



Assessment of ovarian function and reserve based on hormonal parameters, ovarian volume, and follicle count in euthyroid girls with Hashimoto thyroiditis

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Background and Aim: Among autoimmune disorders, autoimmune thyroid diseases are the most prevalent pathologies associated with premature ovarian failure. We aimed to investigate the ovarian function and reserve in euthyroid adolescents (TSH<2.5 mIU/L) diagnosed with Hashimoto thyroiditis (HT).

Methods: Thirty adolescent girls (mean age 15.1±1.4 years) newly diagnosed as HT with presence of high thyroid antibodies with gland heterogeneity in ultrasound and age-matched 30 healthy female subjects were enrolled the study. Anti-ovarian antibody, LH/FSH ratio, estradiol, anti-mullarian hormone (AMH), inhibin-B, and total testosterone were measured and the follicle count, ovarian volumes and uterine length were evaluated using pelvic ultrasound.

- Results:**
- All patients were euthyroid and had normal thyroid volume.
 - 33% (n:10) of the patients had higher ovarian antibody above the limits without any ovarian dysfunction.
 - There was no significant difference between the girls with HT and healthy controls regarding LH/FSH ratio, estradiol and inhibin-B levels.
 - Anti-ovarian antibody (365±311 vs. 168.8±148 ng/mL, p: 0.022), AMH (p:0.007) and total testosterone levels were higher in HT group than the control group (p:0.003).
 - There were no significant mean measurements for total ovarian follicle count, total ovarian volume and uterine length between the groups.
 - Anti-ovarian antibody was found to be positively correlated with LH/FSH ratio (r: 0.271, p: 0.036), AMH (r: 0.845, p: 0.0001) and inhibin-B (r: 0.633, p:0.0001) in HT group.

Table 1: Comparison of baseline characteristics, anthropometric and metabolic parameters in study groups.

	Hashimoto thyroiditis	Controls	p
n	30	30	
Age (years)	15.1±1.4	15.2±1.4	0.716
BMI (kg/m ²)	23.3±2.8	22.8±2.9	0.116
Free T4 (ng/dL)	0.84±0.1	0.84±0.1	0.985
TSH (uIU/mL)	2.5±2.4	1.8±2.8	0.124
TPO Antibody (IU/mL)	365±311	10.7±6.4	0.001
Anti-Ovarian Antibody (ng/mL)	206.4±188	168.8±148	0.022
FSH (mIU/mL)	5.01±2	5.09±1.7	0.868
LH (mIU/mL)	7.8±7.8	8.4±6.9	0.767
Estradiol (pg/mL)	82.3±67	96.9±86	0.472
LH/FSH (mIU/mL)	1.46±1.1	1.74±1.3	0.393
AMH (ng/mL)	10.6±10.4	7.5±7.3	0.007
Inhibin-B (pg/mL)	525±260	478±310	0.185
Prolactin (ng/mL)	11.2±8.2	10.6±4.8	0.726
DHEAS (mcg/dL)	193±112	205±98	0.659
Total Testosterone (ng/dL)	41.5±21.2	30.9±16.2	0.033

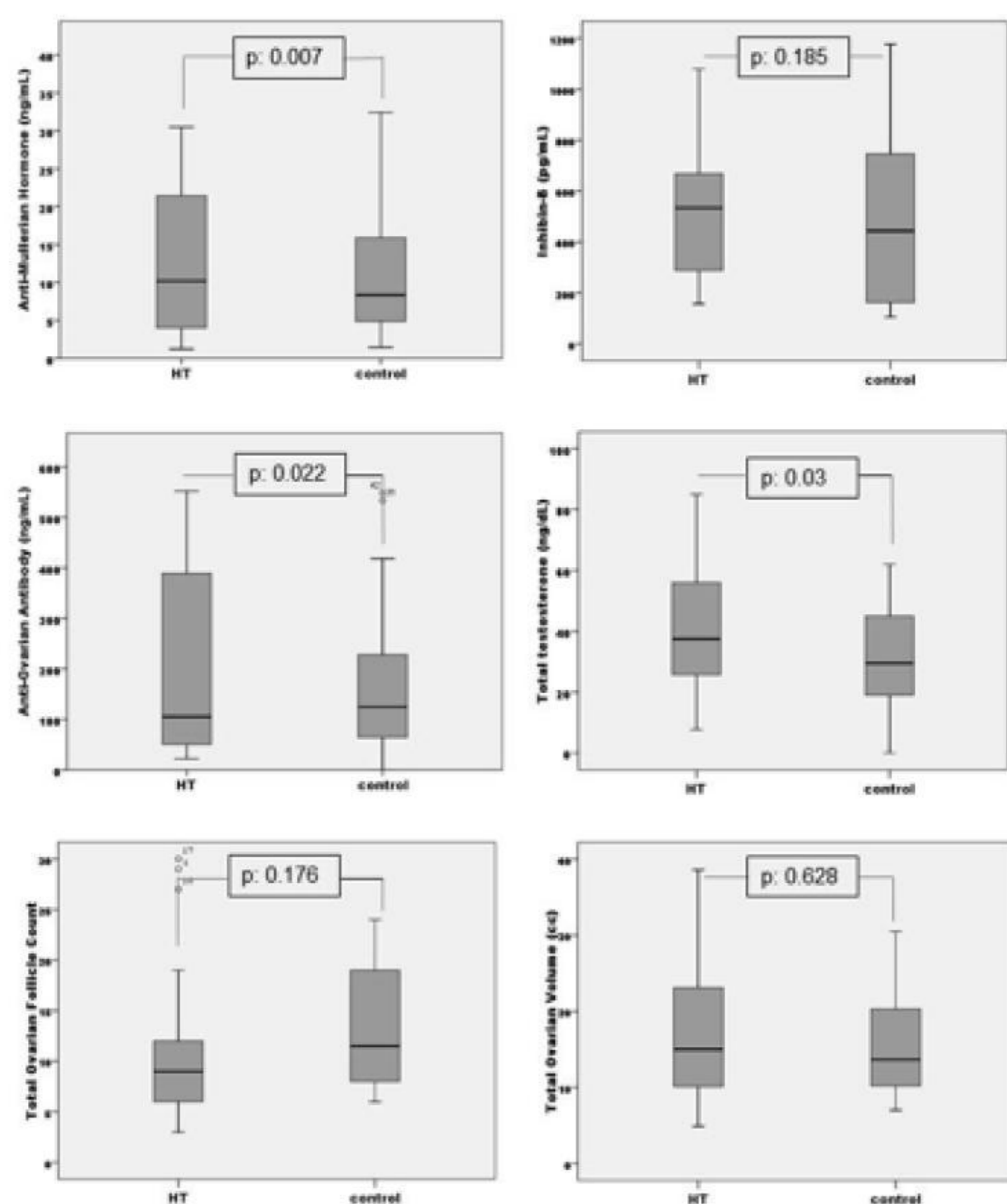
Table 3: Results of correlation analysis for several clinical and laboratory parameters as indicators of ovarian function and reserve.

Dependent variables	Independent variables	r	p
AMH	Age	0.426	0.01
	BMI	0.278	0.03
	Inhibin-B	0.63	0.001
	Anti-ovarian antibody	0.845	0.01
	Total antral follicle count	0.370	0.04
Inhibin-B	Age	0.269	0.038
	LH/FSH	0.324	0.01
	LH	0.286	0.02
	Total testosterone	0.334	0.09
	AMH	0.630	<0.0001
Anti-ovarian antibody	Anti-ovarian antibody	0.633	<0.0001
	Age	0.278	0.032
	LH/FSH	0.271	0.036
	Estradiol	0.293	0.023
	AMH	0.845	0.0001
Inhibin-B	0.633	0.0001	

Table 2: Comparison of hormonal and ultrasonographic parameters of the study population

	Hashimoto thyroiditis	Controls	p
n	30	30	
Total ovarian volume (mm ³)	16.6±8.6	15.8±6.8	0.628
Right	8.5±5.6	7.3±4.6	0.887
Left	8.1±5.7	8.3±3	0.112
Uterine diameter (mm)	66.5±10.1	68.8±8.7	0.378
Total antral follicle count	11±7.2	13.4±5.8	0.176
Right	5.3±3.5	6.8±3	0.293
Left	5.7±4	6.6±3.4	0.144

Figure 1: Comparisons of ovarian function and reserve parameters (hormonal and ultrasonographic measurements) among the groups.



Conclusion:

- In our study, ovarian volume and total AFC of the all patients and control subjects had within normal reference ranges according to age.
- In the study, we did not detect any pathology related to PCOS disorder in adolescents with HT.
- The patients had higher total testosterone levels than controls although their LH/FSH ratio and estradiol levels in normal limits.
- Increased total testosterone and AOAb measurements may be an early and sensitive sign of PCOS or DOR.
- In conclusion, this study demonstrated that the HT girls had normal ovarian reserves based on measurements of AMH, inhibin B, FSH, LH/FSH ratio, estradiol and ovarian follicle counts.

