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Prevalance of Thyroid Disorders and Fetomaternal outcome of Thyroid Disorders in Pregnancy

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Abstract

Introduction: Thyroid diseases are the commonest endocrine disorders affecting women of reproductive age group and hence constitute the commonest endocrine disorder in pregnancy also. Hyperthyroidism or hypothyroidism can influence the outcome for mother and fetus at all the stages of pregnancy. The aim of this study is to establish the prevalence and effect of thyroid disorder on pregnancy outcome. *Materials and Methods:* This study was a prospective study carried on 920 women coming for antenatal check-up in Adichunchunangiri Institute of Medical Sciences, B.G. Nagar, from October 2014 to September 2015. All women who were included in this study were followed up from 11-14 weeks of pregnancy up to delivery for thyroid disorders and their outcome on pregnancy. *Results:* Totally about 8.69 % (80) of 920 antenatal patients were diagnosed as thyroid disorders. The most common thyroid disorder was subclinical hypothyroidism accounting to 4.13% and patients having overt hypothyroidism the most common complication was preeclampsia 30.76% (8/26), 38.46% (10/26) babies developed jaundice. *Conclusion:* TSH is the hallmark in detection of hypothyroid as well hyperthyroid, so TSH should be routine investigations done in all antenatal women in first trimester. If TSH values are abnormal then FT3, FT4 and TPOAb need to be checked. Gestational age specific reference intervals are of utmost importance for monitoring thyroxine replacement therapy in pregnant women.

Keywords: Thyroid Disease; Pregnancy; Feto-Maternal Outcome; Prevalence .

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Introduction

Maternal thyroid state is an important predictor of pregnancy outcome. In a study carried in India, the prevalence of thyroid dysfunction was high with subclinical hypothyroidism found in 6.47% and overt hypothyroidism found in 4.58% of pregnant women[1]. Hyperthyroidism is less commonly encountered in pregnancy with a prevalence of 0.2-0.6%[2]. Autoimmune thyroid dysfunctions remain a common cause of both hyperthyroidism and hypothyroidism in pregnant women. Graves's disease accounts for more than 85% of all cases of hyperthyroid, whereas, Hashimoto thyroiditis is the most common cause of hypothyroidism. Postpartum thyroiditis (PPT) reportedly affects 4-10% of women. Thyroid hormone production which is iodine dependant gradually declines if the increase on iodine demand placed by the pregnant state, which averages 250 micrograms per day, is not met. The reference range for TSH is lower than outside pregnancy, while FT4 levels are highest in the first trimester due to the stimulatory effect of serum beta hCG on the TSH receptors. American Thyroid Association 2011 recommended trimester-specific reference ranges for TSH in pregnancy. (i) First trimester: 0.1–2.5 μU/mL; (ii) Second trimester: 0.2–3.0 μU/mL; (iii) Third trimester: 0.3–3.0 μU/mL. According to Marwaha et

al. 2008 the following reference intervals for FT3, FT4 and TSH determined for each trimester of pregnancy are recommended for evaluation of thyroid status of pregnant Indian women (Table 1).

Symptoms of thyroid dysfunction are generally vague and non specific, and could easily be attributed to the physiological changes that occur in pregnancy. Maternal hypothyroidism has been associated with miscarriage, preeclampsia, preterm delivery, placental abruption, low birth weight, fetal distress and reduced intellectual function of the offspring. Maternal and fetal complications of hyperthyroidism include congestive heart failure, thyroid storm, hyperemesis gravidarum, preeclampsia [5], preterm delivery, fetal growth restriction, still birth, fetal and neonatal thyrotoxicosis [3]. Hence thyroid function test becomes essential to know the thyroid status in pregnancy and also to treat the thyroid dysfunction in pregnancy inorder to prevent the complications associated with it.

Table 1: Pregnanacy and thyroid related hormones

Hormones	Trimester		
	First	Second	Third
FT3 (pmol/L)	1.92–5.86	3.2–5.73	3.3–5.18
FT4 (pmol/L)	12–19.45	9.48–19.58	11.32–17.70
TSH (μU/ml)	0.6–5.0	0.44–5.78	0.74—5.7

Materials and Methods

Method

The present study is prospective study, conducted on 920 ANC women after obtaining informed consent, selected from Adichunchunangiri institute of medical sciences B G Nagar, from October 2014 to September 2015. Inclusion criteria was all pregnant women from 11-14 weeks, evaluated for thyroid disorders and followed them up to term. Exclusion criteria was (i) Multi-fetal gestation; (ii) Known chronic disorder like diabetes and hypertension, know thyroid disorders. A detailed history was taken regarding the symptoms and signs of thyroid disorders which included Menstrual, Obstetric, Past, Medical, Family, Personal history. A through general physical examination in which Pulse, BP, Temperature, Respiratory rate was noted followed by CVS, CNS, RS, Local thyroid examination. Per abdomen and per vaginal examination was also done. Patient's blood samples were sent for routine TSH (Thyroid stimulating hormone) levels. If TSH levels were abnormal then for those patients blood samples were sent for FreeT3, FreeT4 levels. TSH level >2.5 μU/ml then TPOAb was checked. In overt and subclinical hypothyroidism with or without TPOAb positive thyroxine dosage was titrated to maintain serum TSH <2.5 μU/ml in first trimester and < 3 μU/ml in second and third trimester. In overt hyperthyroidism PTU (propyl thiouracil) was given to the patient. Every 6-8 weekly TSH levels were estimated and the dose of drug adjusted accordingly. In this study following first trimester reference ranges of FT3, FT4,TSH was taken. TSH- 0.1–2.5 μU/mL, FT3- 1.92–5.86 pmol/L, FT4- 12–19.45 pmol/L. (FT3, FT4 and serum TSH were done by chemiluminescence immunoassay method). At the end, the obstetrical and perinatal outcome of pregnancy was noted.

Table 2: Reference values for different thyroid functional status

	Overt hyper-thyroidism	Subclinical hyper-thyroidism	Overt hypothyroidism	Subclinical hypothyroidism
TSH μU/ml	<0.1	<0.1	>2.5	>2.5
FT4 pmol/L	>19.45	12-19.45	<12	12-19.45
FT3 pmol/L	>5.86	1.92-5.86	<1.92	1.92-5.86

After confirming high TSH abnormality (TSH>2.5) in hypothyroidism, TPOAb measurement is a necessity for establishing presence of thyroid autoimmunity as a cause of mild subclinical hypothyroidism. The development of thyroid failure considered when higher concentration of TPOAb is present. Increased levels of TPOAb is associated with (normal level TPO Ab-0 to 40) increased pregnancy failure rates and post-partum thyroiditis.

Results

In this study total 920 antenatal patient were subjected to routine TSH test, and about 80/920 (8.69%) antenatal patient were diagnosed to have thyroid disorders, about 6/920(0.65%) were diagnosed as overt hyperthyroidism, 10/920 1.08%) were diagnosed as subclinical hyperthyroidism, 26/920(2.82%) were diagnosed as overt

hypothyroidism, 38/920(4.13%) were diagnosed as subclinical hypothyroidism by taking reference values from (Table 2).From total 80 antenatal patient with thyroid disorders, Maximum number of patients were in 26– 30 years (48.75%) of age group. Maximum number of patients were multigravida with previous viable pregnancy(51.25%), and maximum cases detected were subclinical hypothyroidism (Table 3)

Overt or inadequately treated hypothyroidism is a risk factor of miscarriage and possibly preterm birth and fetal death. From Table 4, patients having overt hypothyroidism 23.07% (6/26) had IUD, 30.76% (8/26) developed preeclampsia, 26.92% (7/26) presented with preterm labour and 11.5% (3/26) had abruption, 15.38%(4/26) had spontaneous abortion at 9 to 14 weeks, 30.76% (8/26) patient developed fetal distress, 38.46% (10/26) babies developed jaundice, 19.23% (5/26) babies had low birth weight, 57.69% (15/26) patient underwent lscs and among them 33.3% (5/15) was preterm lscs.

Table 3: Characteristics of the patients

	Characteristics	N(80)	%
Age Group (years)	18-20	5	6.25
	21-25	28	35
	26-30	39	48.75
	31-35	8	10
Parity	Primigravida	30	37.5
	Multigravida with previous viable pregnancy	41	51.25
	Multigravida with previous abortion (s)	09	11.25
Thyroid status	Overt hyperthyroid	6	7.5
	Subclinical hyperthyroid	10	12.5
	Overt hypothyroid	26	32.5
	Subclinical hypothyroid	38	47.5

Table 4: TSH level & maternal and fetal outcome

		Overt hy Plk er-thyroidism	Subclinical hyper-thyroidism	Overt hypothyroidism	Subclinical hypothyroidism
	No. of cases	6	10	26	38
Maternal	FTND(>37wks)	3	5	9	18
	LSCS(> 37 wks)	1	3	10	9
	VD (< 37wks)	1	1	2	6
	LSCS (< 37 wks)	1	1	5	5
	Hyperemesis gravidarum	5	4	0	0
	Preeclampsia	4	3	8	3
	Abruption	1	0	3	1
	Preterm delivery	2	2	7	11
	IUD	0	0	6	3
	Abortion	2	0	4	1
	Fetal distress	3	1	8	2
	Postpartum thyroiditis	0	0	7	3
	LBW	2	3	5	3
	Jaundice	1	2	10	16

Table 5: Thyroid peroxidise antibody(TPOAb) & maternal and fetal outcome

		TPOAb	
		Positive	Negative
Maternal	No. of cases	23	41
	FTND (> 37 weeks)	10	24
	LSCS (> 37 weeks)	8	12
	VD (< 37 weeks)	0	1
	LSCS (< 37 weeks)	5	4
	Hyperemesis gravidarum	0	0
	Preeclampsia	6	5
	Abruption	4	0
	IUD	6	3
	Abortion	4	1
	Postpartum thyroditis	8	2
Fetal	LBW	5	3
	Jaundice	15	11

Table 5 shows that from total 64 patients of hypothyroidism, 23 patients TPOAb was positive. And among TPOAb positive patients, 56.52% (13/23) underwent LSCS out of which 38.46% (5/13)

were preterm lscs, 26.08%(6/23) patients had preeclampsia, 26.08%(6/23) patient had intrauterine death, 17.3%(4/23) of them had spontaneous abortion at 9 to 14 weeks of gestation, 34.78%(8/23) patients developed postpartum thyroiditis compared to negative TPOAb only 4.87%(2/41) patients developed postpartum thyroiditis, 61.21%(15/23) babies developed neonatal jaundice, 21.73%(5/23) babies had low birth weight. All above complications were much lower in patients with negative TPOAb.

Discussion

In this study about 80/920(8.69%) antenatal patient were diagnosed to have thyroid disorders. Overt or inadequately treated hypothyroidism is a risk factor of miscarriage and possibly preterm birth and fetal death, Abalovich et al. 2002[6]. This study showed that in overt hypothyroidism woman 23.07% (6/26) had IUD, 30.76%(8/26) developed preeclampsia , 26.92%(7/26) had preterm labour, Our results also showed that mothers with TPOAb positive 35.93%(23/64), with overt hypothyroidism and subclinical hypothyroidism during pregnancy, 26.08%(6/23) patients had preeclampsia, 26.08% (6/23) patient had intrauterine death, 34.78%(8/23) patients developed postpartum thyroiditis. These findings indicate that adequate treatment of those with known hypothyroidism and reorganization of those at risk of progressing to overt hypothyroidism during pregnancy is to be recommended – preferably before pregnancy, because the first few weeks of pregnancy are the most important time for brain development in the fetus and even subtle T4 deficiency in the mother may lead to poorer neuropsychological outcome, and reduce morbidity during pregnancy [4]. Gestational age specific reference ranges are of utmost importance because 4.13% of the patients would be missed for the diagnosis of subclinical hypothyroidism in this study. By gestational age specific reference intervals clinicians can reliably evaluate thyroid function and monitor thyroxine replacement therapy in pregnant women.

Conclusion

TSH is the hallmark in detection of hypothyroid as well hyperthyroid so TSH should be included in the list of routine investigations done in all antenatal women in first trimester. If TSH values are abnormal then FT3, FT4 and TPOAb need to be checked. TPOAb positive are associated with an increased risk of abortion, preterm labour, low birthweight of the newborn, even there is more chances of postpartum thyroiditis.

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