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Original Research Article

Universal Thyroid Screening in Pregnancy versus Targeted Case Finding

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Abstract

Background: Thyroid disorders are the second most common endocrinological disorders in pregnancy. With the severity of clinical consequences and the present prevalence rate, a universal screening program would be justified for identifying women with thyroid disorder.

Aim and Objectives: To know the difference in universal thyroid screening and targeted case findings.

Material and Methods: This was prospective study carried out in 200 pregnant patients with singleton gestation at the antenatal clinic of our institution, for the period of one year during the first antenatal visit. Study was conducted after getting informed consent following inclusion and exclusion criteria At the same time patients with known hypothyroidism/ hyperthyroidism were excluded from the study.

Results: 200 patients were screened. Mean age of patient was 26.45 years with SD of 2.12 Years and mean gestational age was 9 weeks. 35 patients had abnormal thyroid profile. Of which 20 had subclinical hypothyroidism, 9 had overt hypothyroidism, 4 had subclinical hyperthyroidism, 2 had overt hyperthyroidism. Of these 35 patients, 22 had risk factors, 13 had no risk factors. If high risk strategy for screening was used, we would miss these 13 patients, which approximates to one third of patients.

Conclusion: From overall results and discussion with other study we can conclude that universal thyroid screening is much better than targeted case finding which misses around one third of patients with abnormal thyroid profile. The incidence of complications was more in patients with abnormal thyroid profile compared to those with normal thyroid profile.

Keywords: Thyroid Disorders, Hypothyroidism, Hyperthyroidism etc.

Introduction

Thyroid disorders are the second most common endocrinological disorders in pregnancy. There is a wide geographical variation in the prevalence of hypothyroidism in pregnancy. Prevalence of hypothyroidism during pregnancy in India reported ranging from 4.8% to 13%. [1] The incidence is therefore higher in Asian countries compared to the West. In view of the adverse outcomes associated with maternal thyroid disorders and the obvious benefits of treatment, some expert

panels have suggested routine thyroid screening. However the endocrine society clinical practice guideline recommend a case finding approach where only women at risk are tested. These include those with a personal or family history of thyroid disorders, type 1 diabetes mellitus, or any other history suggestive Autoimmune disorders, goitre, thyroid antibodies, History of head or neck irradiation, or history of preterm delivery, Infertility, history of recurrent abortion.

Evidence suggests that sub clinical hypothyroidism may be associated with spontaneous abortion, preeclampsia, abruption, preterm delivery, and impaired cognitive and psychomotor development in the offspring. There is no universal consensus amongst various policy enforcing bodies for universal screening of maternal thyroid disorders during pregnancy period. Though there is lack of consensus among various regulatory bodies, but on ground surveys conducted among European and American practitioners showed that many of them had already practised routine TSH testing in pregnant women. [2]

There is a general consensus among clinical scientists regarding pregestational hypothyroidism treatment goal preconception TSH target level. However, the paradox of the same is while the screening program treatment requirement target was set at the same level it was not agreed upon. The knowledge of positive thyroid antibody status is helpful as it is considered as criteria for high-risk pregnancy. With the severity of clinical consequences and the present prevalence rate, a universal screening program would be justified for identifying women with overt hypothyroidism.

Maternal hypothyroidism in the first trimester may be harmful to the fetal brain development. These complication can be prevented if universal screening is done and adequate treatment is started in first trimester as treatment after that will not reverse the established neurodevelopment delay. As in the first trimester, the fetus entirely depends on maternal thyroid hormones for neurodevelopment. The causes for hypothyroidism include iodine deficiency, autoimmune thyroiditis, radioactive iodine therapy or surgical removal of thyroid gland. The incidence of hyperthyroidism in pregnancy is less than 1%. Moreover sub clinical hyperthyroidism does not affect pregnancy outcome. So the screening mainly focuses on hypothyroidism.

Materials and Method

This was prospective study carried out in 200 pregnant patients with singleton gestation at the antenatal clinic of our institution, for the period of one year during the first antenatal visit. All patients gave informed consent to participate in the study. At the same time patients with known hypothyroidism/ hyperthyroidism were excluded from the study. Study was conducted after getting ethical approval from our institute. And patients were included after following inclusion and inclusion criteria given bellow.

Inclusion Criteria:

- All pregnant women having their first trimester, who are willing to come for follow up.
- High risk group include patients with known autoimmune disorders, personal/ family history of thyroid disorders, obesity, recurrent Abortion, history of IUD, long period of infertility.

Exclusion Criteria:

- Patients with known thyroid disorders
- Patients not willing to come for follow up
- Patients with molar pregnancy

Method

After enrolment of participants, an informed written consent, detailed history was taken from patients and attenders,

participants were subjected to relevant general physical examination, and findings were recorded on a pre-designed Proforma.

TSH and free T4 was measured in their first booking visit. Early morning fasting venous sample was being used. Patients were universally screened for thyroid dysfunction and values are noted down and analysed grouping patients into normal / overt hypothyroidism/ overt hyperthyroidism, subclinical hypothyroidism/ subclinical hyperthyroidism and treatment was initiated. Patients are then analysed for risk factors for thyroid dysfunction, and if present, they are grouped into high risk group and those without risk factors into low risk group. Proportion of thyroid dysfunction in both groups are noted and was analysed if screening only high risk population rather than universal screening is sufficient. Information was collected about abortion, abruption, preterm, low birth weight, fetal neonatal death and mode of delivery and birth weight. Complications in the sufficiently treated and inadequately treated group was noted down.

The normal range of TSH was taken as 0.5 to 2.5 in first trimesters. The subjects underwent a detailed assessment of hypothyroidism risk factors as defined by the guidelines. Women with FT3, FT4 below the reference ranges long with elevated TSH>2.5 were diagnosed as overt hypothyroidism. Women with FT3, FT4 in normal range with TSH > 2.5 were diagnosed as having sub clinical hypothyroidism. Women with FT3, FT4above the reference range with TSH<0.1 was classified as overt hyperthyroidism. while those having FT4 FT3 in normal range with TSH less than 0.1were diagnosed as subclinical hyperthyroidism. These women with abnormal thyroid profile will be started on treatment and followed up till term and watched for any complications.

Statistical Analysis: Collected data were entered in the Microsoft Excel 2016 for further statistical analysis. Qualitative data was expressed in term of frequency and proportion and quantitative data were expressed in terms of mean and standard deviation. Chi-square test of association was used to find and association between the variables. And t-test was used to find mean difference between the quantitative variable. P-value<0.05 was considered as statistically significant.

Results and Observation

In the study, total of 200 patients were screened. 26.45 years with SD of 2.12 Years and mean gestational age was 9 weeks.

Table 1: Demographic distribution of study population.

Parameter	Frequency	Percentage
Thyroid Status		
Abnormal	35	17.5
Normal	165	82.5
Age in Years		
< 20 years	29	14.5
21 -25 years	83	41.5
26 -30 years	67	33.5
> 30 years	21	10.5
Gestational Age		
36 weeks	15	7.5
37 weeks	3	1.5
38 weeks	16	8
39 weeks	72	36
40 weeks	94	47

Mode of Delivery		
LSCS	99	5.5
Normal	85	42.5
Forceps	11	49.5
Vacuum	5	2.5

Table 2: Distribution of Type of Thyroid status and Birth weight of baby

Parameter	Frequency	Percentage
Type of Thyroid		
Subclinical hypothyroidism	20	57.2
Subclinical hyperthyroidism	4	11.4
Overt hypothyroidism	9	25.7
Overt hyperthyroidism	2	5.7
Birth Weight		
<2.5 kg	2	5.7
2.5 -3.0 kg	15	42.9
3.0 -4.0 kg	18	51.4

Of the screened population, 35 patients had abnormal thyroid profile. Of which 20 had subclinical hypothyroidism, 9 had overt hypothyroidism, 4 had subclinical hyperthyroidism, 2 had overt hyperthyroidism. Of these 35 patients, 22 had risk factors, 13 had no risk factors. If high risk strategy for screening was used, we would miss these 13 patients, which approximates to one third of patients.

With regard to mode of delivery of the screened Population, 41 had elective LSCS, 58 had emergency LSCS, 85 had normal vaginal delivery, 11 forceps and 5 vacuum. In amongst the abnormal thyroid profile group, 9 had elective LSCS, 8 had emergency LSCS, 13 normal vaginal delivery, 4 forceps, 2 vacuum. The main indication for LSCS was fetal distress, CPD, failed induction.

Table 3: Distribution of Thyroid parameter among study population.

Thyroid Parameter	Normal	Abnormal
TSH	165	35
FT3	145	55
FT4	180	20

Table 4: Distribution of Thyroid parameter among study population.

Parameter	High Risk	Low Risk
Type of Thyroid		
Subclinical hypothyroidism	12	8
Subclinical hyperthyroidism	1	3
Overt hypothyroidism	7	2
Overt hyperthyroidism	2	0
Adverse Outcome		
Miscarriage	2	2
Gestational Diabetes	2	1
Placental Abruption	2	1
Caesarean Delivery	4	2
Preterm	5	4
PIH	4	2
Oligohydramnios	3	1

Among patients with abnormal thyroid status, 22 patients were at high risk and 13 patients were at low risk. Among high risk patient 5 patients had preterm, followed by caesarean delivery, pregnancy induced hypertension, 3 patients had oligohydramnios, each 2 patient had miscarriage, gestational diabetes and placental abruption.

Discussion

The ultimate goal of universal screening of maternal TSH level is the diagnosis of dysfunction at the prenatal or early gestational stage so that therapeutic intervention can be done before crucial irreversible stages of fetal development. Studies were performed to evaluate the cost-effectiveness of universal screening demonstrated favorable outcomes. [3] Universal TSH screening would help to diagnose and treat women with autoimmune subclinical hypothyroidism (SCH). It would also help in close monitoring of euthyroid antithyroid antibody-positive women, who may develop hypothyroidism or postpartum thyroiditis. The screening should be done in such a manner that intervention can be done within the time-based therapeutic window to get the optimum benefit. It has been shown that 6–10 weeks delay of levothyroxine therapy in early pregnancy increases the probability of neurodevelopmental anomaly of the offspring. Therefore, the screening period should be in the early pregnancy period preferably within 1st trimester. Trimester-specific reference ranges maternal serum TSH testing is a reasonably economical, widely available, and reliable test. [4] Endocrine Society guidelines recommend the free T4 index along with TSH rather than free T4 assays during pregnancy. None of the guidelines recommend universal thyroid peroxidase (TPO) antibody screening or treatment of euthyroid antithyroid antibody-positive women.

The high-risk case finding approach for thyroid dysfunction, would therefore overlook about one out of every three pregnant women suffering from these thyroid disorders. The results of our study were similar to Vaidya et al. [5] The upper limit of TSH had been lowered from 0.5 to 0.1mIu/L, based on the 2012 endocrine society guidelines. In our study we have screened 200 pregnant women, with mean age of 26.45 years with SD of 2.12 Years and mean gestational age was 9 weeks. An ongoing Debate is about the need for universal screening of thyroid dysfunction in pregnancy. Even though there is not much of sufficient evidence to prove that the finding out and treating of pregnant women with subclinical hypothyroidism improved maternal and fetal outcomes, the low cost treatment and widespread availability of screening test is now causing the universal screening approach an increasing popularity [6]

In our study, we found that when potential risk factors for thyroid disease are used, case finding misses 17.1 percent of those with hyperthyroidism, 25.7% of those with overt hypothyroidism or 57.2 % of those with subclinical hypothyroidism. The results were similar to the Vaidya et al study. The present study showed that considering the relatively low prevalence of risk factors among South Indian pregnant women, about one-third of pregnant women with thyroid dysfunction (35.6%) were being overlooked by not using universal screening approach. But, those overlooked mainly were subclinical thyroid disorders (35.5%). The present data on the impact of treating these women are limited and conflicting. While some studies showed that subclinical hypothyroidism resulted in adverse pregnancy complications [7] and with L-thyroxine treatment (L-T4) prevented the adverse complications [8], this has not been showed by others [9].

The present study shows that among the risk factors for thyroid dysfunction, age, recurrent abortions and family histories of

thyroid disorders, symptoms of thyroid disorders are significant prognostic factors for prediction of thyroid dysfunction. Pregnant women with recurrent abortion had more chance of having thyroid dysfunction, than those without this history, and a person with a family history of thyroid disorders had higher chance of having thyroid dysfunction compared to women without this history. The main strength of our study was the methodology, because it was a study conducted mainly on pregnant Indian women in their first trimester. Detailed Thyroid function assessment including history, general examination, and thyroid function tests were done for all study participants, while in some other studies these have not been done for all participants [10]. However, the results of our study cannot be generalized to other areas with different statuses of iodine sufficiency or other underlying risk factors. [11]

However, there are a few studies which have argument against universal screening. To date only 2 studies are there which have different results. The Negro et al study found no difference in adverse outcome between universal or selective screening patients . However comparison of women identified with thyroid dysfunction during pregnancy and treated had few adverse outcomes than women with thyroid dysfunction who were not identified and treated. The Lazarus et al study showed no benefit of treatment of subclinical hypothyroid patients. But the pope et al study showed maternal free T4 less than 10 TSH entitle is associated with poorer neuropsychological performance than children whose maternal FT4 was more than tenth centipede.

Conclusion

From overall results and discussion with other study we can conclude that universal thyroid screening is much better than targeted case finding which misses around one third of patients with abnormal thyroid profile. The incidence of complications was more in patients with abnormal thyroid profile compared to those with normal thyroid profile. Identifying and treating thyroid dysfunction improves neonatal and maternal outcome. Moreover, the cost of treatment is also reasonable. Hence In a country where the prevalence of thyroid is high, universal screening must be recommended.

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