

THE EFFECT OF THE MENSTRUAL CYCLE, A SAMPLE OF INFRADIAN RHYTHM, ON THYROID VOLUME AND BLOOD FLOW IN HEALTHY WOMEN

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INTRODUCTION

Previous studies has shown that thyroid blood flow varies cyclically during the normal menstrual cycle in females of reproductive age and that thyroid physiologic characteristics change during different reproductive phases of a woman's life.

The aim of this study is to evaluate the changes in thyroid stimulating hormone (TSH) levels through four different periods of menstrual cycle which is a sample of infradian rhythm; and to investigate the relationship between thyroid volume and doppler parameters of inferior thyroid artery according to TSH and sex hormone alternations in healthy women.

MATERIALS AND METHODS

Twenty-two healthy women having regular menstrual cycles between 21 and 38 years were included in this study. Each participant was evaluated at the 3rd day (menstrual bleeding period), 7th day (follicular phase), 14th day (periovulatory period) and 21st day (luteal phase) of their menstrual cycle. All examinations were performed after a 12 hours fasting time, between am 06:00- 08:00. Blood samples were collected for plasma estradiol (E2), progesterone (PG), luteinizing hormone (LH), follicle stimulating hormone (FSH), thyroid-stimulating hormone (TSH), free triiodothyronine (fT3), free thyroxine (fT4), thyroglobuline (Tg). Conventional ultrasonography and power doppler ultrasonography were carried out (Figure 1).

RESULTS

Mean age of these 22 women was 28,72±5,72 years. The statistical alternations of the mean values of TSH, Tg, peak systolic velocity (PSV), resistance index (RI), pulsatility index (PI) and thyroid volumes at the 3rd day, 7th day, 14th day and 21st days of menstrual cycle were examined. It was detected that there was a statistically significant in TSH, thyroid volume and PSV at the 14th day compared to the 3rd and 7th days (Table 1). With a minimal increase at the 21st day; any statistically significant change could not be found in PI values during menstrual cycle. Compared with the 3rd day; there was a statistically significant decrease in RI value at the 14th and 21st days. Also compared to the 3rd day; there was a statistically significant increase in Tg levels at the 7th and 14th days. During menstrual cycle, there was no significant change in fT3 and fT4 levels. In addition; during this period, no statistically significant correlation was detected between TSH levels and LH, FSH, PG, E2, Tg levels; and yet between TSH levels and PSV, RI, PI, thyroid volume.

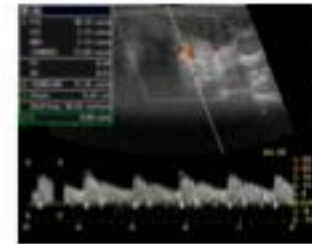


Figure 1. The velocity waveform is displayed above the baseline to indicate the arterial blood flow. The figure shows the measurement of the blood flow velocity in the inferior thyroid artery (left).

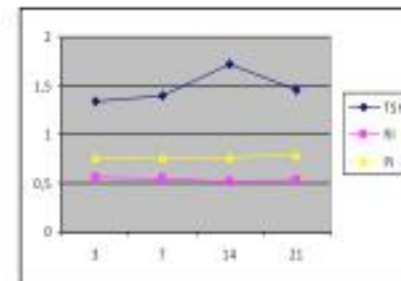


Figure 2. Changes of mean values of RI, PI and TSH at the 3rd, 7th, 14th and 21st days of menstrual cycle

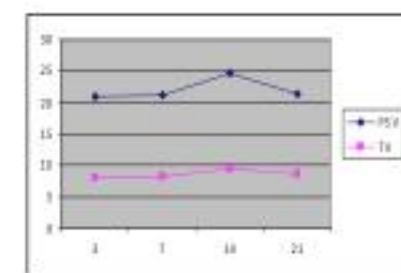


Figure 3. Changes of mean values of thyroid volume and PSV at the 3rd, 7th, 14th and 21st days of menstrual cycle

Table 1. Statistically alternations of the mean values of TSH, Tg, PSV, RI, PI and thyroid volumes at the 3rd, 7th, 14th and 21st days of menstrual cycle

Days of MS	3 rd vs 7 th p	3 rd vs 14 th p	3 rd vs 21 st p	7 th vs 14 th p	7 th vs 21 st p	14 th vs 21 st p
TSH	0,01	0,005	NS	0,021	NS	NS
Tg	0,001	0,021	NS	NS	NS	0,001
PSV	NS	0,014	NS	0,021	NS	0,005
RI	NS	0,002	0,015	NS	NS	NS
PI	NS	NS	NS	NS	NS	NS
Volume	NS	0,000	0,062	0,002	NS	0,011
fT4	NS	NS	NS	NS	NS	NS
fT3	NS	NS	NS	NS	NS	NS

CONCLUSION

Through menstrual cycle; with thyroid volume, TSH, and Tg, also some changes occur in blood flow parameters of inferior thyroid artery. Power doppler measurements are used for differential diagnosis of certain thyroid diseases. In this case; we believe that it is appropriate to evaluate the female patients during the follicular phase while performing doppler or population studies.