Original Research Paper

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Gynaecology

A RANDOMIZED PROSPECTIVE TRIAL TO STUDY THE IMPACT OF THYROID DISORDERS ON FETOMATERNAL OUTCOME

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ABSTRACT

Objectives : To study the prevalence, maternal and fetal outcome in thyroid disorders in pregnancy.

Methods : The study was conducted in the department of Obstetrics and Gynaecology, S.P. Medical College and Associated Group of Hospitals, Bikaner. This was an observational and prospective study conducted on 969 antenatal women attending OPD in first trimester from 1st October 2017 to 30th September 2018.

Results : Majority of subjects 86.5% (n=838) were euthyroid, 0.6% (n=6) subjects were hyperthyroid and all were subclinical hyperthyroid, 2.2% (n=21) subjects were overt hypothyroid & 10.7% (n=104) subjects were subclinical hypothyroid.

Conclusion : Hyperthyroidism in pregnancy is uncommon, effects on both the mother and fetus are critical. Due to immense impact of the maternal thyroid disorder on maternal and fetal outcome, prompt identification of thyroid disorder and timely initiation of treatment is essential.

KEYWORDS : Hypothyroid, Euthyroid, Subclinical, Pregnancy

INTRODUCTION

Thyroid gland is an important endocrine gland in the human body. Its function is to maintain homeostasis and basic metabolic rate. Thyroxin is needed for cellular oxidation and neurophysiological development[1]. Evaluation of thyroid disease in pregnancy is important for gestational maternal health, obstetric outcome and subsequent development of the child. The most frequent thyroid disorder in pregnancy is maternal hypothyroidism. It is associated with fetal loss, placental abruptions, preeclampsia, preterm delivery and reduced intellectual function in the offspring[2]. Prevalence of hypothyroidism was found to be more in Asian countries compared with the west[3-5].

MATERIAL AND METHODS

Study design: Observational and prospective study.

Study population: The study population comprises 969 antenatal women attending OPD in first trimester from 1 October, 2017 to 30 September, 2018.

Data collection

After taking written informed consent, a detail history regarding the symptoms of thyroid disorders, menstrual history, obstetric history, past history and family history were taken. Thorough general physical examination including pulse, BP, local examination of thyroid gland and abdominal examinations were done. Baseline investigations like Hb, BT, CT, Platelet count, ABO Rh, RBS, Urine complete and microscopic examination and serum TSH were done. If serum TSH deranged then FT3 & FT4 were done and repeat TSH after 6 weeks. Fasting blood sample was taken and thyroid function tests will be analyzed by enzyme linked immunosorbent assay technique (ELISA). The reference range used in the study was based on guidelines of American Thyroid Association for the diagnosis and management of thyroid disease during pregnancy and postpartum.

Depending upon the values the cases were grouped as:

- Euthyroid (Normal TSH)
- Subclinical hypothyroidism (High TSH in the presence of normal level of Ft4)
- Overt hypothyroidism (High TSH with low Ft4)
- Hyperthyroidism (low serum TSH)

RESULTS

In present study, majority of subjects 86.5% (n=838) were euthyroid, 0.6% (n=6) subjects were hyperthyroid and all were subclinical hyperthyroid, 2.2% (n=21) subjects were overt hypothyroid & 10.7% (n=104) subjects were subclinical hypothyroid. In euthyroid group, 84.3% cases had no maternal complications and anaemia was present in 10.9% (n= 91) cases while hypertension was present in 2.9% (n=24) cases, placental abruption and oligohydroamnios was present in 0.6% (n=5) cases each, thrombocytopenia was present in 0.5% (n= 4) cases and eclampsia and pre-eclampsia was present in 0.1% (n= 1) cases each. In all cases of hyperthyroidism no maternal complication was found while in overt hypothyroid group, 76.2% (n=16) had normal maternal outcome, 9.4% (n= 2) cases had anemia while 4.8% (n=1 each) cases had placenta abruption, hypertension and oligohyroamnios. In subclinical hypothyroid group, only 44.2% (n=46) cases had no maternal complications and 20.2% (n=21), 16.4% (n=17), 14.4% (n= 15), 2.9% (n=3) and 1.9% (n=2) cases had anaemia, oligohydroamnios, hypertension, pre-eclampsia and placental abruption respectively.

Out of total 838 euthyroid cases, 4.8% (n= 40) cases had IUGR, 4.3% (n=36) cases had LBW, 3.6% (n=30) cases had miscarriage, 1.4% (n=12) cases had IUD/SB while only 0.2% (n=2) neonatal deaths were found.

In hyperthyroid group, 16.7% (n=1) cases had IUD/SB and 16.7% (n=1) cases had IUGR, in overt hypothyroid group,9.5% (n= 2 each) cases had LBW and IUGR while 4.8% (n=1 each) cases had miscarriage and neonatal death.

In subclinical hypothyroid group, 9.6% (n=10) cases had miscarriage, 7.7% (n=8) cases each had LBW and IUGR while 1.9%(n=2) and 0.9%(n=1) cases had IUD/SB and neonatal death.

DISCUSSION

Anemia was found the most common maternal complication in our study. Out of total 114 anemic cases, 20.2% cases were in subclinical hypothyroid, 9.4% cases were in overt hypothyroid and there was no anemic patient in hyperthyroid group and remaining were euthyroid. The results were comparable with the study done by Nangia et al[6] who found 14.1% of subclinical hypothyroid subjects, 8.3% of overt hypothyroid subjects and 8.1% of euthyroid subjects had anemia.

In oligohydroamnios cases, 16.4% cases were found in subclinical hypothyroid group, 4.8% cases were in overt hypothyroid and 0.6% in euthyroid group. The results were not comparable to the study done by Mahajan et al[7] who found 4.65% subclinical hypothyroid subjects and 6.19% euthyroid subjects had oligohydroamnios.

Placental abruption was found in 0.6% of euthyroid cases, 1.9% cases of subclinical hypothyroid and 4.8% cases of overt hypothyroid which was almost similar to the study done by Mahajan et al[7] who found 0.62 % of euthyroid subjects, 2.32% subjects with subclinical hypothyroid and 11.11% of overt hypothyroid subjects had placental abruption.

We found that 84.3% of euthyroid cases had no maternal complications whereas in subclinical hypothyroid group only 44.2% and in overt hypothyroid group 76.2% had no maternal complications. By using chi square test statistically significant difference was found between abnormal maternal outcome and thyroid status of patient ($p<0.001$).

In our study it was found that 28.2% of cases with thyroid disorders and 14.3% of euthyroid cases had abnormal fetal outcome which was two times more in subjects with thyroid disorders as compared to euthyroid subjects.

In the present study, 4.8% cases with overt hypothyroidism and 9.6% cases with subclinical hypothyroidism had abortions as compared to 3.6% of euthyroid cases i.e. 2.9 times more in thyroid disorder subjects. The occurrence of fetal loss (spontaneous abortion and fetal death) was significantly increased in the pregnant women with thyroid disorders. The probable reason for higher miscarriage in patients with thyroid dysfunction may be due to undetected thyroid dysfunction at conception and the treatment might not have been sufficient to restore euthyroidism. A study shows that untreated hypothyroidism, subclinical or overt, at the time of conception is associated with miscarriage rate of 31.4% compared with 4% in euthyroid cases at conception[2]. Similar results were found in the study done by Nangia et al[6] i.e. 16.6% of subjects with overt hypothyroidism, 5.5% of subjects with subclinical hypothyroidism and 2.39% of euthyroid subjects had miscarriage.

In our study, we found that 10.6% cases with thyroid disorders had IUGR babies whereas 4.8% cases with normal thyroid function had IUGR babies which was comparable to the study done by Chauhan et al[8] who found that 8.11% cases with thyroid disorders and 5.7% euthyroid cases had IUGR babies.

In our study, 9.6% cases with thyroid disorders and 4.3% cases with normal thyroid function had LBW babies which were similar to Shah and Shah[1] study in which 8.4% cases with thyroid disorders and 3.2% euthyroid cases had LBW babies. IUD/SB was present in 2.3% cases with thyroid disorders which was comparable to 2.85% cases with thyroid disorders in Nambiar et al[9] study.

By using chi square test statistically highly significant association was found between fetal outcome and thyroid status of the subject (χ^2 =104.209, $p<0.001$).The pregnant women with overt and subclinical hypothyroidism had a significant increase in the incidence of preterm delivery, fetal distress and intrauterine growth restriction.

CONCLUSION

In India prevalence of thyroid disorders in pregnancy is much higher as compared to western countries. Prevalence varies widely among various states in India, as we still face iodine deficiency in many parts of the country. Our study showed a high prevalence of thyroid disorders (13.5%) especially hypothyroidism in pregnant women, with the prevalence of subclinical hypothyroidism being 10.7% and overt hypothyroidism being 2.2%. Hyperthyroidism in pregnancy is uncommon, effects on both the mother and fetus are critical. Thus, universal screening of thyroid disorder should be considered especially in a country like India where there is a high prevalence of undiagnosed thyroid disorder.

Fig. 1 : Distribution of cases according to thyroid status

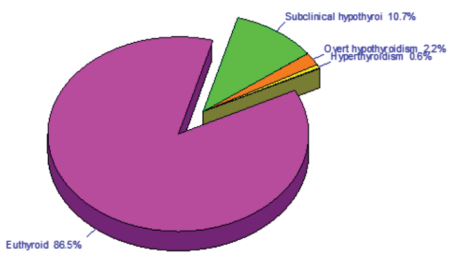

Table 1 Distribution of Cases according to maternal outcome in relation to thyroid status

Maternal Outcome	Thyroidism				Total
	Euthyroid (n=838)	Hyper (n=6)	Overt Hypo (n=21)	Subclinical Hypo (n=104)	
	No.	No.	No.	No.	No.
Placental Abruption	5	0	1	2	8
Anaemia	91	0	2	21	114
Eclampsia	1	0	0	0	1
Hypertension	24	0	1	15	40
Oligohydroamnios	5	0	1	17	23
Pre-Eclampsia	1	0	0	3	4
Thrombocytopenia	4	0	0	0	4
Normal	707	6	16	46	775
χ^2	178.258				
p	<0.001				

Distribution of Cases according to maternal outcome in relation to thyroid status

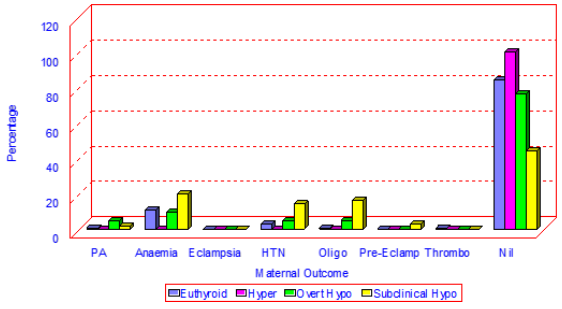

Table 2 Distribution of Cases according to fetal outcome in relation to thyroid status

Fetal Outcome	Thyroidism								Total	
	Euthyroid (n=838)		Hyper (n=6)		Overt Hypo (n=21)		Subclinical Hypo (n=104)			
	No.	%	No.	%	No.	%	No.	%	No.	%
Miscarriage	30	3.6	0	-	1	4.8	10	9.6	41	4.2
IUD/SB	12	1.4	1	16.7	0	-	2	1.9	15	1.6
LBW	36	4.3	0	-	2	9.5	8	7.7	46	4.7
IUGR	40	4.8	1	16.7	2	9.5	8	7.7	51	5.3
Neonatal Death	2	0.2	0	-	1	4.8	1	0.9	4	0.4
X^2	104.209									
P	<0.001									

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