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Paediatrics

A STUDY TO EVALUATE NEONATAL OUTCOME IN MATERNAL HYPOTHYROIDISM

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ABSTRACT The present study was conducted in a tertiary care centre over a period of one year. The aim of the present study was to assess the effect of maternal hypothyroidism which is adequately controlled on thyroxine on the perinatal parameters and neonatal thyroid functions. A total of 150 hypothyroid women and their infants were taken as study group and an equal number of matched normal antenatal women were taken as controls. S.TSH levels of all the newborns were done. We concluded that adequately controlled maternal hypothyroidism in early gestation does not lead to an increased risk of maternal and neonatal complications and normal brain development. Therefore universal screening for all pregnant women as a part of routine antenatal care should be practiced to avert long term consequences.

KEYWORDS : Hypothyroidism, neonatal brain development, thyroxine

INTRODUCTION

Pregnancy has a profound impact on the thyroid gland and thyroid function due to the effect of Beta HCG causing thyroid stimulation. The gland increases 10% in size during pregnancy in iodine-replete countries and by 20%–40% in areas of iodine deficiency. Production of thyroxine (T_4) and triiodothyronine (T_3) increases by 50%, along with a 50% increase in the daily iodine requirement. These physiological changes may result in hypothyroidism in the later stages of pregnancy in iodine-deficient women who were euthyroid in the first trimester. In general, the pregnant women have lower free T3 (fT3) and free T4 (fT4) levels at term than non-pregnant women[1,2]. In India, the incidence of hypothyroidism ranges between 4.8- 11%[3]. The maternal thyroid dysfunction is associated with adverse pregnancy outcomes such as miscarriage, preterm delivery, eclampsia, preeclampsia and placental abruption in mother whereas increased risk of impaired neurological development in fetus. So thyroid function is affected by pregnancy and its dysfunction effects maternal and fetal morbidity. The aim of the present study was to assess thyroid status of babies born to hypothyroid mothers.

MATERIAL AND METHODS

A prospective observational study was conducted in a tertiary care centre of a period of one year. All the term antenatal women coming to the labour room of the department for delivery were subjected to history taking regarding hypothyroidism and its treatment. Serum TSH and free T3 and free T4 levels were done. Infants born to mothers with normal thyroid function tests on thyroxine replacement therapy were included in the study. All the antenatal term women with normal thyroid function tests and a negative history of hypothyroidism were taken as controls. The serum samples of these neonates were drawn within 72 hours of birth and analysed for serum freeT4 and TSH levels. Congenitally abnormal, preterm and sick neonates were excluded from the study. Normal thyroid function tests levels were defined as- T4 8.2-19.9 mcg/dL, TSH 1.0-17.6 mIU/L in term babies according to the recent guidelines (Nelson textbook of pediatrics).

RESULTS

A total of 150 antenatal term women with hypothyroidism and taking thyroxine replacement therapy formed the study group. 150 normal antenatal term women were taken as controls.

In the study group 106 women were primiparous whereas 44 women were multiparous whereas in the control group 111 women were primigravida. 111 cases in the study group and 109 cases in the control group 37- 40 weeks of gestational age. The mean gestational age of the study group was 38.1weeks whereas that of the control group was 38.6weeks. majority of cases in both the study and control group, 62% and 68% respectively delivered vaginally. Thus both the groups were found to be comparable.(Table 1)

TABLE 1 : CASE PROFILE

Maternal parameters	Study group	Control Group
Parity Primigravida Multigravida	106(71%) 44(29%)	111(74%) 39(26%)
Duration of Gestation 37-40wks >40wks	111(74%) 39(26%)	109(73%) 41(27%)
Mode of Delivery Vaginal Caesarean	93(62%) 57(38%)	102(68%) 48(32%)
Amount of L-Thyroxine 25mcg 50mcg 75mcg 100mcg	12(08%) 72(48%) 48(32%) 18(12%)	

TABLE 2: NEONATAL PARAMETERS

Neonatal Parameters	Study Group	Control Group
Neonatal S.TSH levels 2-5mIU/lt 5-10mIU/lt	87(58%) 63(42%)	99(66%) 51(34%)
Birth Weight of Neonates <2.5kgs 2.5-3kgs >3kgs	18(12%) 117(78%) 15(10%)	06(09%) 123(82%) 21(14%)
Apgar Score at 1min <7 7-10	18(12%) 132(88%)	12(08%) 138(92%)
Apgar score at 5mins <7 7-10	03(02%) 147(98%)	00 150(100%)

In the study group, maximum 72 women were taking 50mcg of thyroxine. 32%, 12% and 08% were taking 75mcg, 100mcg and 25mcg of thyroxine respectively. Maternal S.TSH levels were found to be normal in all the cases of the study group.

Mean neonatal S.TSH levels were found to be 4.6mIU/lt in the study group and 4.0mIU/lt in the control group. Thyroxine levels of all the infants ranged from 9-13 mcg/dL (Normal values of T4 8.2-19.9 mcg/dL) with a mean T4 value of 11.9 mcg/dL. Since all the babies had normal TSH and T4 levels none of the infants were commenced on thyroid replacement therapy. Mean birth weight of the infants in the study group was 2.7kgs and that in the control group was 2.9kgs. 3 infant of the study group were asphyxiated due to difficult delivery and required NICU care.(Table 2)

DISCUSSION

It seems that prevalence of hypothyroidism is more in Asian countries when compared to the West.4 In the present study, we found that the prevalence of hypothyroidism in pregnant women is 20.3%. In a study conducted by Krishnamma et al, the prevalence of hypothyroidism was found to be 17.3%5. The results were comparable to our study.

In a study done by Shravani MR et al on maternal hypothyroidism and

neonatal outcome, they concluded that maternal hypothyroidism well controlled by thyroxine replacement therapy in early gestation does not lead to any adverse maternal or neonatal outcome and the infant does not run the risk of congenital hypothyroidism.6 The results were similar to our study.

A systematic review was done by Maraka S et al among pregnant women with subclinical hypothyroidism, he found that they were at higher risk for pregnancy loss, PROM, placental abruption, and infant mortality compared with pregnant women with normal thyroid functions. This emphasizes the importance of universal screening for hypothyroidism.7

Effects of maternal hypothyroidism on fetal brain development are not well defined, several recent reports indicate that IQ is modestly affected (24-26). These studies have increased the concern that even mild hypothyroidism can interfere with normal brain development.

Congenital hypothyroidism is being screened as part of the National Newborn Screening Programme as it is a cause of serious morbidity for the newborn. In our study we did not find any additional infants that had clinically significant low birth weight, overweight babies, abnormal thyroid function test among babies born to mothers with hypothyroidism. This could be probably the result of mothers being screened during their antenatal visits and early initiation of proper treatment.

In a study done by Chang-Qing Gao et al it was found that pregnant women with subclinical hypothyroidism (SCH) were at increased risks of gestational hypertension and premature rupture of membranes, and their fetuses and infants were at increased risks of IUGR and LBW. Therefore, routine maternal thyroid function testing is necessary to reduce maternal and perinatal complications. Untreated maternal hypothyroidism may result in preterm birth, low birth weight, and respiratory distress in the neonate. There is enough evidence about the role of thyroxine in normal development of the fetal brain.8 In present study all pregnant mothers were screened for hypothyroidism during pregnancy hence neonatal outcomes were good.

Thyroxine dose requirement increases during pregnancy. Close monitoring of thyroid function with appropriate adjustment of thyroxine dose to maintain a normal serum TSH level is necessary during pregnancy. Maternal hypothyroidism at presentation and in the third trimester may increase the risk of low birthweight infants.

In some studies, infants and toddlers whose mothers had reduced serum free T4 concentrations (with normal TSH) during pregnancy (12 to 20 weeks) had lower mean intelligence, psychomotor and behavioral scores compared with children of mothers with normal thyroid function during gestation.

CONCLUSION

The prevalence of hypothyroidism in our study was 20.3%. hypothyroidism during pregnancy is well documented to cause several obstetric and neonatal complications. Early diagnosis and initiation of therapy can avert these adverse effectsThus we conclude that universal screening of all pregnant women rather than targeted screening for hypothyroidism which would cause many cases to go unrecognised and untreated. In present study none of the babies born to these hypothyroid mothers required treatment due to early intervention during pregnancy.

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