

## TO STUDY THE INCIDENCE OF CONGENITAL HYPOTHYROIDISM IN BABIES WITH EXAGGERATED PHYSIOLOGICAL JAUNDICE

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### Abstract

**Background:** Congenital hypothyroidism is well known cause of prolonged unconjugated hyperbilirubinemia and appears to be associated with the delayed maturation of hepatic uridine diphosphate glucuronyl transferase enzyme activity.

**Methods:** This is a prospective, longitudinal and randomized study 100 babies are taken consisting of all newborn, age less than 28 days, admitted to hospital with exaggerated physiological jaundice.

**Results:** One case of congenital hypothyroidism in exaggerated jaundice based on raised TSH levels. Rest of the cases (99%) having normal TSH levels. One case (1%) having TSH level of 48 $\mu$ u/ml on D7 of life indicating congenital hypothyroidism. TSB of this baby is 21.3 mg%. One baby is having TSH level of 30.4 $\mu$ u/ml on D3 of life which subsequently decreased to normal physiological limits on D7 of life.

**Conclusion:** Though the present study is unable to make significant correlation between cause and effect relationship of neonatal exaggerated jaundice and congenital hypothyroidism, but as one case has diagnosed to be suffering from congenital hypothyroidism, TSH should be considered as a screening test for all babies suffering from exaggerated physiological jaundice besides the other predisposing factors responsible for causation of hypothyroidism.

**Keywords:** Neonatal hyperbilirubinemia, Preterm, Congenital hypothyroidism

### INTRODUCTION:

Neonatal hyperbilirubinemia is an important problem in the first week of life<sup>1</sup>. In approximately 60% of term and 80% of preterm infants<sup>2</sup>, Jaundice being the most frequent reason of readmission in hospital in first week of life<sup>3,4</sup>.

Physiological jaundice usually appears between 24-72 hrs of life peaks at 4-5 days of life in term and at 7<sup>th</sup> day in preterm & disappears by 10-14 day of life<sup>4</sup>.

Congenital hypothyroidism is well known cause of prolonged unconjugated hyperbilirubinemia and appears to be associated with the delayed maturation of hepatic uridine diphosphate glucuronyl transferase enzyme activity<sup>5-6</sup>.

The high incidence of prolonged neonatal jaundice in infants with congenital hypothyroidism documented by Aakerran<sup>12</sup> and confirmed by Christensier<sup>7</sup> require reemphasis.

Since jaundice may be the first sign of congenital hypothyroidism<sup>8</sup>, this possibility must be kept in mind in the investigation of any cause of jaundice in infancy. Only by maintaining a high index of

suspicion will be recognized such infants early enough to enhance the possibility of normal mental as well as physical development.

### MATERIAL AND METHODS

This is a prospective, longitudinal and randomized study 100 babies are taken consisting of all newborn, age less than 28 days, admitted to hospital with exaggerated physiological jaundice.

#### Case definition:

1. All term neonates between 37 to 42 weeks of gestational age (as per LMP) presented with clinical jaundice irrespective of weight, sex, place and type of delivery admitted to the nursery.
2. Total serum bilirubin (TSB) of more than 12 mg% are included as case.
3. Appearance of Jaundice within the physiological period of jaundice

#### Exclusion criteria:

Any newborn presenting with jaundice having any of these criteria are excluded from the study.

1. Pre-term babies
2. ABO incompatibility

3. Rh incompatibility
4. Neonatal sepsis
5. Cephalohematoma
6. G6PD deficiency
7. Polycythemia
8. Surgical causes of jaundice
9. Presentation within 24 hrs of life
10. History of hypothyroidism in the mother.

All the cases are subjected to thorough physical examinations to segregate the babies into different categories based on cause of jaundice and necessary laboratory investigation have sent.

#### STATISTICAL ANALYSIS:

The incidence of hypothyroidism in babies with severe jaundice was seen by using the Chi Square test, whereas amongst the level of serum thyroid hormone was checked by the unpaired student's t Test.

#### RESULTS

The present study is conducted in the nursery, Maharaja Agrasen Hospital, New Delhi between the periods of August 2009 to August 2010. This is a prospective study consisting of all newborn age less than 28 days, admitted to hospital with exaggerated physiological jaundice. Pre-term babies, ABO/Rh incompatibility, neonatal sepsis, cephalohematoma, G6PD deficiency, polycythemia, surgical causes of jaundice have excluded from the study. After thorough evaluation the following observations have made.

**Table 1:** Incidence of congenital hypothyroidism in exaggerated Jaundice

Total no of cases	No of cases with raised TSH levels	No of cases with normal TSH levels
100	01	99

Table 1 shows one case of congenital hypothyroidism in exaggerated jaundice based on raised TSH levels. Rest of the cases (99%) having normal TSH levels.

**Table 2:** Serum bilirubin vs. TSH levels

Serum bilirubin (mg %)	TSH level (% Of total cases) $\mu\text{u/ml}$		
	0-20	20-40	>40
12-15	34(100%)	00	00
15-18	38(97.4%)	01(2.56%)	00
18-21	17(100%)	00	00
>21	09(90%)	00	01(10%)

The above table shows TSH levels in patients with exaggerated jaundice. One case (1%) having TSH level of  $48\mu\text{u/ml}$  on D7 of life indicating congenital hypothyroidism. TSB of this baby is 21.3 mg%. One baby is having TSH level of  $30.4\mu\text{u/ml}$  on D3 of life which subsequently decreased to normal physiological limits on D7 of life.

**Table 3:** Mean duration of phototherapy

TSH level	Mean duration (days)
Raised	6
Normal	4.18

Table 3 shows the duration of phototherapy given to the neonates with jaundice. The mean duration of phototherapy required to decrease the level serum bilirubin level in babies with normal TSH level is 4.18 days, whereas for raised TSH level baby it is 6 days.

**Table 4:** Management options for neonatal hyperbilirubinemia

TSH status	Only Phototherapy	DVET	Total
Normal	97	02	99
Raised	01	0	01

This table shows that most patients (97.9%) with normal TSH level responded well to only phototherapy while 2 cases (2.02%) required DVET. In the raised TSH group, only phototherapy is required.

#### DISCUSSION

In the present study we attempted to investigate the association between exaggerated jaundice in the newborn and congenital hypothyroidism which is a reversible cause of mental retardation in young infants.

Only the term neonates with TSB  $>12$  mg/dl are included because beyond this level the neonatal jaundice is considered pathological. Exaggerated jaundice during the period of physiological jaundice of newborn has got multiple explanations but the definite cause is not known.

Since the jaundice may be the first sign of congenital hypothyroidism, the possibility must be kept in mind while investigating a case of neonatal jaundice.

Presence of raised TSH level beyond a particular range is suggestive of congenital hypothyroidism. Thyroid level in the study group is estimated between day 4 to day 14 of post natal age to avoid the physiological changes in the hormonal levels, which occurs in the first 72 hours of life.

The present study found only one case with raise TSH level more than 40  $\mu\text{u/ml}$  i.e. 48.0  $\mu\text{u/ml}$ . The study done by B.Singh *et al.*<sup>9</sup> over 100 babies with neonatal jaundice also founded only one case with high serum TSH level ( $>20 \mu\text{u/ml}$ ) indicating presence of congenital hypothyroidism. The present studies have further shown a case with serum TSH value of 30.4  $\mu\text{u/ml}$  on day 3 of life which subsequently decreased to normal level on day 7 of life.

The incidence of congenital hypothyroidism in neonatal jaundice in our study is at par with the study done at PGIMER, Chandigarh by B.Singh *et al.*<sup>9</sup>

The mean serum TSH level in neonates in our study population is 5.10  $\mu\text{u/ml}$  while B.Singh *et al.*<sup>9</sup> observed a mean serum TSH of 3.1+2.9  $\mu\text{u/ml}$ .

Our study has shown the serum bilirubin of the patient having raised TSH is 26.5 mg%. As per the study done by Tiker *et al.*<sup>10</sup> in Turkey, 5 babies who were diagnosed prospectively as congenital hypothyroidism based on TSH levels were having a mean TSB value of 18.3-25.8 mg%. This correlates the trend of higher value of TSB in patients with raise TSH in neonates with exaggerated jaundice.

As per the case reporting by P. Labrune *et al.*<sup>11</sup> one case was registered as congenital hypothyroidism on day 14 of life after thorough evaluation with a TSB level of 18 mg%.

The mean duration of phototherapy in patients with normal TSH is 4.18 days, while the same is 6 days in babies with raised TSH. In the observations made by B.Singh *et al.*<sup>9</sup> with the use of blue light phototherapy, the mean duration was 96.6+38.1 hrs which is parallel with our results.

Out of 99 cases with normal TSH levels only 2 cases have required double volume exchange transfusion (DVET) to bring the TSB to physiological limits where the baby with raised TSH has managed successfully with conservative treatment and phototherapy.

Very few studies have undertaken till now to establish a correlation between the exaggerated physiological jaundice and congenital hypothyroidism. Only one patient out of 100 has raised TSH, suggestive of congenital hypothyroidism. In the absence of any other significant correlation, the present study infers that no cause and effect relationship can be recognized amongst the serum TSH levels with baby blood group, birth weight and

onset of jaundice in patients with neonatal hyperbilirubinemia.

For drawing definite conclusions, epidemiological studies with large sample size are needed to further establish the association between neonatal jaundice and congenital hypothyroidism.

## CONCLUSION

Though the present study is unable to make significant correlation between cause and effect relationship of neonatal exaggerated jaundice and congenital hypothyroidism, but as one case has diagnosed to be suffering from congenital hypothyroidism, TSH should be considered as a screening test for all babies suffering from exaggerated physiological jaundice besides the other predisposing factors responsible for causation of hypothyroidism.

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