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Research Paper

Neonatal factors affecting Neonatal Jaundice in Saurashtra region of Gujarat

Medical Science

KEYWORDS : neonatal jaundice; birth weight; gestational maturity

Gitesh Dubal — M.D. Tutor in physiology, Department of Physiology, Shri M. P. Shah medical college, Jamnagar

Varsha Joshi — Professor and Head in physiology, Department of Physiology, Shri M. P. Shah medical college, Jamnagar

ABSTRACT

Objectives: Several neonatal factors are responsible for neonatal jaundice which is commonly observed in large number of neonates. Yet the role of these factors in causation of neonatal jaundice is not well established. As a result, study was conducted to analyze role of these factors in neonatal jaundice.

Material and methods: 50 neonates with neonatal jaundice with serum bilirubin level >5mg% were examined for presence of these factors and its association with level of total serum bilirubin was studied. Neonates with total serum bilirubin <5mg% and with severe congenital malformation like anencephaly or hydrocephalus were excluded.

Observations: Age, maturity, birth weight were found to be associated ($p<0.05$) with level of total serum bilirubin in neonatal jaundice while sex, place of delivery and etiological profile was not associated ($p>0.05$) with level of total serum bilirubin. Paradox phenomenon was observed regarding factors like maturity and birth weight i.e. with premature babies lesser total serum bilirubin was found compared to mature babies. Reason was change in treatment protocol of phototherapy where it was started in premature babies without prior consideration of total serum bilirubin level resulting into lower levels of total serum bilirubin.

INTRODUCTION

Most jaundice is benign, but because of the potential toxicity of bilirubin, newborns must be monitored to identify those who might develop severe hyperbilirubinemia and, in rare cases, acute bilirubin encephalopathy or kernicterus [1]. Signs of Neonatal Jaundice are seen within the first three days of birth in 80% of preterm babies and 60% of full-term infants. Data from NNPD (National Neonatal Perinatal Database- 2002-03 report) the incidence of neonatal hyperbilirubinemia (>15mg/dl) is 3.3%. Numbers of factors associated with neonatal jaundice are suggested by some authors and research articles [2-11]. So attempt was made to find factors which tend to associate with it in hospital at Saurashtra region and thus altering management protocol and its duration.

MATERIALS AND METHODS

The present study includes analysis of clinical evaluation of 50 neonates. Approval from Institutional Ethical Committee (IEC) was taken before starting study.

Neonates with both conjugated and unconjugated hyperbilirubinemia admitted at Neonatal intensive care unit (NICU) in paediatric department in Shri GuruGobind Hospital (tertiary care hospital), Jamnagar from May 2010 to May 2011 were included.

Those neonates with clinically visible jaundice and with total serum bilirubin > 5 mg% (as per AAP-American Academy of Pediatrics guidelines, 2004) were considered for study. Those neonates not having clinically visible jaundice, whose parents didn't give consent, with Total serum bilirubin < 5 mg% and with life threatening congenital malformations like hydrocephalus, anencephaly etc were excluded.

Information about age, gender, place of delivery, maturity, birth weight, etiological profile, duration of phototherapy and number of exchange transfusions were collected. Written informed consent was taken from all mothers/guardians.

Cases were divided based on total serum bilirubin levels (TSB) into Group A (TSB<15 mg %) and Group B (TSB≥15 mg %) [12]. Serum Bilirubin was done by Diazo reagent method and quantitative analysis was done by Spectrophotometry. Venous Blood sample was collected from dorsum of feet or hand after suspecting clinical jaundice.

Statistical analysis was done by SPSS version 20.0.0. Chi square test was applied to study association of factors with Group A and/or B. ANOVA and Multivariate Analysis was done to observe significant, synergistic and independent risk factors for neonatal jaundice. $p<0.05$ was considered significant.

RESULTS

As shown in table neonates with less age <7days (1-3days=22.7 ± 4.5, 4-6days=16.8 ± 2.4) were having higher serum bilirubin levels than neonates with age ≥7 days (12.4 ± 3.2). No neonate with age <1day was present in the study.

M: F ratio was 1.78:1. Also no difference in TSB level was found between male (17.1 ± 5.4) and female(17.5 ± 6.1) neonates in either Group A or B. Regarding maturity, difference in TSB level was paradoxical in gestational age groups i.e. it was the higher in mature neonates(18.2 ± 5.0) as compare to immature(15.4 ± 6.2). Also frequency of neonatal jaundice was higher in mature (66% of cases) than immature (34% of cases) neonates. No neonate was present with gestational age <28 weeks and >48 weeks.

Table 1: MATERNAL AND NEONATAL FACTORS AFFECTING NEONATAL JAUNDICE

	Group A		Group B		Total	
	N(%)	Avg	N(%)	Avg	N(%)	Avg
Age						
1-3 days	2(4%)	13 ± 2.6	15(30%)	23.9 ± 3.5	17(34%)	22.7 ± 4.9
4-6 days	5(10%)	13.4 ± 1.5	12(24%)	17.6 ± 1.2	17(34%)	16.8 ± 2.4
≥7 days	13(26%)	11.3 ± 2.1	3(6%)	17.2 ± 2.1	16(32%)	12.4 ± 3.2
Sex						
Male	14(28%)	12.2 ± 2.2	18(36%)	21.2 ± 3.4	32(64%)	17.1 ± 5.4
Female	6(12%)	11.2 ± 2.2	12(24%)	20.1 ± 5.2	18(36%)	17.5 ± 6.1
Maturity						
28-37 wks	12(24%)	12.4 ± 2.3	5(10%)	22.5 ± 7	17(34%)	15.4 ± 6.2
37-42 wks	8(16%)	11.4 ± 1.9	25(50%)	20.4 ± 3.5	33(66%)	18.2 ± 5.0
Birth weight						
VLBW	1(2%)	10.57	-	-	1(2%)	10.57
LBW	11(22%)	11.6 ± 2.2	10(20%)	22.2 ± 4.7	21(42%)	16.9 ± 6.5
NBW	8(16%)	12.3 ± 2.6	20(40%)	19.7 ± 3.5	28(56%)	17.6 ± 4.6
Total	20(40%)	12 ± 2.2	30(60%)	20.8 ± 4.2	50(100%)	17.2 ± 5.3

Increase frequency of neonatal jaundice was found in normal birth weight babies (56% of cases) a paradoxical phenomenon and TSB level was also higher (17.6 ± 4.6) than low birth weight babies (16.9 ± 6.5). Though higher total serum bilirubin was found in low birth weight babies of Group B (22.2 ± 4.7) than normal birth weight babies (19.7 ± 3.5) of same group.

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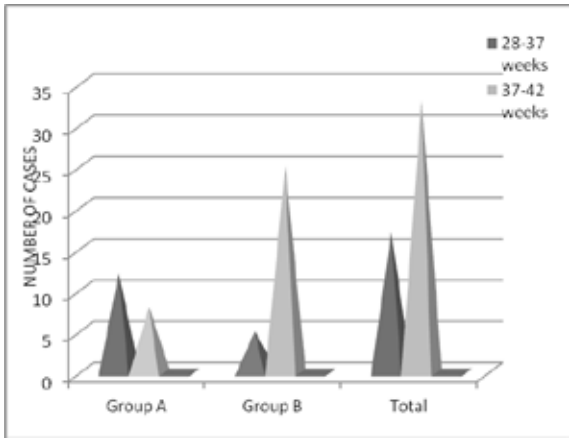

Fig:1 Distribution of newborn as per maturity

Place of delivery (Hospital-delivered or Home-delivered) and etiological profile was not influencing TSB level ($p>0.05$). Neonates with high TSB required longer duration of Phototherapy or Exchange transfusions compared to neonates with low TSB level as more duration is required for geometric isomerisation or removal of bilirubin in high TSB levels.

DISCUSSION

Younger babies have higher TSB level as compare to older ones indicates level of maturity of liver increases with age and thus less chances of higher serum bilirubin as baby's age increases. Also $p<0.001$ indicate association between Group A and B (i.e. TSB level) with age.

In Gender, M: F ratio 1.78:1 indicate male preponderance of neonatal jaundice but no association was found between Group A and B with gender. Similar male preponderance was found in Anil Narang [2] et al, C. N. Onyerugha [3] et al, H. A. Barko [13] et al and Kalakheti [5] et al studies.

Paradoxical results in maturity were also found in C. N. Onyerugha [3] et al studies. Reason for this is change in provision of phototherapy. According to recent guidelines of AAP[14], Prophylactic phototherapy was started in immature neonate without considering estimation of total serum bilirubin level, as a result frequency of neonatal jaundice was less in immature neonate.

CONCLUSIONS

Present study proves influence of age, gender and maturity as risk factors of neonatal jaundice. A precautionary step taken in male premature babies in earlier part of their life thus can prevent neonatal jaundice in large number of cases. Also results show that if prophylactic phototherapy is performed in premature babies it will prevent development of jaundice in large number of neonates.

However other factors still do affect development of jaundice and thus needs further consideration. As sample size is small it act as limiting factor and thus require further investigation in influence of these factors in development of neonatal jaundice.

N= no. of cases, Avg= mean + Standard deviation, VLBW= very low birth weight, LBW= low birth weight, NBW= normal birth weight.

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