

Original Research Article

Maternal hypothyroidism and neonatal outcome

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ABSTRACT

Background: Hypothyroidism is widely prevalent in pregnant women but rate of detection is very low in developing countries. Hypothyroidism is easily treated, timely detection and treatment of the disorder could reduce the burden of adverse fetal and maternal outcomes. Objective of the study was to determine the immediate outcome in neonates born to mother with hypothyroidism.

Methods: Prospective descriptive study. 110 babies were observed for neonatal outcome. 55 babies were born to hypothyroid mothers and 55 babies were born to mothers without thyroid abnormalities. These babies were observed for type of delivery, Gestational age, need for intensive care unit, growth parameters, Interventions required during the stay, sepsis was compared with those born to mothers without hypothyroidism.

Results: Both the groups were similar in terms of type of delivery. No association between maternal hypothyroidism and Hypertensive disorders, gestational diabetes. Cases with prematurity are almost same in both groups. Most of babies were term gestation. The birth weight of babies was similar. Majority from both the group did not require any oxygen support. Majority of babies were in appropriate for age category. Both the groups were similar in incidence of small for gestational age and large of gestational age babies.

Conclusions: Babies born to well treated hypothyroid mothers were similar in all aspects to babies born to non-hypothyroid mothers. These signify the importance of screening all antenatal mothers for hypothyroidism and prompt treatment to prevent adverse consequences on neonatal outcome.

Keywords: Hrishikesh, Hypothyroidism, Maternal, Neonatal, Outcome

INTRODUCTION

Thyroid hormone is required for normal development of fetal brain development. It is also essential for growth and regulation of energy metabolism throughout infancy and childhood. Hypothyroidism is widely prevalent in pregnant women but rate of detection is very low in developing country like India. Since hypothyroidism is easily treated, timely detection and treatment of the disorder could reduce the burden of adverse fetal and maternal outcomes. From previous studies it shows that maternal hypothyroidism is associated with increased rate of neonatal intensive care treatment. Thyroid diseases

were associated with increased neonatal morbidity. Neonates had higher rate of sepsis, respiratory distress syndrome, transient tachypnoea and apnoea.¹ Maternal hypothyroidism is diagnosed in 0.3%-10% of pregnant women. Overt hypothyroidism is diagnosed in ~2.5% of otherwise normal pregnancies.² Untreated hypothyroidism is associated with several complications, most notably preeclampsia, abruptio placentae and increased risk of spontaneous miscarriage, perinatal mortality, preterm delivery and low birth weight. Treatment of pregnant mothers with l-thyroxine reduces these complications substantially.² Congenital hypothyroidism is a preventable cause of intellectual

disability. Hence it is important to monitor babies born to mothers with hypothyroidism. There has been lack of corresponding studies in Indian scenario which assessed the neonatal outcome in babies born of hypothyroid mothers. The aim of this study was to assess neonatal outcome of babies born to hypothyroid mothers.

METHODS

Observational descriptive study in a tertiary care centre in Kochi, India. The sample size was calculated with rate of prevalence of hypothyroidism in mothers as 5% and with a confidence on 95% with an error of estimate of 6%, 55 babies born to mothers with hypothyroidism as per medical reports compared with 55 babies whose mothers did not have hypothyroidism. Study duration was for 6 months. These babies were observed during their hospital stay that including type of delivery, Gestational age at the time of delivery, need for intensive care unit, growth parameters, interventions required during the stay, sepsis was compared with those born to mothers without hypothyroidism. Maternal conditions which was complicating pregnancy as per records like diabetes, hypertension, was compared for their association with hypothyroidism. SPSS version 20 was used for statistical analysis. Qualitative variables were represented by frequency and percentage analysis. Chi-square test was performed to compare the qualitative variable between hypothyroid group and control group. Quantitative variables were represented by mean and standard deviation. Independent sample t-test was performed to compare the quantitative variable between hypothyroid group and control group. A p-value less than 0.05 is taken as statistically significant. The data obtained is described in a descriptive manner.

Inclusion criteria

- Infants born to mothers with hypothyroidism.

Exclusion criteria

- Babies with Congenital anomalies were excluded.

RESULTS

In this study, almost 23.6% of the mothers belong to the age group 20-25 years and 47.3% of the cases belong to the group 26-30 years. Around 19.1% of the mothers belong to the age group 31-35 years and 10.0% of the cases belong to the group >35 years. The average age was 28.8 years with standard deviation 4.60. The average of mothers with hypothyroidism was 29.3±4.50 and the average age of mothers with no hypothyroidism was 28.3±4.68. No association was found between maternal hypothyroidism and type of delivery. The rate of cesarean cases was almost same in mothers with hypothyroidism (47.3%) and mothers with no hypothyroidism (52.7%). No association was found between maternal hypothyroidism and altered baby thyroid function test.

Baby thyroid function tests were similar in both groups. Comparing the incidence of gestational diabetes and pregnancy induced hypertension in both groups there was no association between maternal hypothyroidism and gestational diabetes mellitus and hypertension during pregnancy. Comparing association of prematurity and postdated pregnancy in babies born to hypothyroid and non-hypothyroid mothers 81.8% and 89.1% babies respectively were born at term gestation and 18.2% born to hypothyroid mothers and 10.9% born to non-hypothyroid mothers were born premature. Non from both group had postdated delivery. With p-value>0.05 the association between maternal hypothyroidism and gestational age was not significant birth weight of babies born to hypothyroid mothers were similar to those born to non-hypothyroid mothers. Majority 80.0% of babies being in weight range of 2.5-4 kg in hypothyroid and 81.8% in the non-hypothyroid group in the same weight category. Birth weight was almost same in hypothyroid cases (2.89±0.46) and no hypothyroid cases (2.98±0.40). Regarding association of hypothyroidism in mothers and NICU stay in neonates, duration of NICU stay was similar to general population. 63.6% babies born to hypothyroid mother and 69.1% mothers born to non-hypothyroid mothers did not require any NICU stay. 29.1% required NICU stay for less than 3 days, 5.5% required 3 to 7 days which was similar to control group. Majority of babies 70.9% did not require oxygen support, 25.5% had transient tachypnoea of newborn and 3.6% had respiratory distress which was similar to control group. Both babies born to hypothyroid mothers and babies born to non-hypothyroid mothers had similar rates of sepsis 87.3% and 80.0% respectively. Incidence of hypoglycemia had been similar in babies of both groups. Majority of babies from both groups were born appropriate for gestational age (85.5%), 7.3% were born small for gestational age and large for gestational age.

DISCUSSION

Out of 110 mothers in this study group 55 mothers had hypothyroidism and were on thyroid supplementation and their neonatal outcome was compared with 55 mothers who did not have hypothyroidism. Age group of mothers of both the groups was comparable. The average age of mothers was 28.8 years. Regarding the type of delivery 47.3% mothers had cesarean delivery in hypothyroid group compared to 52.7% mothers in non-hypothyroid group, 49.1% mothers had normal deliveries in hypothyroid group compared to 47.3% mothers in non-hypothyroid group. There is no association between maternal hypothyroidism and type of delivery. The rate of caesarean section was higher in study Iskandar Idris et al, Sahu MT et al.^{3,4} It was comparable to results Wolfberg AJ.⁵ In comparison to other studies all the mothers were adequately treated with thyroid supplementation starting from first trimester due to high level of screening for hypothyroidism during antenatal visits. Comparing thyroid screening of babies of both the groups. Most of the babies had normal TSH (0.7-

10mU/L) in both the groups. 3.6% babies of hypothyroid mothers and 7.3% babies of comparison group had TSH in the range of 10-20 mU/L on day 3 Thyroid screening. These babies were followed after 2 weeks and were found to have normal range of TSH value. 1.8% of both the groups had babies with TSH value between 20-40mU/L but none of them required thyroid supplementation since repeat values were within normal range. Only 1 baby born to mother on treatment for hypothyroidism had TSH in excess of 40mU/L on day 3 thyroid screening requiring thyroid supplementation. There is no association between maternal hypothyroidism and baby TSH. Both the groups had similar distribution of TSH values. Incidence of gestational diabetes /Diabetes mellitus was also comparable in both the groups. 23.6% mothers in hypothyroid group and 10.9% mothers in comparison group. In this study we find no increase in incidence of gestational diabetes in well treated group compared to those without hypothyroidism. In the study Ozdemir H et al, incidence of gestational diabetes was high among hypothyroid mothers.⁶ This shows importance of early diagnosis and need for screening mothers for hypothyroidism during antenatal visits and early treatment for the same. Incidence of Pregnancy induced hypertension/hypertension was also similar in both groups as compared to previous studies.⁷ Effect on Gestational age of babies showed both group showing similar distribution indicating no effect on Gestation. In the study 18.2% babies were born preterm at 28-37 weeks compared to 10.9% in comparison group in the same gestational week.

The study by Casey B et al, had almost 2-fold higher in women with subclinical hypothyroidism.⁸ Most of babies were term (37-42wks) gestation 81.8% in hypothyroid mothers and 89.1% in comparison group. None of babies were born post term >42 weeks, may be due to induction or cesarean section after 40 weeks. There is no association between maternal hypothyroidism and gestational age. Comparing the birth weight of babies show that in babies born to hypothyroid mothers' majority 80% were in weight group of 2.5-4.0 kg as compared to similar number in comparison group 81.8%. Only 2 babies in control group were born macrosomic (>4 kg). Both the groups were similar in terms of birth weight signifying there is no association with low birth weight or macrosomic babies as shown in previous studies. Babies requiring NICU stay was comparable in both the groups.

Majority of babies in both the groups did not require any NICU stay. 63.6% (35) of hypothyroid mothers and 69.1% (38) of comparison did not require any intensive care and was kept with mother 16 babies (29.1%) of hypothyroid group and 11 (20.0%) babies of comparison group required intensive care for less than 3 day.⁹ 9 babies (8.2%) required NICU stay for more than 3 days but less than 7 days. Out of these 3 belong to hypothyroid mothers and 6 from comparison group. Both the groups were comparable. No association was found between well

treated maternal hypothyroidism and requirement of intensive care in newborn babies. In previous studies rates of neonates requiring NICU admission was higher Ozdemir H et al.⁶ Again difference in the study group being early detection and treatment of mothers starting in first trimester. Compared to other studies Nazarpour S et al, which showed increase in oxygen requirement and respiratory distress of neonates of hypothyroid mothers.⁹ Comparing the requirement for oxygen for respiratory distress in babies born to hypothyroid mothers, majority from both the group did not require any oxygen support, 70.9% from hypothyroid group and 72.7% from comparison group did not require any support, 25.5% of babies of hypothyroid mothers required oxygen for few hours in the form of nasal canula with diagnosis of Transient Tachypnoea of newborn while 23.6% from comparison group required oxygen in the form of nasal canula. Only 2 babies (3.6%) from both the groups required oxygen support in the form of Ventilation or CPAP.

This study shows no difference in the 2 groups. This is in accordance with the study by Wasserstrum N et al, which advocates early replacement therapy in pregnant women with hypothyroidism. Comparing the incidence of sepsis in babies 87.3% (48) babies of babies born to hypothyroid mothers did not have any sepsis.¹⁰ Only 7 (12.7%) babies of hypothyroid group and 11 (20.0%) babies of comparison group had sepsis screen positive and required antibiotics. All mothers of these babies had risk factors for sepsis in the form of urinary tract infection, lower respiratory tract infection or vaginal discharge. Compared to previous studies Mannisto T et al, which showed higher incidence of sepsis in babies born to hypothyroid mothers.¹ Both the groups were comparable in terms of incidence of sepsis in this study. Incidence of shock and hypoglycemia were compared in both the groups. Babies requiring fluid and Ionotropic support in was 5.5% (3) babies in hypothyroid group and 1.8% (1) in the comparison group, 10 babies (18.2%) in hypothyroid group and 7 babies (12.7%) in comparison group required glucose infusion for hypoglycemia. Both the groups were comparable and there is no association between neonates of hypothyroid mothers and babies requiring Ionotropic support or glucose infusion. Babies requiring ionotropic support was due to other factors like sepsis or due to prematurity.

Majority of babies were in appropriate for age category 85.5% (47) of babies born to hypothyroid mothers and 83.6% (46) babies of comparison group. Only 4 (7.3%) babies from hypothyroid group and 3(5.5%) babies from comparison group had weight in the range of large for gestational age as compared to previous study.¹¹ The mothers of these babies also had associated gestational /diabetes mellitus. Only 4 babies (7.3%) and 6 babies (10.9%) were in category of small for gestational age. Both the groups were similar in incidence of small for gestational age and large of gestational age babies signifying early detection and treatment decreased

incidence of small for gestational age and large for gestational age comparable to normal population.

CONCLUSION

These findings signify the importance of screening all antenatal mothers for hypothyroidism in the first trimester itself and prompt treatment with thyroid replacement to prevent adverse consequences on neonatal outcome.

Recommendations

- All mothers should be screened for hypothyroidism during first trimester and started on treatment as early as possible.
- Trimester specific values to be taken during screening for thyroid abnormalities and mothers should be followed up if any irregularities.
- Babies should be screened for hypothyroidism if possible, during hospital stay and followed up if abnormal values.

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