Original Article

Frequency of Congenital Hypothyroidism in Newborn Admitted with Neonatal Jaundice at Tertiary Care Hospital Peshawar

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Abstract

Introduction: Neonatal jaundice is a common disorder worldwide affecting 30-70% of newborn infants. Severe neonatal jaundice and its progression to kernicterus is a leading cause of death and disability among newborns in poorly-resourced countries.

Objective: To determine the frequency of congenital hypothyroidism in new born admitted with neonatal jaundice at tertiary care hospital Peshawar.

Materials and Methods: This Descriptive (cross sectional) study in the Department of child health, Hayatabad Medical Complex, Peshawar for a Period of 1 year from January 2020- January 2021.

Results: In our study 489 mothers 386(79%) mothers were in age range 18-30 years while 103(21%) mothers were in age range 31-40 years. 279(57%) babies were male and 210(43%) babies were female. 303(62%) newborns had maternal gestation age ≤38 weeks and 186(38%) neonates had gestation age >38 weeks. 352(72%) newborns had duration of jaundice ≤14 days and 137(28%) newborns had duration of jaundice >14 days. Birth weight was analyzed as 200(41%) newborns had birth weight ≤2.5 kg and 289(59%) newborns had birth weight >2.5 kg. 15(3%) Mothers had positive history of hypothyroidism while 474(97%) mothers had negative history of hypothyroidism. 24(5%) mother had positive history of anti-thyroid drug intake while 465(95%) mothers had negative history of anti-thyroid drug intake. 5(1%) newborn had congenital hypothyroidism while 484(99%) newborn didn't had congenital hypothyroidism. P-value of congenital hypothyroidism with respect to duration of neonatal jaundice, body weight, history of maternal hypothyroidism intake $p<0.001$, 0.3 and 1.15.

Conclusion: Our study concludes that the frequency of congenital hypothyroidism was 1% in new born admitted with neonatal jaundice at tertiary care hospital Peshawar.

Keywords: Hypothyroidism, Jaundice, kernicterus, bilirubin, morbidity, anti-thyroid drugs.

Introduction

Neonatal jaundice is a common disorder worldwide affecting 30-70% of newborn infants1. Severe neonatal jaundice and its progression to kernicterus is a leading cause of death and disability among newborns in poorly-resourced countries2. Mostly jaundice is benign, transitional phenomenon of no clinical significance and subsides itself but in minority of cases, it is pathological and needs treatment. Neonatal jaundice as routinely evaluated by measuring total serum bilirubin concentration (TSB) occurs in varying degrees in most term and premature infants during the first 2 weeks after birth3.

Unconjugated bilirubin is produced from the breakdown of red blood cells in the vascular system. The majority of unconjugated bilirubin (99.9%) is immediately bound to protein and circulates as a bound form until taken up by hepatic cells where it is conjugated to form conjugated bilirubin. The protein binding prevents partially lipid soluble unconjugated bilirubin from crossing the blood brain barrier and subsequently causing brain injury. However, a fraction of unconjugated bilirubin may remain free (unbound to proteins). This free or unbound unconjugated bilirubin has the potential to cross the blood brain barrier and cause neurotoxicity4. This condition is manifested by cerebral palsy, sensory neural hearing loss, dental dysplasia, upward gaze paralysis and mental retardation5.

There is controversy in defining danger level in term and pre-term babies. Recommended threshold levels of serum bilirubin differ between sources, though a level of 20-25mg/dL appears to be a standard threshold with modifications for maturity and general condition of the infant6.

Congenital hypothyroidism (CH) is the most common preventable cause of mental retardation7. CH is defined as thyroid hormone deficiency or defective thyroid function at birth8. In infants it is difficult to diagnose as there are few symptoms. The diagnostic features may include prolonged jaundice, umbilical hernia, macroglossia, feeding difficulty, mottled skin, lethargy, hypothermia, edema, hypotonia, abnormal cry and hypothyroid appearance9. Previously the incidence of CH was in the ratio of 1:2000 to 1:4000 before screening was introduced10. Now this range stands at 1:4000 after congenital screening programs were instituted11. In developing countries, newborn screening (NS) is mandatory. However in countries like Pakistan no Newborn Screening program has been started yet. Therefore, a study was planned to evaluate the incidence of congenital hypothyroidism by measuring the TSH levels in the blood of infants of Pakistani pediatric population so as to recommend guidelines for establishing Newborn Screening. In one study conducted by Ivison F et al had reported that among infants presenting with prolonged jaundice, there were only 2 children with confirmed CHT (prevalence of 0.79%)12.

Materials and Methods

This Descriptive (cross sectional) study in the Department of child health, Hayatabad Medical Complex, Peshawar for a Period of 1 year from January 2020- January 2021.

Inclusion criteria: All the neonates in age range 1 to 14 days, both male and female gender and All the neonates presenting with neonatal jaundice having total serum bilirubin >15mg/dl.

Exclusion criteria: While the neonates already Exchange transfusion for polycythemia, birth Asphyxia Grade III, sepsis & DIC were excluded from this study.

Data Collection Procedure:

All the neonates who fulfilled the inclusion criteria were enrolled though OPD and nursery department. Written informed consent taken from the parents/care givers of the patients for inclusion of their babies in the study and using their data for research. All the routine investigations, clinical examination done for the confirmation of neonatal jaundiced. 2 ml of blood sample was taken from the neonates and was sent to hospital laboratory for the diagnosis of congenital hypothyroidism. Congenital hypothyroidism was considered positive if the TSH level is > 30mU/ml measured in hospital laboratory. All the laboratory investigations were done by an expert pathologist have at least five years of experience. All the above mentioned information like age, gender, duration of jaundice, birth weight and gestational age were recorded in a proforma. Exclusion criteria were strictly followed to control bias in study results.

Results

Table 1: Duration of Jaundice

Duration	*Frequency*	*Percentages*	*P-value*
≤ 14 days	352	72%	<0.001
> 14 days	137	28%	
Total	489	100%	

Table 2: Birth Weight

Birth Weight	*Frequency*	*Percentages*	*P-value*
≤ 2.5 Kgs	200	41%	0.38
> 2.5 Kgs	289	59%	
Total	489	100%	

Table 3: Maternal History of Hypothyroidism

History of Hypothyroidism	*Frequency*	*Percentages*	*P-value*
Positive	15	3%	1.15
Negative	474	97%	
Total	489	100%	

Table 4: Maternal History Of Anti Thyroid Drug Intake

Drug Intake	*Frequency*	*Percentages*	*P-value*
Yes	24	5%	5.6
No	465	95%	
Total	489	100%	

Table 5: Congenital Hypothyroidism

Congenital Hypothyroidism	*Frequency*	*Percentages*	*P-value*
Yes	5	1%	5.6
No	484	99%	
Total	489	100%	

Our study shows that among 489 mothers 386(79%) mothers were in age range 18-30 years while 103(21%) mothers were in age range 31-40 years. Gender of the baby was analyzed as 279(57%) babies were male and 210(43%) babies were female. 86 patients were having Gestation age was analyzed as 303(62%) newborns had gestation age ≤38 weeks and 186(38%) neonates had gestation age >38 weeks. Duration of jaundice was analyzed as 352(72%) newborns had duration of jaundice ≤14 days and 137(28%) newborns had duration of jaundice >14 days (p<0.001) (Table 1). Birth weight was analyzed as 200(41%) newborns had birth weight ≤2.5 kg and 289(59%) newborns had birth weight >2.5 kg (Table 2) (p=0.38). Maternal history of hypothyroidism was analyzed as 15(3%) mother had positive history of hypothyroidism while 474(97%) mothers had negative history of hypothyroidism (Table 3) (p=1.15). Maternal history of anti-thyroid drug intake was analyzed as 24(5%) mother had positive history of anti-thyroid drug intake while 465(95%) mothers had negative history of anti-thyroid drug intake (Table 4) (p=5.6). Status of congenital hypothyroidism was analyzed as 5(1%) newborn had congenital hypothyroidism while 484(99%) newborn didn't had congenital hypothyroidism (Table 5). P-value was calculated using chi-square test.

Discussion

Neonatal jaundice is a common disorder worldwide affecting 30-70% of newborn infants1. Severe neonatal jaundice and its progression to kernicterus is a leading cause of death and disability among newborns in poorly-resourced countries2. Mostly jaundice is benign, transitional phenomenon of no clinical significance and subsides itself but in minority of cases, it is pathological and needs treatment3.

Our study shows that among 489, 279(57%) newborns were male and 210(43%) newborns were female. 303(62%) newborns had gestation age ≤38 weeks and 186(38%) newborns had gestation age >38 weeks. 5(1%) newborn had congenital hypothyroidism while 484(99%) newborn didn't had congenital hypothyroidism.

Our results correlates with another study carried out by Ivison F et al12 in which a total of 257 infants presented with prolonged jaundice, of whom 179 (70%) had serum TFTs. Five infants had a serum TSH >10 mU/l (range 11–422 mU/l, fT<4-22 pmol/l) bloodspot TSH in this age group was 0.5-227Mu/l are two of these groups were identified as CHT screen positive A further 39 had serum TSH 5–10 mU/l (fT4 14–28 pmol/l), all had NBS TSH results<8mU/l (0.4-4mU/l). All the children other than those identified as screen as positive had normal follow up TSH levels and none were found to have CHT at 3 months of age. There were only 2 children with confirmed CHT (prevalence of 0.79%).

Our results correlates with another study carried out by Anjum A et al13 in which among 550 newborns, 4 (0.8%) newborns had elevated TSH level. CH had statistically significant association with mother's hypothyroidism (P value 0.000) and mother's drug intake during the pregnancy period (P value 0.013). maternal hypothyroidism (P value 0.000) and mother's

drug intake during the pregnancy period (P value 0.013).

Our results correlates with another study carried out by Raza H et al14 in which congenital hypothyroidism was found in three babies of 1337 screened.

Our results correlates with another study carried out by Ahmad A et al15 in which a total of 257 infants presented with prolonged jaundice, of whom 179 (70%) had serum TFTs. Five infants had a serum TSH >10 mU/l (range 11–422 mU/l, fT430 mIU/L), was observed in 0.4% (Frequency, 1:257) neonates, with the incidence rate of 1:257. Female to male ratio of hypothyroid neonates was 2:1.

Conclusion

Our study concludes that the frequency of congenital hypothyroidism was 1% in new born admitted with neonatal jaundice at tertiary care hospital Peshawar.

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