ORIGINAL RESEARCH

Assessment of thyroid functions in early pregnancy

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ABSTRACT

Background: Measurement of serum free T4 concentrations and TSH is helpful in assessing thyroid function. During the first trimester of pregnancy, free T4 levels measured by analog immunoassays may be unreliable, as measurements using 2 different assays were not reproducible. The present study was conducted to assess thyroid functions in early pregnancy.

Materials & Methods:

Results: Age group 18- 21 years had 28, 22-25 years had 25, 26- 29 years had 20 and 30-33 years had 7 patients. Subclinical hypothyroidism was seen in 20, euthyroidism in 4, overt hypothyroidismin 8, subclinical hyperthyroidism in 45 and overt hyperthyroidism in 3. The mean TSH (mIU/l) in subclinical hypothyroidism was 4.31, in euthyroidism was 1.48, in overt hypothyroidism was 10.32, in subclinical hyperthyroidism was 0.016 and in overt hyperthyroidism was 0.06. The mean FT3(pg/ml) level in subclinical hypothyroidism, euthyroidism, overt hypothyroidism, subclinical hyperthyroidism and overt hyperthyroidism was 4.08, 3.94, 1.54, 4.2 and 7.52 respectively. The mean S.FT4(ng/dl) level in subclinical hypothyroidism, euthyroidism, overt hypothyroidism, subclinical hyperthyroidism and overt hyperthyroidism was 1.20, 1.28, 0.48, 1.6 and 4.2 respectively.

Conclusion: The high prevalence of thyroid disorders in pregnant women makes it necessary to screen all the pregnant women in early pregnancy.

Key words: thyroid disorders, pregnancy, subclinical hyperthyroidism

INTRODUCTION

The thyroid is a small endocrine gland located in front of the trachea. It utilizes iodine to produce thyroid hormones which are essential for normal growth,development,maturation and regulation of metabolism.[1] Thyroid disorders are common endocrine disorders seen during pregnancy,but may go unnoticed due to non- specific symptoms. Thyroid disorders include subclinical hypothyroidism, subclinical hyperthyroidism, overt hypothyroidism and

overt hyperthyroidism. The most prevalent thyroid disorder in pregnancy is subclinical hypothyroidism.[2]

Measurement of serum free T4 concentrations and TSH is helpful in assessing thyroid function. During the first trimester of pregnancy, free T4 levels measured by analog immunoassays may be unreliable, as measurements using 2 different assays were not reproducible.[3] Similarly, there are no trimester-specific pregnancy reference ranges for free T4 assays, and available commercial assays may underestimate or overestimate free T4 concentrations in pregnant women.[4] Free T4 measurements obtained indirectly by the free T4 index and directly by equilibrium dialysis and ultrafiltration, and if available, by solid phase extraction-liquid chromatography/tandem mass spectrometry (LC/MS/MS), may provide more reliable estimates of thyroid function during pregnancy. During pregnancy, total T4 levels are appropriately elevated above the non-pregnant reference range, due to the increased serum TBG levels throughout gestation.[5]The present study was conducted to assess thyroid functions in early pregnancy.

MATERIALS & METHODS

The present study comprised of 80 healthy I trimester pregnant women. The consent was obtained from all enrolled patients.

Data such as name, age, etc. was recorded. General examination was done and parameters such as body temperature, pulse rate, blood pressure, respiratory rate wererecorded. Assessment of CVS,CNS, respiratory system, thyroid gland and per abdomen and per vaginal examination was done. Pregnancy <12 weeks was confirmed by clinical assessment and USG.

Serum TSH, fT4 and fT3 was assessed. The following reference ranges were used- I trimester: 0.1 -2.5 mIU/L, II trimester: 0.2-3.0 mIU/L and III trimester: 0.3-3.0 mI U/L. Normal fT4 level is 0.7-1.8 ng /ml and normal fT3 level is 1.7-4.2 pg/ml. Depending on the hormone values, patients were classified into subclinical hypothyroidism: when TSH value is raised butFT3& FT4 values are normal, overt hypothyroidism when TSH value is raised , FT3 & FT4 values are lower, subclinical hyperthyroidism when TSH value is low but FT3 & FT4 values are normal and overt hyperthyroidism when TSH value is low, FT3 & FT4 values are raised. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Age wise distribution

Age group (years)	Number	P value
18-21	28	0.12
22-25	25	
26-29	20	
30-33	7	

Table I shows that age group 18- 21 years had 28, 22-25 years had 25, 26- 29 years had 20 and 30-33 years had 7 patients. The difference was significant (P< 0.05).

Table II Thyroid disorders among subjects

Thyroid disorders	Number	P value
subclinical hypothyroidism	20	0.01
Euthyroidism	4	
Overt hypothyroidism	8	
subclinical hyperthyroidism	45	
Overt hyperthyroidism	3	

Table II, graph I shows that subclinical hypothyroidism was seen in 20, euthyroidism in 4, overt hypothyroidism in 8, subclinical hyperthyroidism in 45 and overt hyperthyroidism in 3. The difference was significant (P< 0.05).

Graph I Thyroid disorders among subjects

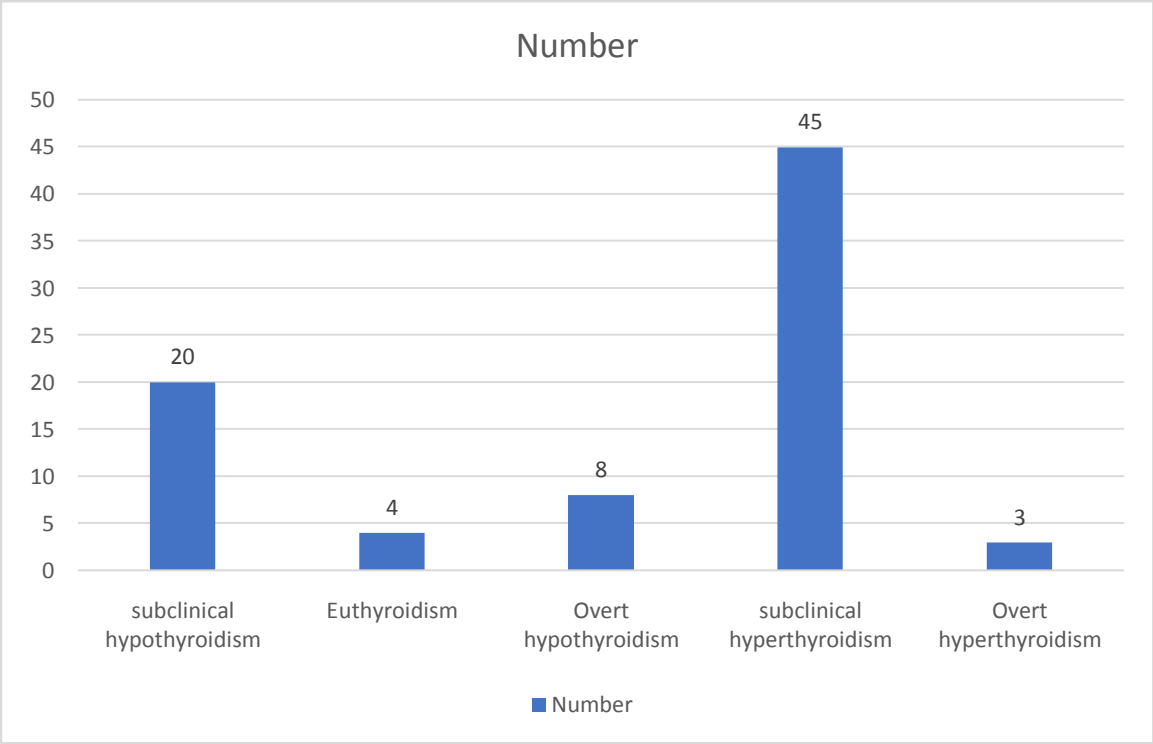
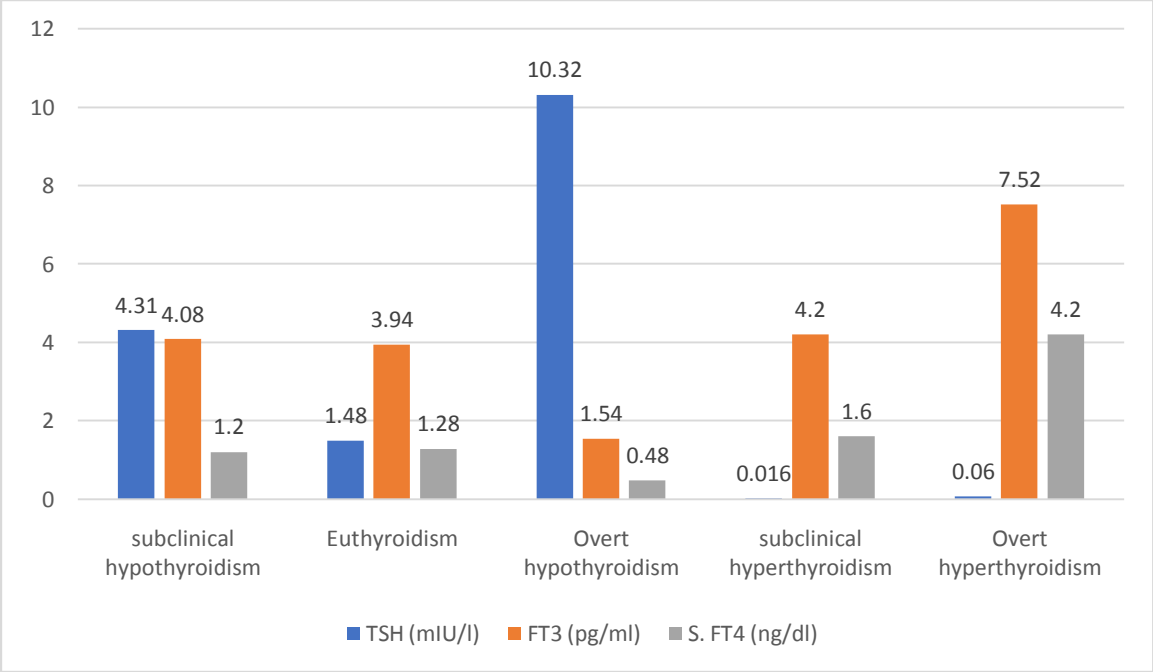


Table III TSH, T3 and T4 value distribution in thyroid dysfunctions

Thyroid disorders	TSH(mIU/l)	FT3(pg/ml)	S.FT4(ng/dl)
subclinical hypothyroidism	4.31	4.08	1.20
Euthyroidism	1.48	3.94	1.28
Overt hypothyroidism	10.32	1.54	0.48
subclinical hyperthyroidism	0.016	4.2	1.6
Overt hyperthyroidism	0.06	7.52	4.2
P value	0.01	0.02	0.04

Table III, graph II shows that mean TSH (mIU/l) in subclinical hypothyroidism was 4.31, in euthyroidism was 1.48, in overt hypothyroidism was 10.32, in subclinical hyperthyroidism was 0.016 and in overt hyperthyroidism was 0.06. The mean FT3(pg/ml) level in subclinical hypothyroidism, euthyroidism, overt hypothyroidism, subclinical hyperthyroidism and overt hyperthyroidism was 4.08, 3.94, 1.54, 4.2 and 7.52 respectively. The mean S.FT4(ng/dl)level in subclinical hypothyroidism, euthyroidism, overt hypothyroidism, subclinical hyperthyroidism and overt hyperthyroidism was1.20, 1.28, 0.48, 1.6 and 4.2respectively. The difference was significant (P< 0.05).

Graph II TSH, T3 and T4 value distribution in thyroid dysfunctions



DISCUSSION

Serum thyroid antibody positivity is common among women of childbearing age and may be associated with abnormal thyroid function.[6] Serum anti-thyroglobulin antibodies and antithyroid peroxidase (TPO) antibodies, found in 10–11% of the general U.S. population, are more prevalent in women and in older age. The reasons for the associations between anti-thyroid antibodies and obstetric complications remain unclear.[7] They may be related to a direct effect of the anti-thyroid antibodies, or the anti-thyroid antibodies may serve as a marker for other causative autoimmune syndromes.[8] Alternatively, anti-thyroid antibodies may simply indicate limited thyroid functional reserve suggesting that the association between TPO antibody positivity and obstetric complications may be confounded by even mild hypothyroidism obtained during pregnancy.[9]The present study was conducted to assess thyroid functions in early pregnancy.

We found that age group 18- 21 years had 28, 22-25 years had 25, 26- 29 years had 20 and 30-33 years had 7 patients. Jakhar et al[10] in their study 71 (35.5%%) cases found to have subclinical hypothyroidism, 1(0.5%) case was found to have subclinical hyperthyroidism, 7 (3.5%) cases found to have overt hypothyroidism and 1 (0.5%) case was found to have overt hyperthyroidism. 96 cases out of 200 belong to primipara group (48%) and this group had the highest rate of history of spontaneous abortion 7.5%.There was statistically significant association between parity and thyroid disorders.

We found that subclinical hypothyroidism was seen in 20, euthyroidism in 4, overt hypothyroidismin 8, subclinical hyperthyroidism in 45 and overt hyperthyroidism in 3. Vimal Nambiar et al[11]carried a study to establish the prevalence and the effect of thyroid dysfunction on pregnancy outcomes in Asian-Indian population. The study cohort comprised of 483 consecutive pregnant women in the first trimester. Thyroid hormone levels and thyroid peroxidase antibody were estimated. Patients with thyroid dysfunction were assessed periodically or treated depending on the severity. Subjects were followed until delivery.The prevalence of hypothyroidism, Graves' disease,gestational transient thyrotoxicosis,and thyroid autoimmunity (TAI) was 4.8%, 0.6%, 6.4 % and 12.4%, respectively. Forty percent of the hypothyroid patients did not have any high-risk characteristics.

We found that mean TSH (mIU/l) in subclinical hypothyroidism was 4.31, in euthyroidism was 1.48, in overt hypothyroidism was 10.32, in subclinical hyperthyroidism was 0.016 and in overt hyperthyroidism was 0.06. The mean FT3(pg/ml) level in subclinical hypothyroidism, euthyroidism, overt hypothyroidism, subclinical hyperthyroidism and overt hyperthyroidism was 4.08, 3.94, 1.54, 4.2 and 7.52 respectively. The mean S.FT4(ng/dl) level in subclinical hypothyroidism, euthyroidism, overt hypothyroidism, subclinical hyperthyroidism and overt hyperthyroidism was 1.20, 1.28, 0.48, 1.6 and 4.2 respectively. Sahuet al[12] screened 633 pregnant women in second trimester. TSH level estimated. If TSH level was deranged, then free T4 and thyroperoxidase antibody level were done. Patients were managed accordingly and followed till delivery. Their obstetrical and perinatal outcomes were noted. Their results showed that prevalence of thyroid dysfunction was high, with subclinical hypothyroidism in 6.47% and overt hypothyroidism in 4.58% women. Overt hypothyroids were prone to have pregnancy induced hypertension (P=0.04). IUGR (P=0.01) and intrauterine demise (P=0.0004) as compared to control. CS rate for fetal distress was significantly higher among pregnant subclinical hypothyroid women. (P=0.04). Neonatal complications and gestational diabetes were significantly more in overt hyperthyroidism group (P=0.03 and P= 0.04) respectively. They concluded that prevalence of thyroid disorders, especially overt and subclinical hypothyroidism (6.47%) was high. Significant adverse effect on maternal and fetal outcome were seen emphasizing the importance of routine antenatal thyroid screening.

CONCLUSION

Authors found that the high prevalence of thyroid disorders in pregnant women makes it necessary to screen all the pregnant women in early pregnancy.

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