Original Research Article

Thyroid disorders in pregnancy

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Abstract

Background: Pregnancy is an important milestone in the life of every female. Thyroid disorders are observed 4 to 5 fold more frequently in women and often during the child bearing period. In patients with thyroid dysfunction prior and during pregnancy, maintenance of hormone levels to physiological levels is essential for good maternal and foetal outcome. **Aims and Objectives:** The present study was undertaken to monitor Patients on treatment for thyroid disorders till term and evaluation of maternal and foetal outcome. **Methodology:** It was prospective observational study conducted over 1 year. 40 patients were included who were pregnant and have deranged thyroid function test. They were further divided into 2 groups as hypothyroidism with pregnancy (28 patients with TSH>4mlU/l) and hyperthyroidism with pregnancy(12 patients with TSH<0.5mlU/l and FT4> 0.7ng/dl). These patients one diagnosed were started on appropriate medication and followed up every 6 weekly with Thyroid function test till they deliver and 7 days post-partum. Primary end point was to achieve and maintain Thyroid profile in a pregnancy suitable range and the secondary end point was to assess the maternal and foetal outcome at the end of pregnancy. **Results:** Out of 28 patients in hypothyroid group only 27 patients had received treatment as 1 patient came in labour directly. Only 4 out of 27 patients were maintained on 50mcg of thyroxine supplement till term, rest all 23 required escalation in doses such as up to 150 mcg of thyroxine in 5 patients, 100mcg of thyroxine in 15 patients and 75 mcg of thyroxine in 3 patients. The adequate TSH response was seen in 7 patients (TSH<2.5) and intermediate response was seen in 9 patients (TSH 1.5 to 4.5) and unsatisfactory response was seen in 12 patients (TSH>4.5) owing to their poor follow up. Out of 12 hyperthyroid patients only 3 were started on treatment in 1st trimester, 2 patients were started in 2nd trimester and 7 patients were started on treatment in 3rd trimester. Incidence of maternal and foetal complications were high in hyperthyroid group as compare to hypothyroid group. **Discussion:** In spite of giving treatment and optimization of doses of drugs in hyperthyroidism, their were significantly high number of complications as compare to hypothyroidism group. In hypothyroidism group good follow up leads to adequate control of TSH levels owing to lesser complications. **Conclusion:** Profound alterations occur in thyroid function during pregnancy. Exact interpretation of these alterations as depicted by laboratory reports is very important for timely diagnosis of hypo or hyperthyroidism during pregnancy and should be treated accordingly.
Key Words: Thyroid disorders.

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INTRODUCTION

Medical disorders in pregnancy are common clinical problems and can be challenging to the both clinicians and obstetrician in terms of diagnosis and adequate treatment. During pregnancy there are anatomical and physiological changes not only confined to the genital organs but also to all systems of the body. This is principally a phenomenon of maternal adaptations to the increasing demands of the growing fetus. A perfect harmony between all systems in human body is essential for a good maternal and foetal outcome. Endocrine glands play a very important role in physiology of pregnancy. Hyperplasia of thyroid gland occurring during pregnancy is a normal phenomenon to meet increased thyroxine need (4-5 times nonpregnant state). Physiological changes during pregnancy can make subclinical thyroid dysfunction become overt. Pregnancy is hypermetabolic state with 20 to 25% rise in basal metabolic rate, increase in heart rate. Many of these changes can mimic signs of

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hyperthyroidism. Evolution of biochemical assays over last few decades has facilitated early and accurate detection of thyroid abnormalities even in the absence of overt symptoms of hypothyroidism or hyperthyroidism. Pregnancy in hypothyroidism has been wrongly considered to be relatively rare presumably because of increased infertility and miscarriage rates associated with hypothyroidism[1].Studies have shown that when hypothyroid women become pregnant and maintain pregnancy, they carry an increased risk of obstetric and foetal complications. Both maternal and foetal complications occur more frequently and they are more severe when pregnant women present with overt hypothyroidism compared with subclinical hypothyroidism. However recent study has shown that it was not the diagnosis of subclinical or overt hypothyroidism that mattered in relation to obstetrical complications, but rather the adequacy of thyroxin treatment given during pregnancy[2].

AIMS AND OBJECTIVES

1. To study the clinical and laboratory profile of patients with thyroid disorders in pregnancy.
2. To Study the maternal and foetal outcome of pregnancy with thyroid disorders.

MATERIALS ANDMETHODS

An open prospective study was conducted over one year at a tertiary care hospital. All pregnant females with thyroid dysfunction prior to pregnancy or developed during pregnancy visiting medicine out door department were included after proper valid consent. Patient with vesicular mole and planning delivery in other hospital were excluded. Thorough physical examination with routine investigations like complete hemogram, blood sugar levels, liver and renal function tests, urine routine microscopy were done for all patients. Thyroid function tests were repeated every 6 weeks and at term and 7 days postpartum for adjustment of doses of drugs. Thyroid antibodies and antithyroglobulin antibodies along with Ultra sonography of neck were done in indicated patients. Foetal anomaly scan was done before 20weeks of gestation for all patients. Laboratory values of fT3,fT4 and TSH for trimester specific are as below[7]:

Table 1:

Lab test	Reference range for non-pregnant population	1st trimester	2nd trimester	3rd trimester
fT3(pmol/L)	9-26	10-16	9-15.5	8-14.5
fT4(pmol/L)	2.60-5.7	3-7	3-5.5	2.5-5.5
TSH(mu/L)	0.3-4.2	0-5.5	0.5-3.5	0.5-4

Patient were followed up till term at 6 weekly interval and also 7days after post-partum to monitor their response to treatment. Statistical analysis was done using paired T Test and Chi Square test.

RESULTS

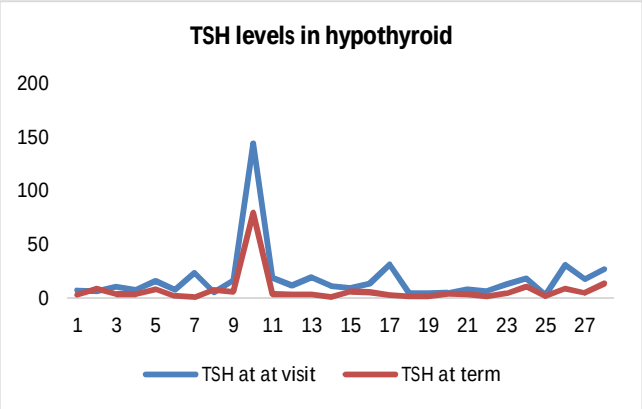

Figure 1: TSH values at first visit and at term in hypothyroid patients

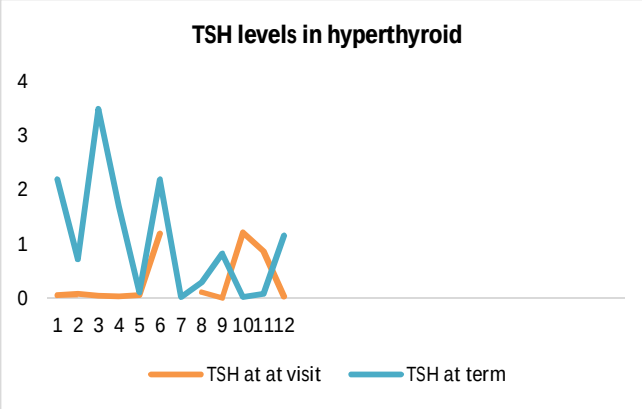

Figure 2: TSH levels at first visit and at term in hyperthyroid patients

Table 2: Maternal and Foetal complications in both group

Outcome	PIH	Abruptio Placentae	Preterm labour	LBW	LSCS	Perinatal complications	Foetal complications
Hyperthyroid	3/12	3/12	3/12	6/12	6/12	3/12	5/12
Hypothyroid	3/28	1/28	7/28	7/28	8/28	1/12	2/28

In the present study we have screened total 396 patients out of which 40 patients were found to have deranged thyroid function tests. These 40 patients were further grouped into hypothyroid (N-28patients) and hyperthyroid (N.- 12 patients). Out of 28 hypothyroid 7 patients were known case of hypothyroidism and 1 out of 12 hyperthyroid patient was known case of hyperthyroidism. In this study age group of patients were ranging from 21 to 38years with mean age of 27.96 which is almost same in both the subgroups. The mean gestational age in weeks were 24.25wk in hypothyroid group and 23.18week in hyperthyroid group. In hypothyroid group, 12 patients had Goiter. Fatigue (82%), constipation (71%), and cold intolerance (64%) were common symptoms experienced by these patients. In hyperthyroid group, Palpitations and sinus tachycardia were present in all patients (100%). Other symptoms like inadequate weight gain (83%), diaphoresis (75%), rest tremors (66%) were also noted in significant number of patients. Ocular manifestations of Graves' disease were present in 3 out of 12 patients (25%). Out of 28 hypothyroid patients 27 had received treatment. One patient was presented in labour with report suggestive of hypothyroidism so was not any prior medications. 20 newly detected and 2 known hypothyroid were on dose of 50mcg of thyroxine. Only 4 out of 22 patients achieved desired level of TSH value (</= 2.5 IU) with this dose, rest all needed dose increment to achieve and maintain the desired level of TSH (Fig. No.1). Out of Remaining 5 known cases; 4 were on 100mcg and 1 was on 150mcg thyroxine supplement throughout their pregnancy. Maximum dose used was 150mcg/day. At term 15 patients were on dose of 100mcg/day and 5 patients required dose as high as 150mcg/day to maintain TSH value in normal range for pregnancy (below 2.5IU). Hyperthyroid patient when detected were started on PTU (Propylthyouracil) in doses of 50-150mg/day in divided doses along with propranolol for symptomatic management in their first trimester(3/12 patients); if detected in 2ndand 3rdtrimester were directly started on carbimazole(9/12 patients). They were monitored 6weekly for vitals and also FT4 and FT3 were done 6weekly for dose adjustment till term (Fig. no.2). Incidence of maternal complications like PIH, abruptio placentae, Preterm labour was definitely high in hyperthyroid group as compared to hypothyroid group. Similarly number of foetal complications and perinatal morbidity were more in hyperthyroid group irrespective of TSH levels or adequacy of treatment as shown in table no.1. None of the foetus in both the groups was found to have congenital anomalies after delivery.

DISCUSSION

The present study consists of, pregnant women who were evaluated for thyroid function at their first antenatal visit and followed up till term for both maternal and foetal outcome. Patients included in the study were grouped according to laboratory tests as hypothyroid and hyperthyroid group. Age of all patients in the study group ranged from 21 to 38yrs with mean age being 27.96 in hypothyroid group, 26.83 in hyperthyroid group. Mean age of gestation in weeks was 24.25 in hypothyroid group and 23.18 in hyperthyroid group. Out of the 28 hypothyroid patients, 21 patients were detected during pregnancy. Remaining 7 patients with known hypothyroidism conceived while they were on thyroxine therapy. Three of them had high TSH values(> 4.5mcg/ml) at the time of confirmation of pregnancy and required immediate increment in doses. The increment in thyroxine dose was based on the initial degree of TSH elevation. For women with a serum TSH between 5-10mIU/ltr, the average increment in thyroxine dosage was 25-50mcg/day: for those with a serum TSH between 10 and 20 mIU/ltr, 50-75mgm/d; and for those with a serum TSH greater than 20mIU/ltr,75-100mcg/d. The overall aim was to achieve and maintain free T4 and TSH at levels normal for pregnancy throughout gestation. Maximum dose used was 150mcg/day. In present study in hypothyroid group 3 out of 28(10.7%) patients had pregnancy induced hypertension (PIH). No case of PIH was reported from adequately treated group and all 3 cases were from inadequately controlled group, however definite correlation of TSH levels with PIH cannot be projected for general population considering small sample size of study group. PIH has been reported in about 13 to 14% hypothyroid females in various studies till date[3,4,5]. Only one case of abruptio placentae was recorded from present study in hypothyroid group which was reported 19% in previous study[3]. This patient did not received thyroxine supplements as she was detected to be hypothyroid few days prior to labour and presented to our hospital while in labour. Intrauterine foetal distress was reported from single case which required delivery by caesarean section. An increased incidence of about 14% intrauterine foetal distress has been reported in a previous

study[6]. Preterm labour with low birth weight baby was reported in 7(25%) cases and predominantly from inadequately controlled group (6 out of 7 patients). Preterm labour has been reported in 22 to 31% of patients in previous studies[2,3,5]. Preterm labour showed inverse correlation with TSH value in our group. LSCS incidence in females with thyroid dysfunction (including hyperthyroid group) was significantly high, total 14 out of 40 patients; though nodefinite correlation was found between TSH value and LSCS. In 71% of evaluated pregnancies from hypothyroid group dose of thyroxin has to be increased with a mean increase of 76.5mcgm/day. The increase need of LT4 may be because of several factors; an increase in thyroid binding globulin (TBG) in response to increased estrogen levels; inefficient human chorionic gonadotropin (hCG) stimulation on insufficient thyroid and deiodination of T4 at the placental levels. The fact that 71% of patients requiring an increased dose during pregnancy, needed decrease in their dose after delivery confirms that such dose adjustments were because of changes inherent to pregnancy and not to factors unrelated to pregnancy[7]. As per previous studies lack of control of hyperthyroidism is associated with adverse pregnancy outcomes hence an early and timely diagnosis is essential. Overall control of thyroid function in patients from hyperthyroid group in our study was inadequate owing to late presentations in most of patients. Only 3 patients were started on treatment in 1st trimester, 2 patients in 2nd trimester and 7 patients in 3rd trimester. Five out of twelve patients showed TSH value more than 1mlU/dlat term and remaining seven patients had TSH value less than 1mlU/dl with decreasedfT4 values but not normalised, depicting poor control. Over all maternal and foetal complications like PIH, abruptio placentae, preterm labour and foetal complications like low birth weight, IUFD were high in hyperthyroid group when compared with hypothyroid group (table no.1).

CONCLUSIONS

A good number of hypothyroid patients (12/28) had TSH value more than 10 at term owing to poor follow up and inadequate compliance. A few complications were also noticed in this group. However, hyperthyroidism in the third trimester is an independent risk factor for low birth weight (LBW). Irrespective of TSH response achieved at term maternal complications like PIH, abruptio placentae, Preterm labour and foetal complications like IUGR, IUFD were significantly high in hyperthyroid group as compared to hypothyroid group. Hyperthyroidism has to be detected and treated early to have a good maternal and foetal outcome. Limitation of the study is sample size being small the evaluation for miscarriages and poorly treated thyroid disorders cannot be estimated adequately so enables larger sample size. Post-partum follow up was only till 7 days so long term maternal and foetal outcomes were not included in the study

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