

Intima media thickness and brachial artery flow mediated dilatation in women with polycystic ovary syndrome and type 1 diabetes mellitus

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Background

Polycystic ovary syndrome (PCOS) and type 1 diabetes (T1DM) are accompanied by increased risk of atherosclerosis. A higher prevalence of PCOS in T1DM patients has been reported, which could predispose this group of patients to higher risk of cardiovascular disease. Brachial artery flow-mediated dilatation (FMD) and intima media thickness of common carotid artery (IMT) are used to detect an early endothelial dysfunction.

Aim

The aim of our study was to examine IMT and FMD in T1DM women with PCOS. We also estimated the relation of IMT and FMD to clinical and hormonal parameters in the studied population.

Subjects and methods

We studied 85 women: 27 with T1DM (14 with PCOS+T1DM, 13 with T1DM/no-PCOS), 38 with PCOS and 20 healthy women (Control). PCOS was diagnosed according to the Rotterdam criteria. Studies were performed 3-5 days after a spontaneous menses. IMT and FMD were assessed by ultrasonography (Hewlett Packard Sonos 4500). A transvaginal ultrasound with measurement of ovarian volume and antral follicle number was performed in each patient (Voluson 730 Expert GE Healthcare). Fasting blood samples were taken for the determination of lipid and hormonal profile, soluble E-selectin (sE-selectin), intercellular adhesion molecule-1 (sICAM-1) and C-reactive protein (CRP) serum concentration. Lipids were estimated using the enzymatic methods (Cobas c111, Roche Diagnostics, Switzerland). sE-selectin and sICAM-1 were estimated using ELISA method (R&D Systems Inc, USA). hsCRP was estimated using the turbidimetric method (Cobas c111, Roche, Switzerland). LH, FSH, estradiol, testosterone were measured using the RIA method (DiaSource, Belgium).

Results

Table 1. Clinical characteristics of the studied groups

	PCOS+T1DM (n=14)	PCOS (n=38)	T1DM/no-PCOS (n=13)	Control (n=20)
Age (yr)	24.0 (21.0-28.0)	24.0 (23.0-27.0)	27.0 (21.0-32.0)	23.5 (22.0-26.5)
BMI (kg/m ²)	25.4 (22.2-26.4)	25.5 ¹ (21.8-30.0)	24.4 (23.5-27.7)	21.7 (20.2-23.3)
DM duration (yr)	10 (8-13)		12 (4-16)	
HbA1c (%)	6.65 (6.50-7.60)		8.10 (7.10-8.80)	
Insulin dose (U/24h)	34.5 (30.0-48.0)		46.0 (27.0-55.0)	
Ovarian volume (ml)	13.0 (10.7-20.3)	15.5 (10.5-19.0)	9.5 (9.3-10.2)	10.9 (8.1-15.0)
Ovarian follicle number	19 ² (18-29)	24 ¹ (18-34)	14 (10-16)	14 (12-17)
sE-selectin (ng/ml)	38.1 ³ (26.7-52.0)	23.8 (15.7-37.3)	35.9 (34.4-44.6)	28.1 (16.8-35.1)
sICAM-1 (ng/ml)	256.1 ³ (200.8-291.6)	209.7 (169.9-232.9)	261.1 (226.3-257.9)	219.8 (179.7-221.4)

Values are median (interquartile range)
¹p<0.05 PCOS vs Control
²p<0.05 PCOS+T1DM vs T1DM/no-PCOS
³p<0.05 PCOS+T1DM vs PCOS

Figure 1. IMT and FMD in the studied groups

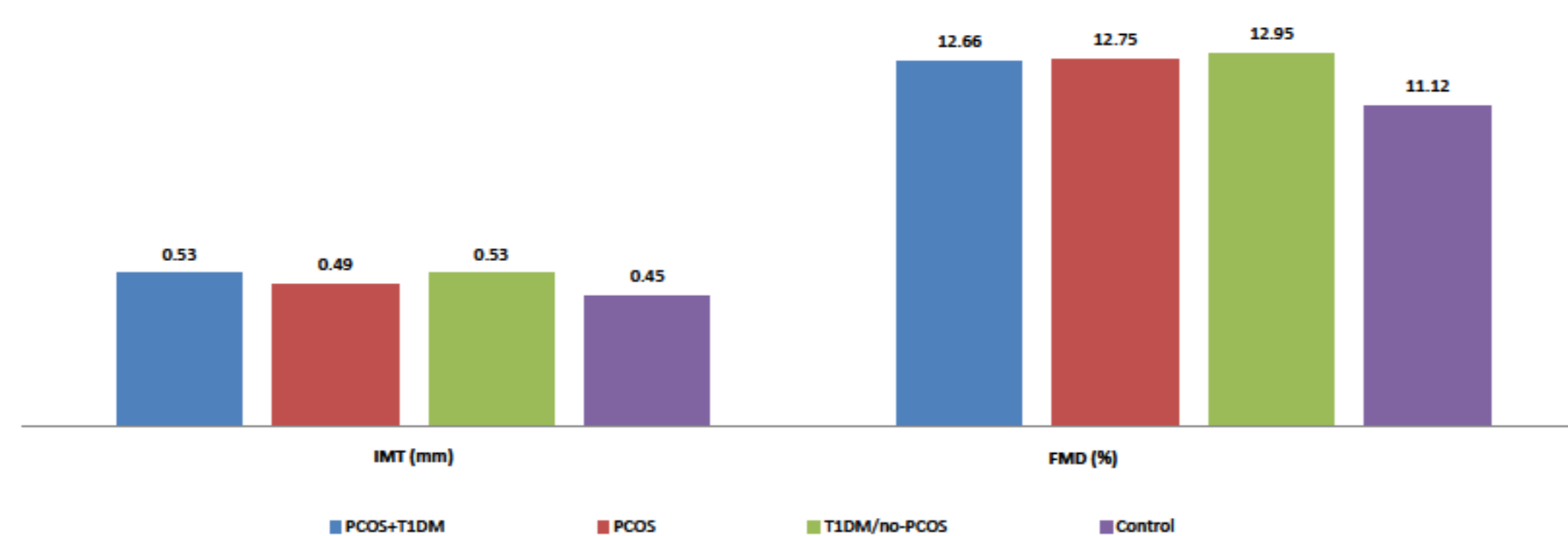


Table 1. Correlations of IMT in the entire studied group

	IMT	
	r	p
BMI	0.36	0.001
CRP	0.26	0.044
sE-selectin	0.23	0.033
sICAM-1	0.29	0.007

Table 2. Correlations of IMT and FMD in T1DM

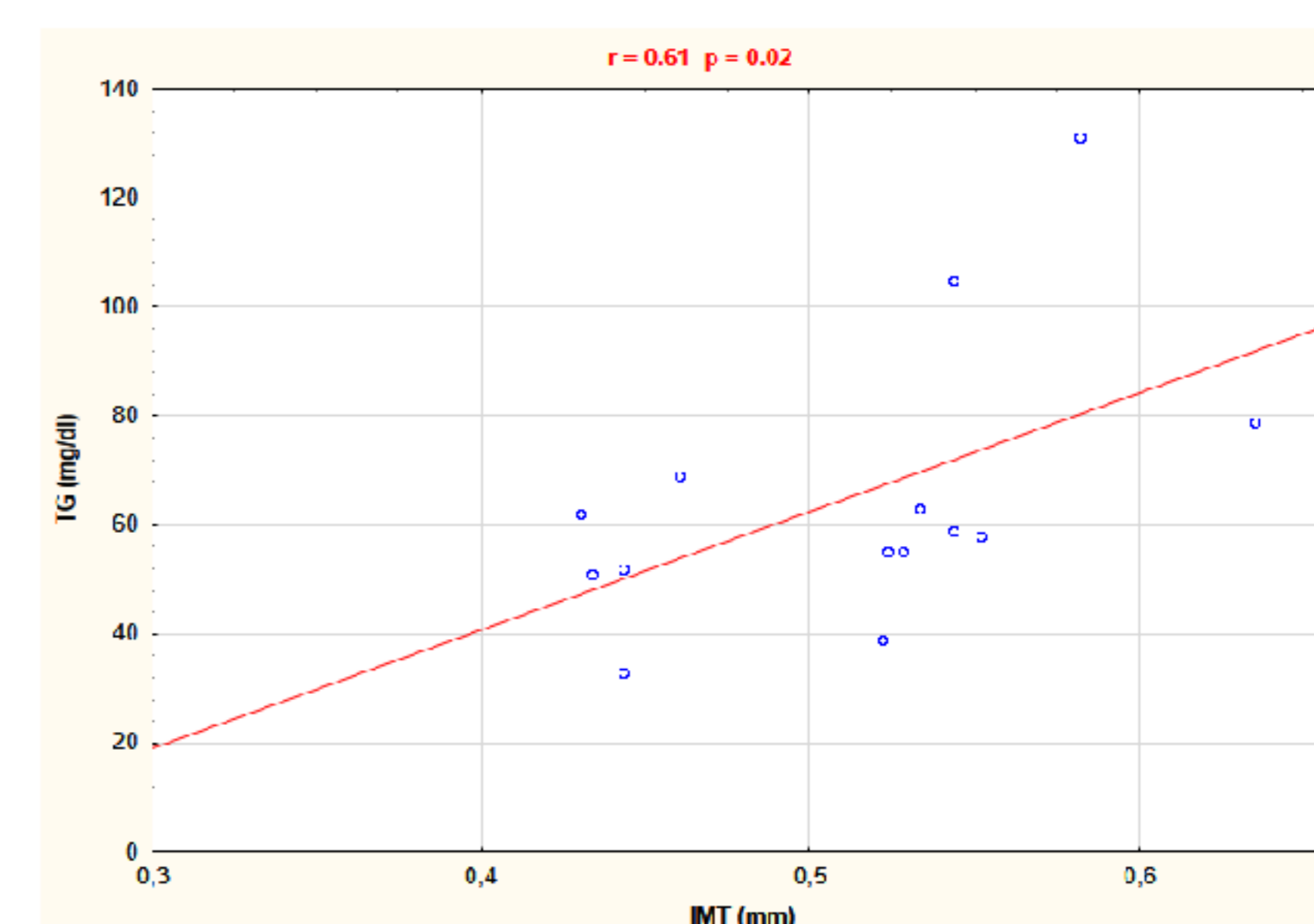
	IMT		FMD	
	r	p	r	p
Diabetes duration	0.36	0.05	-0.42	0.03

Table 2. Hormonal and lipid profile of the studied groups

	PCOS+T1DM (n=14)	PCOS (n=38)	T1DM/no-PCOS (n=13)	Control (n=20)
LH (mIU/ml)	4.23 (3.35-6.02)	4.60 (3.54-6.00)	3.47 (2.23-4.28)	3.86 (2.82-4.36)
FSH (mIU/ml)	4.44 (3.53-5.88)	4.17 (3.00-5.37)	4.72 (3.62-5.51)	5.75 (5.11-8.10)
Estradiol (pg/ml)	51.71 (37.00-72.00)	77.00 (46.00-131.25)	89.53 (60.52-150.87)	68.01 (45.00-80.00)
Testosterone (ng/ml)	0.69 (0.55-1.06)	0.88 ¹ (0.59-1.12)	0.53 (0.43-0.72)	0.51 (0.39-0.70)
Total Cholesterol (mg/dl)	169.5 (160.0-176.0)	181.0 (161.0-201.0)	171.0 (137.0-189.0)	165.5 (154.0-180.5)
LDL (mg/dl)	90.8 (80.4-99.2)	100.1 (81.8-119.6)	90.4 (55.6-95.4)	88.5 (68.6-104.8)
Triglycerides (mg/dl)	58.5 (52.0-69.0)	65.5 (51.0-106.0)	79.0 (64.0-108.0)	59.0 (39.5-81.0)
HDL (mg/dl)	65.0 (50.0-72.0)	61.0 (51.0-78.0)	64.0 (57.0-81.0)	65.5 (59.5-78.0)
hsCRP (mg/l)	1.65 (0.34-3.06)	0.57 (0.12-1.92)	1.40 (0.70-2.10)	0.28 (0.12-1.22)

Values are median (interquartile range)
¹p<0.05 PCOS vs Control

Figure 2. Correlation of IMT and triglycerides in PCOS+T1DM



Conclusions

Our data suggest that early vascular changes in young T1DM patients are related to diabetes duration and additionally, in patients with PCOS+T1DM, to atherogenic lipid profile.

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