J Obstet Gynecol India Vol. 57, No. 4 : July/August 2007 Pg 331-334

ORIGINAL ARTICLE

The Journal of Obstetrics and Gynecology of India

Hypothyroidism in pregnancy

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OBJETIVE(S) : To estimate the incidence of hypothyroidism in pregnancy, the effect of hypothyroidism on pregnancy, and the effect of pregnancy on hypothyroidism

METHOD(S) : The study period was from January 2002 to December 2003. Forty one pregnant women with hypothyroidism were taken as study group and 141 matched euthyroid pregnant women as control group. Z test was used for statistical analysis.

RESULT(S) : Incidence of hypothyroidism in pregnancy was 1.15%. Common associated complications were preeclampsia (21.95% vs, 14.89%, Z=0.99), preterm labor (19.51% vs, 23.40%, Z=0.54), threatened abortion (14.63% vs 4.96% Z=1.66), low birth weight (27.03% vs 27.21% Z = 0.02), neonatal hyperbilirubinemia (13.51% vs 4.41%, Z =1.55),neonatal hypothyroidism (10.81% vs 0.74%, Z=1.95) and early neonatal death (2.70% vs 2.94%, Z=0.04). There were no significant differences found between the two groups. In 82.93% of pregnant women thyroxine requirement was unchanged. Perinatal mortality rate was 81 per 1000 live births in hypothyroid women during the study period.

CONCLUSION(S) : No significant differences in pregnancy outcome were found when hypothyroid pregnant women (on thyroxine therapy) compared with euthyroid pregnant women. As there is higher incidence of cesarean section due to intrapartum fetal distress intensive intrapartum fetal monitoring is required.

Key words : hypothyroidism, thyroid replacement, pregnancy.

Introduction

Hypothyroidism is endemic in many parts of northern India. In most cases of hypothyroidism, a specific cause is not apparent. The most common cause is autoimmune thyroid disease (elevated titers of antithyroid antibodies) in areas with normal iodine intake. However, making an etiologic diagnosis in women adds little to the clinical management[1]. Hypothyroidism during pregnancy occurs in 1/1600-2000 (0.06-0.05%) deliveries[2]. Probably the rarity of hypothyroidism in pregnancy is due to the fact that hypothyroid women have a higher prevalence of anovulatory cycles (>70%) and, in case of conception, they have a high rate of fetal loss in the first trimester[3].

We conducted this study in a tertiary care hospital from January 2002 to December 2003 to estimate the incidence of hypothyroidism in pregnancy, the effect of hypothyroidism on pregnancy, and the effect of pregnancy on hypothyroidism.

Methods

Forty one pregnant women with hypothyroidism were taken as study group and 141 matched euthyroid pregnant women were taken as control group. The inclusion criterion was hypothyroid pregnant women on thyroid replacement therapy. Data were collected by record analysis regarding parity, previous obstetric history, associated medical, surgical, and obstetric complications, thyroid function tests (serum TSH, free T4, free T3), duration of hypothyroidism and its treatment, dose adjustment during pregnancy, and feto-maternal outcome.

Paper received on 18/08/2006; accepted on 21/06/2007

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Z test was used for statistical analysis. Z value >2 was considered statistically significant.

Results

Total number of pregnant women who attended in our hospital during this period was 3564. Of them, 41 had hypothyroidism and all were on replacement therapy. Thus the incidence of hypothyroidism in pregnancy was 1.15%. 90.24% (37/41) cases were due to primary hypothyroidism. Four cases were iatrogenic - three followed subtotal thyroidectomy for colloid goiter and one total thyroidectomy for papillary carcinoma. Forty four percent women were primigravidas.14.63% (6/41) had history of primary infertility and 24.38% (10/41) had history of abortions.

14.63% (6/41) were diagnosed to have hypothyroidism during pregnancy. 85.37% (35/41) women had hypothyroidism before pregnancy and were on thyroid replacement therapy. 53.66% (22/41) women were on thyroxine therapy since last 1-5 years (Table 1).

Table1. Duration of thyroid replacement (n=41)

Duration (years)	Number of cases	Percentage
<1 (since antenatal visit)	6	14.63
1-5	22	53.66
>5-10	9	21.95
>10	4	9.76

In 82.93% (34/41) of the pregnant women thyroxine requirement was unchanged (Table 2). Diabetes mellitus was the most common associated medical disease found in 7.31% of study group (Table 3). There was no significant difference between the two groups. Among maternal complications (Table 4) preeclampsia and threatened abortion were more but not significantly so, in study group than control (21.95% vs 14.89%, Z=0.99, and 14.63% vs 04.96%, Z =1.66 respectively). There were no significant differences between the two groups. Cesarean section was needed in 61.54% (25/41) cases (Table 4). Most common indication was intrapartum fetal distress.

Table 2. Thyroxine requirement during pregnancy (n=41)

Requirement	Number of cases	Percentage
Not changed	34	82.93
Increased by 50-100 µg/day	6	14.63
Decreased	1	02.44

Neonatal complications (Table 5) were low birth weight (27.03% vs 27.21%, Z=0.02), neonatal hyperbilirubinemia (13.51% vs 4.41%, Z=1.55), and neonatal hypothyroidism (10.81% vs 0.74%, Z=1.95).

Table 5. Mode of delivery (n=39)[a]

Mode of delivery	Number of cases	percentage
Vaginal delivery	10	25.64
Instrumental vaginal delivery	05	12.82
Cesarean section	24	61.54

[a] Two of the 41 women had spontaneous abortion.

Table 3. Associated medical diseases

Disease	Study group (n=41)		Control group (n=141)		Z value
	Number	percent	Number	percent	
Diabetes mellitus	3	7.31	3	2.12	1.22
Hypertension	1	2.44	5	3.54	0.35
SLE	1	2.44	0	0	-
Jaundice	2	4.88	1	0.70	1.21
Heart disease	2	4.88	6	4.25	0.16

Table 4. Maternal complications

Complication	Study group (n=41)		Control (n=141)		Z value
	Number	percent	Number	percent	
Preeclampsia	9	21.95	21	14.89	0.99
Preterm labor	8	19.51	33	23.40	0.54
Threatened abortion	6	14.63	7	4.96	1.66
Wound infection	2	4.88	9	6.38	0.38
Postpartum hemorrhage	2	4.88	9	6.38	0.38
Antepartum hemorrhage	1	2.44	6	4.25	0.79
Maternal death	0	0	1	0.70	-

Table 6. Neonatal complications

Neonatal complications	Study group (n=37)[a] Number	Control (n=136)[b] percent	Z value Number	percent	
Low birth weight (<2.5 kg)	10	27.03	37	27.21	0.02
Neonatal hyperbilirubinemia	05	13.51	06	4.41	1.55
Neonatal hypothyroidism	04	10.81	01	0.74	1.95
Early neonatal death	01	02.70	04	2.94	0.04
Congenital goiter	0	0	0	0	-
Congenital malformations	0	0	04	2.94	-

[a] There were two intrauterine deaths in the study group.
[b] There were two abortions and three intrauterine deaths in the control group.

Discussion

India is one of the major endemic regions of goiter in the world. Reports published in 1996 stated that about 167 million persons were at risk of iodine deficiency disease in India including the 54 million with goiter, 2.2 million with cretinism, and 6.6 million with mild neurological deficits[4].

Pregnancy has an effect on thyroid function with significant changes in iodine metabolism, serum thyroid binding proteins, and the development of maternal goiter especially in iodine deficient areas. Pregnancy is also accompanied by immunological changes. Thyroid peroxidase antibodies are present in 10% of women at 14 weeks gestation, and are associated with (i) increased pregnancy failure (i.e. abortion), (ii) increased incidence of gestational thyroid dysfunction, and (iii) predisposition to post partum thyroiditis [5]. Earlier studies have reported an increased prevalence of congenital anomalies (10-20%), perinatal mortality (20%), and impaired mental and somatic development (50-60%) in newborns of untreated hypothyroid mothers. Even in L-T_4 treated pregnant hypothyroid women, an increased prevalence of maternal complications, such as anemia (31%), Pre-eclampsia (44%), placental abruption (19%), postpartum hemorrhage (19%), and fetal complications such as low birth weight (31%), and fetal death (12%), have been reported [3]. Probably these serious complications have been observed in pregnant women not accurately monitored. In our study most common maternal complication in hypothyroid women was preeclampsia (21.95%) followed by preterm labor (19.51%) and in euthyroid women common complications were preterm labor (23.40%) followed by preeclampsia (14.89%). Other complications in hypothyroid women were threatened abortion (14.63%), postpartum hemorrhage (4.88%), wound infection (4.88%), antepartum hemorrhage (2.44%). No significant differences in maternal complication were noted between the two groups. Most common cause of fetal morbidity was low birth weight (27.03% vs 27.21%) in both the groups followed by neonatal hyperbilirubinemia (13.51% vs 4.41%) and neonatal hypothyroidism (10.81% vs 0.74%) in hypothyroid women. But significant differences in neonatal complications were not found. Endemic iodine deficiency produces combined maternal and fetal hypothyroidism, which increases the risk of severe fetal hypothyroidism. Perinatal mortality rate was 81 per 1000 live births in hypothyroid women during the study period. Perinatal mortality rate was high because of two cases of intrauterine deaths in those where hypothyroidism was diagnosed in later part of pregnancy due to late presentation. Optimum treatment before pregnancy resulted in good perinatal outcome (PMR-30 per 1000 live births during the study period viz., 1 in 33 cases). Matalon et al[6] reported that treated maternal hypothyroidism is not associated with adverse perinatal outcome.

Women on adequate replacement of thyroxine, during preconception and in early pregnancy, should expect a good obstetric outcome than in those who start treatment in second trimester. Controlled TSH was defined as mothers with TSH between 0.1 and 2 with normal free thyroid hormone levels. Hypothyroidism in pregnancy needs to be treated with a larger dose of thyroxine than in the nonpregnant state [5]. In our study, in majority of cases 82.93% (34/41), there was no change in thyroxine requirement during pregnancy probably because of optimum prepregnancy doses. Thyroxine requirement increased in 14.63% (6/41) women in the range of 50-100 mg per day.

High incidence of cesarean section (61.54%) was due to both emergency and elective cesarean sections. Most common indication for cesarean section was intrapartum fetal distress (28.20%). Total number of cases in study group was 41. There were 2 cases of abortions. Out of 39 remaining cases in study group, 11 women have undergone CS due to spontaneouse fetal distress i.e. 28.2%. Idris et al [7] reported higher cesarean section rates in the study group (28.7%) compared with the institutional rate (18%). In hypothyroidism there are placental hypoxic changes. This may be responsible

for thick meconium stained liquor and/or fetal distress. Hence active intrapartum monitoring is required. 21.95% (21/41) had other associated medical disorders, commonest being diabetes mellitus 7.31% (3/41) followed by jaundice 4.88% (2/41), and heart disease 4.88% (2/41) hypertension 2.44% and SLE 2.44%. In euthyroid women heart disease 4.25% (6/41) and hypertension 3.54% (5/41) were the common associated medical diseases. Hypothyroidism is associated with other autoimmune diseases like pernicious anemia, vitiligo, and type 1 diabetes mellitus [8]. Maternal hypothyroidism either overt or subclinical may cause subnormal mental development. Cord blood sampling done on 6th day showed to significant difference.

In the study group (n=37) there was 1 early neonatal death and in control group (n=136) there were 4 early neonatal deaths (vide table no. 5).

Causes of early neonatal death :

Study group - Aspiration in neonatal hypothyroid baby, died on 2nd day.

Control group - 1. Tracheo esophageal fistula, died on 3rd day
2. Convulsion in a case of PROM, compound presentation, died on 3rd day.
3. Septicemia died on 4th day
4. Neonatal jaundice in A -ve blood group of mother, died on 5th day.

Conclusion

No significant differences were seen in complications between hypothyroid women under treatment and euthyroid women. Optimum thyroid replacement before pregnancy results in good perinatal outcome. As there is higher incidence of cesarean section due to intrapartum fetal distress, intensive intrapartum fetal monitoring is required.

Acknowledgement

We thank Dr. S. K. Bhattacharya, Associate Professor, Department of community medicine, for analyzing the data.

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