ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

Original Research Article

TO EVALUATE CONGENITAL HYPOTHYROIDISM AMONG TERM, AND PRETERM BABIES BORN IN LABOUR ROOM AND OPERATION THEATRE AT NETAJI SUBHASH CHANDRA BOSE MEDICAL COLLEGE, JABALPUR

Dr. Rashmi Singh[1] (Senior Resident), Dr. Shilpa Jain[2] (Senior Resident), Dr. Shivanand Solanki[3] (Senior Resident), Dr. Monica Lazarus[4] (Professor) & Dr. Gaurav Gupta[5] (Senior Resident)

Dept. of Paediatrics, NSCB Medical College, Jabalpur, M.P.[1,2&4]
Super Specialty Hospital NSCB Medical College, Jabalpur, M.P.[5]
Corresponding Author: Dr. Gaurav Gupta
e-mail: gauravprakashgupta85@gmail.com

Abstract

Background & Methods: The aim of the study is to evaluate congenital hypothyroidism among term, and preterm babies born in Labour Room. All consecutive deliveries conducted during this period were part of the study. But we were not able to send cord blood thyroid profile of all newborn at the time of covid pandemic so we collected 275 newborn cord blood sample which was further analysed. Blood samples were drawn from maternal end of cord immediately after the cord was being cut and about 3 ml blood was collected in red vacuum tube. The sample obtained was mixed, contained both umbilical artery and veinous blood.

Results: Out of 83 neonates with maternal disease present, pre-eclampsia as a maternal disease was present in mothers of 53 neonates, out of which, 1 had elevated cord blood TSH. Eclampsia as a maternal disease was present in mothers of 15 neonates, out of which 3 neonates had elevated cord blood TSH. GDM as a maternal disease was present in mothers of 10 neonates out of which, 1 had elevated cord blood TSH. PIH+GDM as a maternal disease was present in mothers of 5 neonates, out of which 1 had elevated cord blood TSH. Maximum elevated TSH in neonates was found in eclamptic mothers (20%). and P value is 0.06

Conclusion: As we know that congenital hypothyroidism is the most common preventable cause for mental retardation with an incidence of 1:3000-1:4000 live births worldwide and about 1:2500-1:2800 in India. Because of this all the newborn with initial value of TSH >10µIU/ml, using cord blood as screening tool, were re-evaluated at 3rd postnatal day according to age adjusted reference values for serum T3, T4 and TSH levels. These newborns with increased TSH should be taken as a positive case and should be started on treatment according to protocol and further re-evaluated in follow-ups.

Keywords: congenital, hypothyroidism, term, preterm & Labour.

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

Study Design: Prospective observational study.

1. Introduction

Congenital hypothyroidism (CH) is one of the major health problems and the main preventable cause of mental retardation in Children. It has an incidence of 1 in 4000 births in various neonatal screening programs in India.[1] If Congenital hypothyroidism is diagnosed promptly and treated early, irreversible mental retardation can be prevented. Because signs and symptoms of congenital hypothyroidism are nonspecific and difficult to identify in the neonatal period, newborn are screened at birth for early diagnosis of congenital hypothyroidism. Neonatal screening programs for detection of congenital hypothyroidism in neonatal period are widespread in the developed countries for the last three decades [2, 3] and are fast encouragement in the developing world as well. [4-7] In most screening programs blood samples are collected at 3-6 days of age, but with large number of babies being discharged early, cord blood samples are being used as well.[7,8] In our country, it is very difficult to follow up all babies once discharged. Also, an effective social system where babies could be approached at home is practically non-existent. Thus cord blood remains a very practical alternative for screening purposes, and thus is the practice in some Asian countries. Mixed cord blood samples for TSH values have compared well with filter paper samples taken in the first few days of life.

Use of cord blood TSH are a screening tool is an attractive preposition because of its simplicity and accessibility. The Indian Academy of Pediatrics recommends the use of cord blood samples for screening for congenital Hypothyroidism.[9] Very few reports of cord blood values of only TSH exist in Indian literature[10] and thus this study is being carried out.

Primary congenital Hypothyroidism arises by either abnormality in the development of the thyroid gland (Aplasia, Hypoplasia or ectopic) or an inability to manufacture and secrete thyroid hormone (dyshormonogenesis). Less commonly, the altered neonatal Thyroid function is transient, attributable to the transplacental passage of maternal medications, maternal blocking antibodies, or iodine deficiency or excess. Much rarer secondary hypothyroidism occurs when the pituitary gland dysfunctions, and tertiary when the pathology is at the level of Hypothyroidism.

2. Material and Methods

This is a prospective observational study carried out from December 2019 to December 2021 in a NSCB Medical College in Jabalpur. All consecutive deliveries conducted during this period were part of the study. But we were not able to send cord blood thyroid profile of all newborn at the time of covid pandemic so we collected 275 newborn cord blood sample which was further analysed. Blood samples were drawn from maternal end of cord immediately after the cord was being cut and about 3 ml blood was collected in red

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

vacuum tube. The sample obtained was mixed, contained both umbilical artery and veinous blood. Sample was kept at room temperature of around 25°C and transported to laboratory within 1 hr and analysed with electrochemilumine scence assay. The data of each baby will be collected in the specific proforma which include mother name, mother age, antenatal history for diabetes, hypertension, mode of delivery, maternal risk factor like pre-eclampsia, eclampsia, GDM, PIH plus GDM, baby's gestational age, gender, birth weight.

INCLUSION CRITERIA:

- All newborn babies seen by normal vaginal delivery and LSCS.

EXCLUSION CRITERIA:

- Mother on thyroid medications.
- Very low birth weight (< 1.5kg)
- Prematurity(< 28weeks of gestational age)
- Major congenital anomalies.

3. Result

Table 1: Showing Gender distribution

	Frequency	**Percent**
Male	135	49.1
Female	140	50.9
Total	275	100.0

In my study of 275 neonates,135(49.1%) were males and 140(50.9%)were female.

Table 2: Showing birth weight distribution of neonates studied

Birth Weight	No. of neonates	Percent
1.5-2.5	87	31.6
>2.5	188	68.4
Total	275	100.0

Out of 275 neonates, 87(31.6%) weighed between 1.5 – 2.5 kg, 188(68.4%) weighed > 2.5 kg.

Table 3: Disease wise correlation with cord blood TSH

Maternal disease	TSH Range in Neonate			Total
	< 10	10 – 20	>20	
Pre-eclampsia	52(98.1%)	1(1.9%)	0(0%)	53
eclampsia	12(80%)	2(13.3%)	1(6.7%)	15
GDM	9(90%)	1(10%)	0(0%)	10
PIH + GDM	4(80%)	1(20%)	0(0%)	5
Total	77(92.8%)	5(6%)	1(1.2%)	83

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

Among the 83 neonates with some maternal disease present, pre-eclampsia as a maternal disease was present in 53 neonates, out of which 52(98.1%)neonates had TSH <10µIU/ml, 1(1.9%) had TSH between 10 - 20µIU/ml. With eclampsia as a maternal disease, 12(80%) neonates had TSH <10µIU/ml, 2(13.3%) had TSH between 10 - 20µIU/ml, and 1(6.7%) had TSH >20µIU/ml. With GDM as a maternal disease, 9(90%) neonates had TSH <10µIU/ml, 1(10%) neonate had TSH between 10 - 20µIU/ml. With PIH +GDM as a maternal disease, 4(80%) neonates had TSH <10µIU/ml, and 1(20%) neonate had TSH between 10 -20µIU/ml. Maximum elevated TSH was found with eclamptic mothers.

Table 4: Disease wise correlation with increased cord blood TSH in neonates

Maternal disease	Total No. Of neonates with maternal disease	No. Of neonates with not increase TSH	No. Of neonates with increase TSH	Percentage No. Of neonates with increase TSH	P value
Pre-eclampsia	53	52	1	1.9%	0.06
Eclampsia	15	12	3	20%	
GDM	10	09	1	10%	
PIH+GDM	05	04	1	20%	
Total	83	77	6	7.2%	

Out of 83 neonates with maternal disease present, pre-eclampsia as a maternal disease was present in mothers of 53 neonates, out of which, 1 had elevated cord blood TSH. Eclampsia as a maternal disease was present in mothers of 15 neonates, out of which 3 neonates had elevated cord blood TSH. GDM as a maternal disease was present in mothers of 10 neonates out of which, 1 had elevated cord blood TSH. PIH+GDM as a maternal disease was present in mothers of 5 neonates, out of which 1 had elevated cord blood TSH. Maximum elevated TSH in neonates was found in eclamptic mothers (20%). and P value is 0.06

4. Discussion

Cord blood screening has been a good sampling technique for screening of congenital hypothyroidism. Congenital hypothyroidism is the most preventable cause of mental retardation in children. The cord blood TSH estimation has the advantages of easy collection, simplicity. Previous studies have already concluded that cord TSH had a better specificity and sensitivity as compared to cord or filter paper T4 at 3-5 days of age.

In our result 9.5% (26 neonates) samples showed a cord blood TSH value of >10mIU/L. Mean cord blood TSH value was 6.98 ±3.56 mIU/L amongst 275 neonates. Arun kumar manglik et al.[11] observed mean cord blood TSH was 6.13±5.29mIU/L in 1200 newborn. Feleke et al.[5] observed value of 9.6±7.8mIU/L in 4206 newborn.

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

We used a lower cut off range of TSH for screening congenital hypothyroidism in our study compared to higher ranges used in other studies.

Corbett c et al.[12] showed that the use of low TSH cut off allowed the detection of an unsuspected number of children with neonatal hypothyroidism. In my study, TSH value up to 10µIU/ml was taken as normal, borderline-risk between 10 and 20 µIU/ml, and more than 20µIU/ml as high risk for congenital hypothyroidism. Similar comparison of TSH in their study. Recently another study from India by Gurjit kaur et al.[13] from Chandigharh had taken 9µIU/ml as TSH cut off range.

C Habibur Rasul et al. And S Nahar Lucky et al.[14] In their study from Bangladesh also had had taken cut off range similar to the my study.

In my study the newborns were suspected to have hypothyroidism if TSH levels were >10µIU/ml or TSH levels were <10µIU/ml with T4levels <4 µg/dl. Out of 275 neonates screened with cord blood, 26 (9.4%) were considered to have hypothyroidism on 1st screening.

Among suspected neonates, 24 (8.7%) had a TSH levels between 10 – 20 µIU/ml, and 2(0.7%) had a TSH levels >20 µIU/ml. Repeat sample of veinous blood was sent for thyroid profile as second screening on 3rd post natal day only for the suspected neonates. On 2nd screening it was found that 21 had normal, 1 had TSH between 10-20 (20µIU/ml) and 2 (83.3%) had TSH level >20 (34.56;30.5µIU/ml), and 2 neonates were not found for 2nd screening and were lossed on follow up. Treatment has been started in these 3 neonates out of total 275 neonates screened.

5. Conclusion

As we know that congenital hypothyroidism is the most common preventable cause for mental retardation with an incidence of 1:3000-1:4000 live births worldwide and about 1:2500-1:2800 in India. Because of this all the newborn with initial value of TSH >10µIU/ml, using cord blood as screening tool, were re-evaluated at 3rd postnatal day according to age adjusted reference values for serum T3, T4 and TSH levels. These newborns with increased TSH should be taken as a positive case and should be started on treatment according to protocol and further re-evaluated in follow-ups.

6. References

1. Lafran Congenital Hypothyroidism S, Hypothyroidism in: Behrman RE, Kleigman RM, Jenson HB, editors. Nelson Textbook of Pediatrics, 17th ed. Philadelphia:Saunders. 2004: 1872-1879.
2. Newborn Screening for Congenital Hypothyroidism: Recommended Guidelines.AAP Policy Statement. Pediatrics 1993: 91;1203-1209.
3. Dussault JH. The Anecdotal history of Screening for Congenital hypothyroidism. J Clin Endocrinol and Metabolism. 1999; 84:4332-4334

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE1, 2024

4. Fagela-Domingo C, Padilla CD, CutiongcoEM. Screening for congenital hypothyroidism(Congenital hypothyroidism) among Filipino newborn infants. Philippine Newborn Screening Study Group. Southeast Asian J Trop Med Public Health1999; 30 Suppl 2: 20-22.
5. Feleke Y, Enquoselassie F, Deneke F,Abdulkadir J, Hawariat GW, Tilahun M, *et al*.Neonatal congenital hypothyroidism screening in Addis Ababa, Ethiopia. East Afr Med J2000; 77: 377-381.
6. Azizi F, Oladi B, Nafarabadi M, Hajipour R.Screening for congenital Hypothyroidism in Teheran; the effect of iodine deficiency on transient elevation of TSH in neonates. J FacultMed SBUMS, 1993; 18: 34-38.
7. Wu LL, Sazali BS, Adeeb N, Khalid BAK. Congenital hypothyroid screening using cord blood TSH. Singapore Med J 1999; 40: 23-26.
8. Ordookhani A, Mirmiran P, Najafi R, HedayatiM, Azizi F. Congenital hypothyroidism in Iran. Indian J Pediatr 2003; 70: 625-628.
9. Fuse Y, Wakae E, Nemoto Y, Uga N, Tanaka M, Maeda M, *et al*. Influence of perinatal factors and sampling methods on TSH and thyroid hormone levels in cord blood. Endocrinol Jpn 1991; 38: 297-302.
10. Walfish PG. Evaluation of three thyroid function screening tests for detecting neonatal hypothyroidism. Lancet. 1976; 1: 1208-1210.
11. Manglik A.K, Chatterjee N, Ghosh G. Umbilical Cord Blood TSH Levels in Term Neonates: A Screening Tool for Congenital Hypothyroidism. IndianPediatr. Oct 2005;42:1029-1032.
12. Corbett C, Weber G, Cortinovis.F, Calebiro D. A 7-year experience with low blood TSH cutoff levels for neonatal screening reveals an unsuspected frequency of congenital hypothyroidism (CONGENITAL HYPOTHYROIDISM). Clin Endocrinol (oxf) 2009 nov;71(5):739-45.
13. Gurjit Kaur and Jyoti Srivastav and Suksham Jain and Deepak Congenital Hypothyroidismawla and Bir S. Congenital Hypothyroidismavan and Rajiv Atwal et al. Preliminary Report on Neonatal Screening for Congenital Hypothyroidism, Congenital Adrenal Hyperplasia and Glucose-6- Phosphate Dehydrogenase Deficiency: A Congenital Hypothyroidismandigarh Experience. Indian J Pediatr 2010; 22
14. C Habibur Rasul, S Nahar Lucky. Congenital Hypothyroidism in the Southern Bangladesh; The Journal Of Teachers Association RMC, Rajshahi; June 2008; Vol 21 : 1.