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Effect of Maternal Thyroid Status on Umbilical Cord Blood TSH Value

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Abstract: ***Congenital hypothyroidism is one among the preventable causes of mental retardation. Indian Academy of Paediatrics recommends the use of cord blood samples for screening congenital hypothyroidism. In most cases, the disorder is permanent and results from dysgenesis or agenesis of thyroid gland or a defect in hormonogenesis. A hospital based prospective cohort study was done to study the reliability of cord blood TSH in the diagnosis of congenital hypothyroidism. A cross-sectional study was conducted on 1387 new born babies born in southern railway headquarters hospital between November 2015 to November 2016 to study relationship between maternal thyroid status and cord blood TSH levels.***

Keywords: Congenital hypothyroidism, Cord blood TSH, maternal thyroid status

1. Introduction

Congenital hypothyroidism (CH) is the most common congenital endocrine disorder in childhood and also is one of the most common preventable causes of mental retardation The worldwide incidence is 1:1000-3500 live births and the estimated incidence in India is 1 in 2000 [1]. With increased screening of newborn populations, the incidence was cut down from 1:3, 000 to 1:4,000 [2].

The clinical features of congenital hypothyroidism are often subtle and many newborn infants remain undiagnosed at birth [3]. The slow development of obvious clinical symptoms [4], coupled with the importance of early treatment led to the implementation of widespread newborn screening for this condition.

Aims and Objectives

- To estimate the levels of cord blood TSH and maternal thyroid levels.
- To study relationship between cord blood TSH and maternal thyroid levels.

2. Materials and Methods

A descriptive analytical cross-sectional study was conducted in southern Railway headquarters hospital between January 2016 to January 2017 after getting approval from institutional ethical committee. All new-born babies born during this period are included in the study irrespective of weight and gestational age. Mothers on known anti thyroid drugs and conditions like Down's syndrome, Trisomy 18, neural tube defects were excluded.

Blood samples were collected in a sterile container, from the incised umbilical cord while severing it at the time of birth of the baby. A mixed cord blood sample including both from the umbilical artery and vein was taken.

CB TSH samples of 1324 neonates were sent for estimation by chemiluminescence immunoassay method. All neonates who had a CB TSH value >20 mIU/ml were asked to report on day 7 of life for a full thyroid profile, including TSH, T3, T4, fT3, and fT4. Confirmatory test for congenital hypothyroidism is repeat TSH level >20 mIU/ml was considered. Mothers were classified as being hypothyroid, euthyroid or hyperthyroid during the period of gestation. Those on antithyroid drugs were excluded from the study.

Statistical Analysis

The data was analysed using SPSS (statistical package for social science) ver 20.0. Following the descriptive analysis for comparison among the categorical variables, Chi-square test was used. A "P" value <0.05 was considered to be significant.

3. Result

Table 1: Cord Blood TSH Value And Maternal Thyroid Status

Maternal Thyroid Status	Cord Blood TSH Value				P-Value
	<20mu/l		>20mu/l		
	N	%	N	%	
Euthyroid	1305	98.6	63	100	0.648 NS
Hypothyroid	17	1.3	0	0	
Hyperthyroid	1	0.1	0	0	
Total	1324	100	63	100	

Out of 1324 babies with cord blood TSH <20mu/L, 98.6% of the mothers were euthyroid, 1.3% were hypothyroid and 0.1% were hyperthyroid. Out of 63 babies with cord blood TSH >20mu/L, all mothers were euthyroid. The difference in the distribution was not statistically significant (p=0.648).

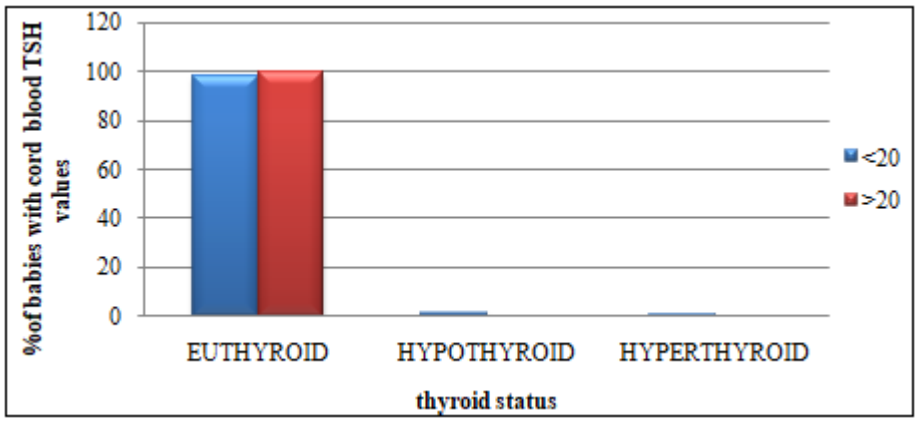

Figure 1: Cord Blood TSH Value and Maternal Thyroid Status

4. Discussion

In our study the relation between the cord blood TSH and maternal thyroid status was not statistically significant (p=0.648).

In a study done on infants with congenital hypothyroidism Grant et. al have reported thyroid disease in 13 mothers (3%) of whom 5 had goiters, three had thyroglossal cyst, two had hypothyroidism and three had hyperthyroidism [5]. Their study done showed that maternal thyroid status has very little effect on cord blood TSH supporting the use of it in primary screening programs. Their study also stated that mothers on antithyroid drugs may have a positive effect on cord blood TSH and may cause transient hypothyroidism in such infants. Bartalena et. al have reported transient hypothyroidism may result from intrauterine exposure to maternal antithyroid drugs [6, 7]

5. Conclusion

The cord blood TSH estimation has the advantages of being easy to collect, noninvasive method for screening for Congenital Hypothyroidism. Our study shows there is no impact of maternal TSH levels in cord blood TSH levels.

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