

ULTRASONOGRAPHIC EXAMINATION OF THE THYROID DURING PREGNANCY*

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SUMMARY : *Traditionally it is believed that pregnancy has a goitrogenic effect on the thyroid. To discover whether pregnancy causes ultrasonically detectable changes in the thyroid we performed an ultrasound examination of the thyroid in healthy and normal pregnant and we studied thyroid size, echogenicity and homogeneity with real - time ultrasonography scanner. We concluded that the mean volume of the thyroid displayed a slight increase during the pregnancy which is not significant statistically and that there became no difference in echogenicity and echo pattern.*

Key Words : *Ultrasonographic Examination, Thyroid, Pregnancy.*

INTRODUCTION

Traditionally it is believed that pregnancy has a goitrogenic effect on the thyroid because of the growing fetus especially in adolescents. In some older reports investigators claimed a relationship between thyroid gland enlargement and pregnancy (Brander and Kivisaari, 1989; Lona et al. 1985; Prout, 1975).

In previous studies the examination of the thyroid gland depended on palpation only as a clinical method. But after the introduction of high resolution screening equipment, it can easily and reliably be detected by ultrasonography since palpation is not adequate in detecting thyroid size, nodules and paranchimal structure.

We studied the thyroid size and echogenicity in a small group of pregnancies at different menstrual ages to determine the ultrasonographic changes in normal pregnant thyroids. We also compared the results with those in healthy non - pregnant women as a control group.

MATERIALS AND METHODS

We examined thyroid glands in 50 pregnant women referred to the Ultrasound Division of Radiology Department for the estimation of gestational age in Gazi University Medical Faculty. The mean age for pregnant was 24.1. Our control group consisted of 50 healthy non - pregnant women of the same age. The mean age for the control group was 23.4.

All examinations were performed by the same examiner with General Electric RT 3600 real - time ultrasonography scanner and 7.5 MHz. transducer.

We estimated the thyroid size and assessed echogenicity and homogeneity in every pregnant and control subject.

We calculated the volume of each thyroid lobe with the method described by Brunn et al. (1981) and modified by Brander and Kivisaari (1989).

According to the method described by Brunn et al. (1981), thyroid volume was calculated by multiplying the three dimensions of the gland with 0.479.

The formula was :

$$\text{Thyroid Volume} = \text{Height} \times \text{width} \times \text{thickness} \times 0.479$$

They did not include isthmus to the width of the lobe (Brunn et al. 1981).

Brander modified this method. According to his modification although the formula used for calculation of thyroid volume was just the same, isthmus was included to lobe width and measurements were done from the midline (Brander and Kivisaari, 1989) (Fig 1).

We preferred Brander's modification in order to define the exact total volume of the thyroid gland.

Thickness of the lobe was antero-posterior diameter just perpendicular to the width in the same section (Fig 1). Height of the lobe was the longest distance between cranial and caudal borders of the lobe in the long axis (Fig 2).

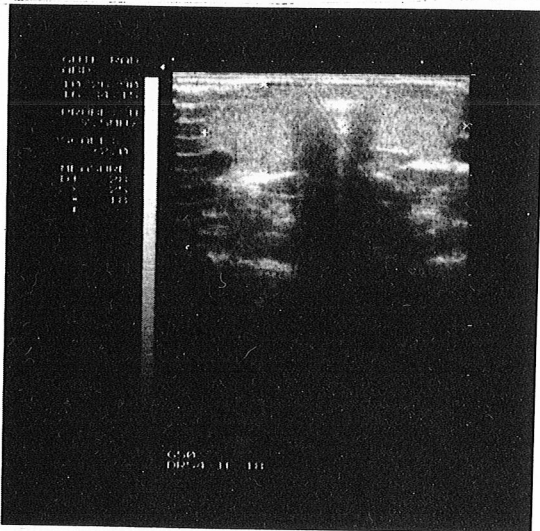


Fig. 1 : The measurement of width and thickness of the thyroid lobe.

All measurements were done with electronic calipers.

Thyroid echogenicity can be assessed by comparing with the adjacent muscles. But the assessment of echogenicity by comparison with adjacent muscles is not a sensitive method and minor differences may be missed.

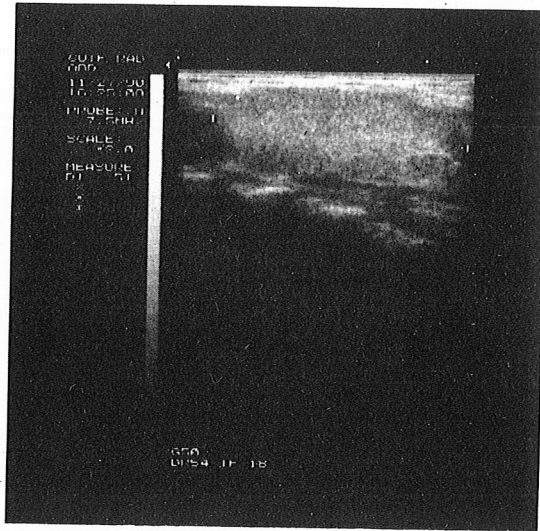


Fig. 2 : The measurement of length of the thyroid lobe.

Therefore using echo - level measurer of our equipment which declares echo-level digitally we could assess the thyroid echogenicity in pregnant and non - pregnant more sensitively. We also defined each heterogenicity.

There were 13 pregnant in the first trimester, 20 in the second and 17 in the third.

Gestational week was estimated from the last menstrual period.

Each case in control group was examined once.

RESULTS

No significant differences were found between the mean volumes during I., II. and III. trimesters (Fig. 3). We found that the difference of the thyroid

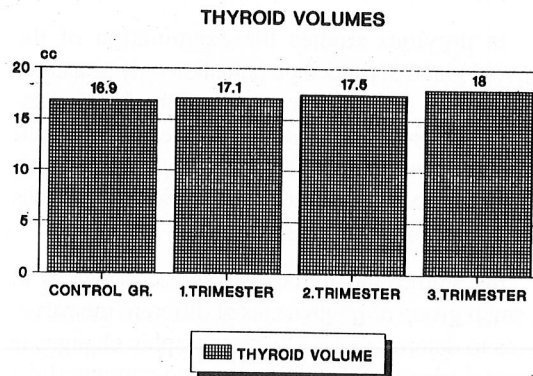


Fig. 3 : The differences of the thyroid volume between the first, second and third trimesters and the control group.

mean volumes between the first and the last trimester was only 0.9 cm^3 . Stated in another way, the thyroid volume was increasing 0.9 cm^3 during the whole pregnancy.

Also the difference between the mean volume of the control group and of the last trimester was 1.1 cm^3 .

If it is considered that the largest volume value in our series is 29.7 cm^3 , it could easily be seen that 1.1 cm^3 difference is not significant. It was also found to be statistically insignificant.

The echogenicity of the thyroid was distinctly greater than that of the adjacent muscles in all pregnant and controls. In all cases echo level was 27-30 gray - scale value. There was no significant difference in echogenicity between the pregnant at different menstrual ages and the controls.

When focal irregularities in echo structure were assessed it was noted that solid nodular lesions were observed in four pregnant and three controls. Three of the four pregnant had soliter nodules and one of them had three nodules. Two of these pregnant were at the last trimester and two of them were at the first and second trimesters.

When the pregnant were examined at the first and the second trimesters, and re-examined at their last trimesters for control; it was observed that there was no difference in the size, the number, and the echo structure of the nodules.

DISCUSSION

Although enlargement of the thyroid gland was once thought to be a characteristic feature of pregnancy, it is understood that fetus is independent of the maternal thyroid hormones. Thyroid hormones do not cross the placenta, for this reason there is no need for the development of goiter in pregnancy.

In the past, it was concerned that morphological alterations became apparent during pregnancy (Long et al. 1985). Stoffer et al proved that there occurred follicular hypertrophy in an autopsy series but defined no significant increase in weight (Brander and Kivisaari, 1989).

In 1985 Indman et al, claimed that although most of the function tests were abnormal in pregnancy, there was no hypersecretion of thyroid hormones and no naturally occurring hyperthyroidism of pregnancy. According to this study thyroid func-

tion tests all showed increases during pregnancy but not because of an increase in thyroid gland function (Indman and Arndt, 1985).

In a similar study which is the only one on ultrasonic determination of the thyroid in pregnant done by Brander in 1989. The method for measuring and volume calculation was exactly the same as in our study. He also claimed that there occurred no significant difference in volume and echogenicity of the thyroid during pregnancy. In the study, thyroid echogenicity was assessed by comparing with the adjacent muscles. It was stated that this method was not sensitive enough for assessing echogenicity (Brander and Kivisaari, 1989).

We believe that we assessed the echogenicity more sensitively using the echo - level measuring capacity of our equipment.

The reason for a minimal increase in volume may be the hyperemia of the thyroid because there becomes an increase in vascularity of the thyroid and cellular hypertrophy. Due to the increase in vascularity total blood volume of thyroid increases during pregnancy and reaches a peak in the last trimester (Brander and Kivisaari, 1989).

As a closing remark against some reports, we believe that pregnancy has no effect on thyroid gland, there only occurs a minimal increase in thyroid volume probably depending on hyperemia.

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REFERENCES

1. Brander A, Kivisaari L : Ultrasonography of the thyroid during pregnancy. *J Clin Ultrasound* 17 : 403-406, 1989
2. Brunn J, Block U, Ruf G : Volumetrieder schilddrusen lap-pen mittels real - time sonographie. *Dtsch Med Wschr* 106 : 1338-1340, 1981
3. Indman PD, Amdt BC : Laser treatment of cervical intraepit-helial neoplasia in an office setting. *Am J Obstet Gynecol* 152 : 674-676, 1985
4. Long TJ, Felice EM, Hollingsworth DR : Goiter in pregnant teenagers. *Am J Obstet Gynecol* 152 : 670-674, 1985
5. Prout TE : Thyroid disease in pregnancy. *Am J Obstet Gynecol* 122 : 669, 1975