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Original Research Article

Hypothyroidism in pregnancy: the scourge of the hills

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ABSTRACT

Background: Hypothyroidism is a causal agent sub serving a multitude of complications in pregnancy. There is a lot of controversy regarding universal screening for thyroid abnormalities during pregnancy. An attempt was made to ascertain the incidence of hypothyroidism during pregnancy in a peripheral hospital.

Methods: All patients reporting to ANC OPD were subjected to thyroid profile and results tabulated as per ATA guidelines 2017. Patients with clinical hypothyroidism were followed up with treatment to look for condition related complications if any. Complications despite treatment were noted and included only after ruling out masquerading mimickers or co existent conditions.

Results: An incidence of 14.46% per two years was detected with hypothyroidism.

Conclusions: The need for universal screening for hypothyroidism is inescapable particularly in hilly terrain.

Keywords: Free T4, Hypothyroidism, Pregnancy Complications, Thyroid Stimulating Hormone (TSH).

INTRODUCTION

Thyroid disorders during pregnancy are documented as one of the commonest endocrine disorders in pregnancy. Lot of debate is on regarding routine screening of thyroid disorders during pregnancy.

As per a report in Lancet, 42 million people in India have hypothyroidism, which makes the prevalence a staggering 11% as compared to only 2% in UK and 4.6% in USA.¹ As per American Thyroid Association(ATA) guidelines 2017 as many as 2-3% of prepregnant population has raised TSH values.²

Treatment of subclinical hypothyroidism has not shown to be beneficial as compared by with euthyroid patients in preventing complications of pregnancy.³ However several complications in pregnancy due to overt hypothyroidism have been reported over the years. Most sinister among them being intra uterine fetal demise. A study by Alan et

al reported a significantly higher rate of fetal demise in the sufferers of overt hypothyroidism.⁴

Higher TSH levels have been associated with first trimester pregnancy losses. Studies comparing low and high-risk groups of women with no history of abortion, women with previous history of abortion and women reporting for the first time with bleeding per vaginum showed TSH was strongly associated with first trimester pregnancy loss.^{5,6}

During pregnancy, dysfunction of thyroid glands causes dysembryogenesis and placental pathology, deteriorates the labour and perinatal outcome. Literature shows that 17% of pregnant women manifest various pathologies like preeclampsia (30%), fetomaternal insufficiency (86%) and labor abnormalities (30%).⁷

A prospective study by Saha et al found early detection and treatment of hypothyroidism reduced severe

complications of PIH, Abruptio placentae and Intra Uterine Fetal Demise (IUFD).⁸

There has been lot of controversy over whether a thyroid function test using T3, T4, TSH or a panel consisting of FreeT3, FreeT4, TSH should be used as a reliable biochemical indicator.

As per ACOG, Free T4 and TSH are most reliable due the reason of being independent of thyroid binding globulin values which vary patient to patient and across the timeline of pregnancy thus defeating the virtue of accuracy.⁹

METHODS

This was a prospective study conducted in the ante natal OPD of this hospital for a period of 2 years. All patients were universally screened for TSH using Ultra-Sensitive Sandwich Chemiluminescent Immune Assay method and Free T4 using Competitive Chemo Luminescent Immune Assay method during the first visit to OPD. Sandwich assay employs the technique of sandwiching the antigen between a precoated antibody and a biotin coated antibody only to be revealed by a luminescent avidin solution and quantified.

Competitive chemiluminescent assay employs a biotinylated antigen- antibody complex measurement using luminescence generated on adding luminescent solution on immobilized complexes. The pregnancy reference ranges used were defined as per kit manufacturer for the above assays. Positive cases of overt hypothyroidism were treated with thyroxine supplementation in consultation with the physician and monitored for evolution of any complications stemming from this underlying condition and documented. Attributable complications detected during pregnancy despite treatment were noted and rigorous search made for mimickers like Diabetes, use of drugs etc.

Inclusion Criteria

All pregnant ladies reporting to Ante Natal OPD were screened using FT4 and TSH values. Valid consents were taken and counselling regarding the implications and further treatment protocols were explained in sync with the hospital protocol. The ladies had stayed in the region for at least a period of one year and conceived during this timeframe.

Exclusion Criteria

Ladies reporting from lower altitude or from different geographic regions were excluded to remove variability arising from different altitude and territorial conditions. Previously known hypo/hyperthyroid cases, Central endocrinopathies and thyroid malignancies were kept as exclusion criteria because of their impact on FT4 and TSH values giving rise to false positives.

RESULTS

Case definition for overt hypothyroidism based on freeT4 and TSH values were drawn and assessed on case to case basis (Table 1). Increase in TSH value with a corresponding decrease in the free T4 was labelled as overt hypothyroidism whereas increase in merely TSH without a correlation to free T4 was classified as sub clinical hypothyroidism.

Table 1: Categorisation of thyroid malfunction during pregnancy.

Maternal Status	TSH	Free T4
Pregnancy	Varies by trimester	No Change
Overt Hyperthyroidism	Decrease	Increase
Subclinical Hyperthyroidism	Decrease	No change
Overt Hypothyroidism	Increase	Decrease
Subclinical Hypothyroidism	Increase	No change

Reference values for pregnancy given by the kit manufacturer were used to quantify the abnormalities (Table 2). Values were given by the manufacturer based on 5th and 95th centile defining the lower and upper limits of the range. Pregnancy values differ from normal physiological values due to increased metabolism of thyroid hormones and effect of estrogen on the thyroid binding globulins.

Table 2: Trimester wise reference values of TSH.

Trimester	TSH levels	Free T4
1st trimester	0.10-2.5 µIU/ml	0.90-1.50 ng/dl
2nd trimester	0.20-3.0 µIU/ml	0.70-1.50 ng/dl
3rd trimester	0.30-3.0 µIU/ml	0.70-1.80 ng/dl

Out of 235 cases that reported to ANC, 34 were detected with overt hypothyroidism with an incidence of 14.46 percent per two years (Table 3).

Table 3: Incidence of overt hypothyroidism in study population.

Number of cases presented	Number of cases screened	Overt hypothyroidism	Incidence (%/duration)
235	235 (Nil excluded)	34	14.46/2 years.

DISCUSSION

American Thyroid Association places a prevalence of 2-3% in pregnant population and the ACOG at 2-10/1000 pregnancies of overt hypothyroidism.^{2,9} Indian statistics suggest a much higher prevalence (4-11%) with an affinity for the hilly terrain.^{10,11} Discussions have been on since the realization of the fact that thyroid levels are

essential for growth and development of the maturing fetus. Whilst the medical fraternity agrees on a universal screening cost to benefit ratio has been a major road block in the developing countries which implement high risk strategies. Hills form a very specific haven for hypothyroidism. Similar studies in generic populations of children in various districts of Karnataka showed a higher prevalence in the populace of Coorg which has a similar hilly terrain. Attributable risk factors in the hills include a low soil iodine content and consumption of organic food with a rich mix of goitrogens found specifically in the blue mountains.¹² ATA guidelines of 2011 classifies women into a high risk category if their history or physical examination includes one or more of the following: thyroid disease and/or thyroid surgery, iodine-131 (I131) treatment, family history of thyroid disease, thyroid disease symptoms, thyroid swelling, positivity for thyroid autoantibodies, type 1 diabetes or other autoimmune diseases, infertility, spontaneous abortion, preterm birth, amiodarone or lithium treatment, head and neck irradiation, recent exposure to iodine contrast agent, age greater than 30, and body mass index greater than 40 kg/m². Such guidelines were tested in studies conducted in field by Yang et al who concluded that risk stratification fails to detect most of thyroid disorders in women who are not even tested being of exclusive nature from the guidelines.¹³ Similar Guidelines were issued by the National health mission in India which were centered on selective screening based on risk stratification.¹⁴ With such a high rate and unwelcome complications in pregnancy, a universal screening for thyroid especially in hilly terrains, the potential benefits for a universal screen are substantiated in sync with the modern clinical mindset.

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