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Original Article

Thyroid Screening in Pregnancy – A Study of 82 Women

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Abstract

Objectives: To create awareness, lay down a new criterion to pick up probable cases, and draw a proper management protocol for hypothyroidism in pregnancy. *Methods:* Inclusion criteria – All normal pregnant women and those with thyroid problems were included in the study. Exclusion criteria – All others who had diabetes, collagen disease, heart disease with pregnancy were excluded from the study. Eighty two women were screened for hypothyroidism in pregnancy using T3, T4, TSH and FT4. A new screening criterion was followed [TSH value – 0.5-1.5 mIU/ml i.e biological range]. Women with TSH in pregnancy were followed up. Women with TSH value above 3mIU/ml, were considered hypothyroid and received treatment with L-Thyroxin. The group with a TSH value 2-3 mIU/ml was assessed with FT4. Those with low values or those with increasing TSH value on subsequent follow up received treatment. *Results:* Study group consisted of 62 primigravidae and 20 multigravidae. A. 40[32P + 8M] > 3 TSH value, these women received treatment with L-Thyroxin B. 24[16P + 8M] 2-3 TSH value, C. 18[14P + 4M] <2 TSH value. According to thyroid status, they were categorized into euthyroid – [27 true euthyroid + 4 potential hypothyroid] and overt hypothyroid – [43 adequately treated and 6 inadequately treated], two were untreated. Inadequately treated and potential hypothyroid pregnant women landed with miscarriages or pregnancy inducted hypertension, oligohydramnios and IUGR. *Conclusions:* Potential and inadequately treated hypothyroid patients present with problems in pregnancy, while adequately treated hypothyroid and true euthyroid women get normal ongoing pregnancies. So to identify these potential or overt hypothyroid women, thyroid screening with T3, T4, TSH and FT4 must be done during prenatal period, at first booking, and repeated at 8 weeks interval thereafter, in pregnancy. TSH value should be kept below 2mIU/ml to get adequate control.

Key words: screening in pregnancy, thyroid and pregnancy, hypothyroidism

Introduction

Thyroid gland plays an important part in our life. Thyroxin is needed for cellular oxidation and neurophysiologic development[5]. It regulates our metabolism and hormone production. Pregnancy increases the demand on maternal thyroid gland. When the mother fails to cope with this, she develops hypothyroidism. Overt hypothyroidism causes infertility and amenorrhea, while it is the borderline or the potential hypothyroids and inadequately treated hypothyroids who present with problems in pregnancy. Thus the whole scenario of pregnancy complications i.e. early pregnancy wastage, abruption, preterm pains[2,9,11], late fetal death, PIH[7,11,] LBW, cerebral palsy[15] arise in this lag period from the sub-clinical to clinical manifestation. Researches are of

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the opinion that non-pregnant thyroid values are unreliable in pregnancy. Here our aim is to create awareness, lay down a new criterion to pick up probable cases, and draw a proper management protocol.

Methods

Inclusion criteria – All normal pregnant women and those with thyroid problems were included in the study. Exclusion criteria – All others with diabetes, collagen disease, and heart disease in pregnancy were excluded.

Eighty two women pregnant women in the age group of 20-35 years who attended the antenatal clinic were personally followed throughout their pregnancy. T3, T4, TSH screening was done using fasting serum sample at first booking and as early as the pregnancy was confirmed. In selected subjects, FT4 was done to confirm diagnosis and start treatment. TSH was repeated at 8 weeks interval and postnatally. If there was an excess weight gain, preterm pains and pregnancy-induced hypertension, TSH was repeated. All the women with TSH value above 3mIU/ml received L-Thyroxin tablets on empty stomach. The dose of thyroxin was adjusted to keep TSH value between 0.5 – 2 mIU/ml. Those with low FT4 values and those with increasing TSH value on follow up received treatment.

Results

Among the 82 pregnancies studied, 62 were primigravidae [P] and 20 multigravidae[M].

We arranged the women according to TSH values into three groups.

Group A – 40[32P + 8M] had TSH > 3mIU/ml
Group B – 24[16P + 8M] had TSH between 2-3mIU/ml
Group C – 18[14P + 4M] had TSH below 2mIU/ml

According to the thyroid status, these women were categorized into euthyroid-27, true euthyroid and four potential hypothyroid. In addition, overt hypothyroid under treatment – adequately treated 43 and inadequately treated six; two were untreated. This study showed that there is no difference in performance of euthyroid and adequately treated hypothyroid women and that they had normal pregnancy outcome. Inadequately treated, untreated hypothyroid and potential hypothyroid pregnant women presented with miscarriage and pregnancy induced hypertension [PIH].

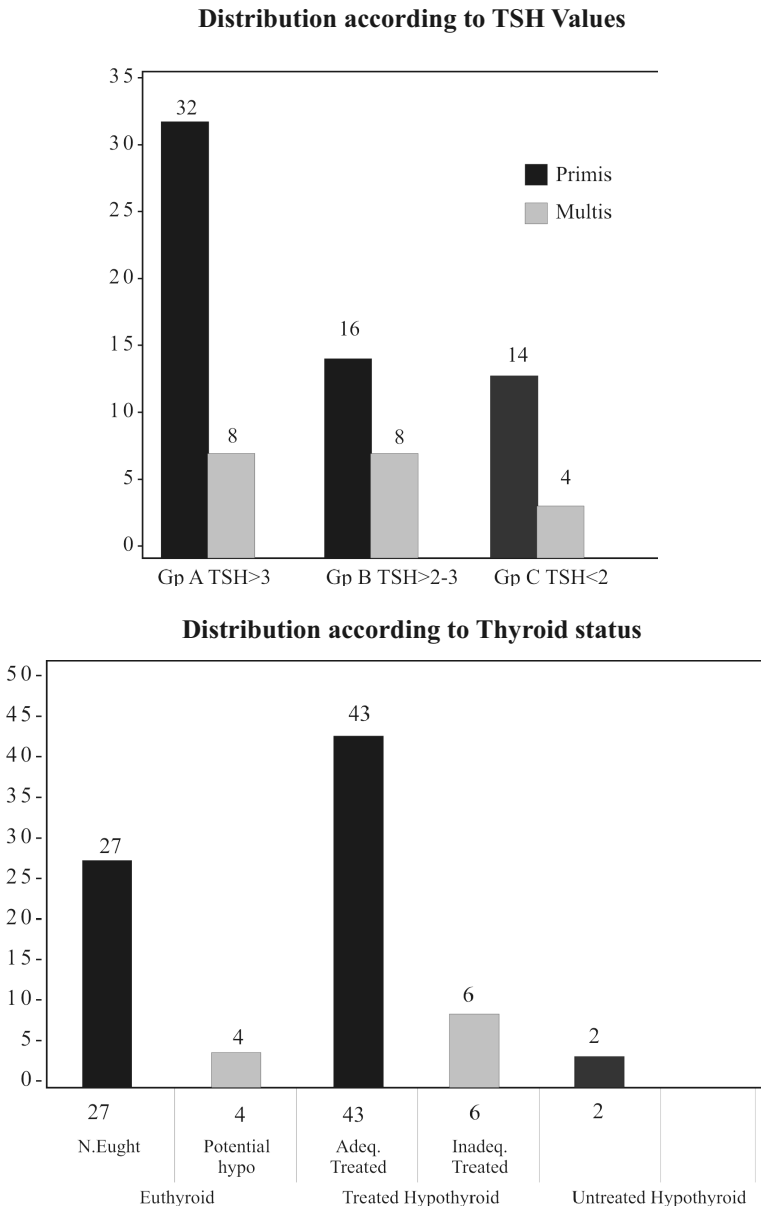
Seven women had PIH, four in the inadequately treated group, two in the potential hypothyroid, and one came with antepartum eclampsia from untreated overt hypothyroid group [p=<0.01, x2=2.99 >2.58, df=1]. Four women had miscarriages, ix gave past history of abortions [p=<0.01, x2=2.92 >2.58, df=1]. Two gave history of ectopic pregnancy. Fifteen infertile women conceived and came following treatment with thyroxin [p=<0.001, x2=11.702 >10.83, df=1].

Discussion

Pregnancy is a stress test to the maternal thyroid gland, due to increase in thyroxin binding globulin, increased demand for iodine, and thyroid stimulation by HCG[15]. While for normal euthyroid pregnant women this does not seem to be a burden, it is borderline hypothyroid women, who conceive, and come out with sub clinical or overt hypothyroidism. Fetus depends in the first 12 weeks on the mother for thyroxine1,[3,11]. A substantial amount of thyroxin is transferred across the placenta. Placental de-iodinases can convert T4 to T3. Fetus needs thyroxin for brain development, growth, and lung maturation[3,1,11,17].

Thus if maternal levels of thyroxin are not well maintained in pregnancy, fetus is at risk. This demands an early or even prenatal FT4, TSH screening and more frequent fetal monitoring of thyroxin levels in pregnancy.

Various reports asset that S.TSH is the corner stone of diagnosis of mild thyroid failure. Normal lab range of TSH is 0.25-5 mIU/ml. In normal pregnancy due to suppressive effect of increasing thyroxin and increased TSH excretion, TSH is kept at its lowest minimal or can even go below normal range. In populations rigorously defined as euthyroids, TSH level is always 0.1-1.4 mIU/ml. This is justified by our finding of TSH value 0.1-1.6 mIU/ml in true euthyroids. T3, T4, FT4 is done to confirm the diagnosis of thyroid failure in cases of central hypothyroidism; TSH remains at lower limit with low thyroxin levels. Studies showed thyroxin level is increased one and half times in pregnancy. FT4 is considered by some as reliable for diagnosis, while another group rely on FT3. In our study both T3, T4 supplemented by FT4 has helped in sorting out the hypothyroid women. Thyroperoxidase antibodies, i.e. thyroid autoimmunity is said to be yet another cause of thyroid disease in pregnancy. In women with thyroid antibodies, chances of later hypothyroidism are in-

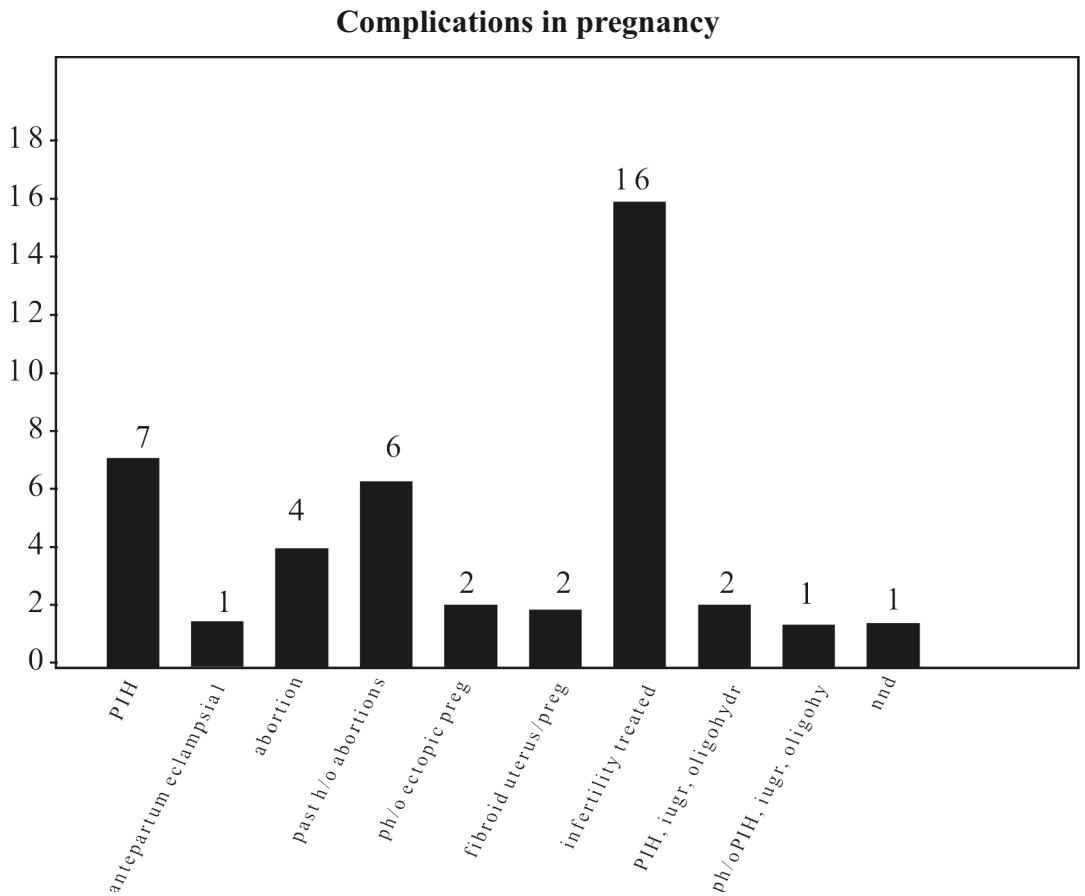


creased. A value above 150u/ml is considered positive[13.]
TSH distribution: - In our study, lowest TSH value was 0.1 and highest 10 mIU/ml. Only one woman presented with very high values of TSH coming to 58mIU/ml. As mentioned earlier, we have categorized these women into three groups depending on TSH values.

Why? How? We have done it

Non-pregnant TSH ref. ranges are unreliable in pregnancy. We have accepted a TSH value of 0.25-2mIU/ml as normal euthyroid ref. range in pregnancy.

Supported by literature
S.TSH >2.5 mIU/ml in 1st trimester shows T4 insufficiency - Spencer et al[16]
Biological ref. range of TSH is 0.5-1.5 mIU/ml – Cleveland Clinic J.of Medicine[10]
A.T.A. has stressed daily dosage of thyroxin should be adjusted to keep TSH at 1-2 mIU/ml[14].
Truly normal range of TSH is defined as 0.5-2.5mIU/ml – William L Green[4]
Individuals with >2 mIU/ml of TSH have a higher incidence of later hypothyroidism[4]



Controlled TSH as mothers with TSH value between 0.1 -2 mIU/ml – Idris et al[8]

Glinor et al has said "at individual level it is possible to predict the risk of occurrence of hypothyroidism, when TSH is >2mIU/ml and /or TPOAb>1250U/ml before 20 weeks, it shows occurrence of hypothyroidism before the end of gestational period[13]. Had we taken the laboratory range of TSH, we could have picked up only 12 women with hypothyroidism and missed 31 women. Another 12 women were on treatment with Thyroxin and 27 were euthyroids throughout the period of pregnancy.

Sharma et al18 reported no significant difference in pregnancy outcome between treated hypothyroid and euthyroid women. In our study 27 euthyroid and 43 adequately treated hypothyroid women, had normal pregnancy outcome; seven women had pregnancy-induced hypertension amounting to 8.5%. Hypothyroid pregnant women showed a significant increase in PIH, with a p value <0.01 x2= 2.99>2.58, df=1. Four PIH women belonged to the inadequately treated hypothyroid group. They were on thyroxin replacement and BP was normal 120/70. Either by negligence or due to wrong advice they stopped thyroxin and presented with excess weight gain and rising BP. On resuming treatment, BP was normalized in three and they delivered term babies. One woman was on 100-mcg thyroxin. She stopped treatment for 5 weeks and presented with severe PIH. Her FT4 was low and serum antithyroid antibodies were present. She received magnesium sulphate therapy and immediate delivery by caesarean section at 33 weeks.

Yet another woman [overt hypothyroid untreated] whose TSH was 4.8 in the early antenatal period, did not receive thyroxin replacement, came at 34 weeks with antepartum eclampsia. Two potential hypothyroid women came with PIH, oligohydramnios, IUGR and one had NND. Their TSH was 2.4, and T3, T4 was normal. Both of them had postnatal hypothyroidism. In their next pregnancies, they were started on thyroxin and had normal pregnancy outcome.

Among the women who had abortions, three were overt hypothyroids. Two were diagnosed in very early stage

gestation and were on treatment. Third one came late with second trimester abortion. Her TSH was 5 and she did not receive thyroxin. The Fourth was a potential hypothyroid with TSH 2.1 and T3, T4 towards lower limits. Later she presented with high TSH and was on thyroxin. She conceived while on treatment and had normal pregnancy. This justifies the prenatal screening for thyroid problems. Hypothyroidism is highly associated with miscarriage with a p value <0.01, x2 2.92=>2.58,df=1. Six pregnant women who were hypothyroid on treatment with thyroxin gave previous history of abortions. In the study group 16 women gave history of infertility and conceived following treatment with thyroxin. Thus, we can state that thyroid problems are significantly increased in infertile women. This statement can be made with a confidence limit of 99.9%. Ninety four percent of infertile women had thyroid problems, while 62.1% of normal parus women had thyroid deficiency - p=<0.001, x2 11.702=>10.83, df=1.

Analysis of these cases stressed the following two points:

1. The importance of prenatal check up with T4, TSH and appropriate treatment with L-thyroxin to prevent early pregnancy wastage.
2. Once diagnosed proper follow up with TSH and adequate dosage adjustment can prevent PIH, preterm delivery and other complications21,18

Conclusion

Thyroid Screening is a must at first booking, ideally prenatally to prevent miscarriages. T3, T4, FT4, TSH screening is able to pick up even borderline cases 0.25-2mIU/ml recognized as normal ref. range for TSH. Repeat TSH screening to be done at 8 weeks interval or each trimester, as and when the situation dictates. Adequate replacement therapy should be given when TSH is above 3mIU/ml and/or with low T4, FT4 in pregnancy. Prof. Ladenson has rightly said, “We should consider this as Gestational hypothyroidism”

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