria:

a. Out-born babies were excluded from the study.
b. Babies with major congenital malformations.
c. New-borns who expired or were referred before complete evaluation during the period of hospital stay.
d. Conjugated hyperbilirubinemia (conjugated bilirubin> 2mg/dl).

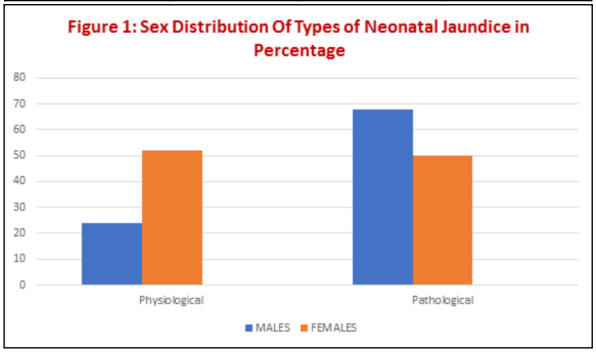
RESULTS AND OBSERVATION

In the present study, out of 290 new-borns who were delivered during the study period, 180 (62.06%) neonates developed clinical jaundice. (Table 1)

Out of 180 neonates with clinical jaundice, 118 (65%) neonates had pathological jaundice and the rest 62(34%) developed physiological jaundice. Among the 118 babies developing pathological jaundice 68(58%) were males 50 (42%) were females and among the total 290 babies developing clinical jaundice 92(52%) were males and 88(48%) were females (Figure 1)

Table 1 Sex Distribution Of Jaundice

Type of jaundice	Total (%)	Male (%)	Female (%)
Clinical	180(62)*	92(52)	88(48)
Physiological	062(34)	24(38)	38(62)
Pathological	118(66)	68(58)	50(42)



Out of 118 neonates who developed pathological jaundice maximum cases n=28(24%) had jaundice due to ABO incompatibility followed by idiopathic where no cause could be found causes in 20(17%), G6PD in 18(15%), hypothyroidism in 14(12%)1,12(10%) presented with sepsis,9% were low birth weight (either preterm or IUGR babies), 6(5%) had cephalohematoma, 4(3%) had Rh incompatibility.

Table 2: Etiology Of Pathological Jaundice

Causes	Frequency (N=118)	Percentage %
ABO Incompatibility	28	24
Idiopathic	20	17
G6PD	18	15
Hypothyroidism	14	12
Sepsis	12	10

Low birth weight (Prematurity/IUGR)	09	08
Cephalhematoma	07	06
Breast feeding jaundice	06	05
RH Incompatibility	04	03
Total	118	100

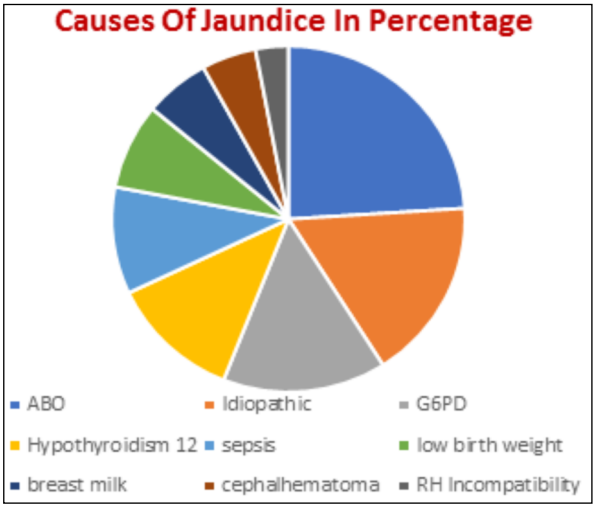


Figure 2 Showing Percentages Of Causes Of Neonatal Jaundice

Risk Factors

Out of the total babies with pathological jaundice, 42 (36%) neonates were born to mother with history of hypothyroidism, 24(20%) neonates were born to mothers with history of Gestational Diabetes Mellitus, 22 (19%) had history of previous sibling requiring phototherapy. However, in 17(14%) no risk factor was found and it was seen that 13(11%) had history of birth asphyxia as a risk factor.

Table 3 Risk Factors For Jaundice

Risk factor	Frequency	Percentage
Mother hypothyroid	42	36
Baby of diabetic mother	24	20
History of Jaundice in sibling	22	19
No risk factor	17	14
Birth asphyxia	13	11
Total	118	100

Out of 149 neonates with pathological jaundice, 2 (1.3%) required double volume exchange transfusion as a therapeutic intervention for the treatment of jaundice. Out of the two babies requiring double volume exchange transfusion, one baby had ABO incompability and one had Rh incompability as a cause of jaundice.

DISCUSSION

A total of 180 neonates of neonatal hyperbilirubinemia were studies in detail and following observations were made. Out of the total 180 neonates with neonatal jaundice 52% were males. Studies by Narang et all and Singhal et al [11] also showed a male predominance with 56.2% males.[10]

In the present study physiological jaundice was seen in 34% of the total babies who presented with clinical jaundice. In a study conducted by Anil Narang et al [10] 14.5% developed neonatal jaundice.

Among them most common cause of jaundice was jaundice due to ABO incompatibility in 28 (24%), second most common cause being due to idiopathic causes in 20(17%), third common cause being due to G6PD deficiency in18 (15%), followed by hypothyroidism in 14(12%), sepsis in 12(10%), low birth weight of either preterm or IUGR babies was seen in 9(8%), cephalhematoma in 6%. In a study conducted by May-Jen Huang et al., similar patten of distribution has been observed [12].

In our study ABO incompatibility is the most common cause of non-physiological jaundice in new-born. In a study of a population of new-borns in Turkey, there was a 14.8% incidence of ABO incompatibility, with 21.3% of these babies exhibiting significant hyperbilirubinemia and 4.4% exhibiting severe ABO haemolytic disease[13]. Prematurity/ IUGR was also a common cause in our study. These babies are prone to develop jaundice due to immaturity of bilirubin conjugating system, higher rate of Hemolysis, increased enterohepatic circulation, decreased caloric intake[14]. Onyearugha, et al also concluded prematurity as one of the leading cause of neonatal jaundice.[15]

In our study 6% (7) new-borns had extravascular bleed and all developed pathological jaundice. In a study done by Meredith L. Porter et al in Virginia, they found that common risk factors for hyperbilirubinemia include fetal-maternal blood group incompatibility, prematurity, and a previously affected sibling, Cephalohematoma, bruising, and trauma from instrumental delivery may increase the risk for serum bilirubin elevation[16]. All 22(19%) new-borns with history of previous sibling death developed pathological jaundice. Infants with risk factors should be monitored closely during the first days to weeks of life[16]. 13(11%) new-borns with history of birth asphyxia developed pathological jaundice. Out of 180 new-borns with clinical jaundice, 118 (65%) new-borns required therapeutic intervention in the form of phototherapy as a mode of treatment for clinical jaundice.

CONCLUSION

Present study concludes that the leading cause of pathological jaundice is ABO incompatibility followed by idiopathic causes. Pathological jaundice contributes to maximum number of cases among total cases. Early detection and timely intervention should be attempted aggressively to avoid high risk procedures like exchange transfusion.

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