Phenotypic characteristic of type 1 diabetic women with polycystic ovary syndrome

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BACKGROUND

The prevalence of polycystic ovary syndrome (PCOS) is increased in women with type 1 diabetes (T1DM) in comparison to the general population. It has been suggested that exogenous insulin administered to T1DM women in supraphysiological doses could act as co-gonadotropin and lead to disturbances observed in PCOS.

AIM

The aim of this study was to evaluate the phenotypic characteristic and differences between diabetic women with PCOS (T1DM+PCOS) and age- , body mass index - matched women with type 1 diabetes without PCOS (T1DM-no PCOS) and non-diabetic women with PCOS (PCOS).

STUDY PARTICIPANTS

We studied 108 women: 39 with T1DM (18 with T1DM+PCOS and 21 with T1DM-no PCOS), 47 with PCOS and 22 healthy women.

METHODS

Diagnosis of PCOS was established according to Rotterdam criteria. Studies were performed 3-5 days after a spontaneous menses, or independent of cycle phase in the presence of amenorrhea.

The BMI, WHR were calculated. Percent of body fat was assessed by bioelectric impedance analysis using In Body 220 Body Composition Analyzer. The grade of hirsutism was established using the modified Ferriman-Gallwey score.

Fasting blood samples were taken for the determination of sex hormones, SHBG, HbA1c. A transvaginal ultrasound with measurement of ovarian volume and antral follicle number was performed in each patient. In both diabetic groups insulin sensitivity was calculated with estimated glucose disposal rate (eGDR).

The statistics were performed with the STATISTICA 10.0 program (StatSoft, Krakow, Poland).

RESULTS

Table 1. Clinical characteristic of studied groups

	PCOS+T1DM (n=18)	PCOS (n=47)	T1DM- no PCOS (n=21)	Control (n=22)
Age (yr)	24.5 (22-28)	25 (23-28)	26 (21-31)	25.5 (22-28)
BMI (kg/m^2)	25.1 (24.1-26)	24.7[1] (21.6-28.4)	24.2 (22.1-26.5)	22.3 (20.6-26)
WHR	0.82 (0.78-0.85)	0.84[1] (0.8-0.89)	0.83 (0.82-0.86)	0.79 (0.76-0.82)
FAT mass (%)	21.25 (17.2-26)	24.5 (16.2-32.1)	19.3 (14.2-24.5)	17.9 (12.8-26.9)
DM duration (yr)	11.5 (9-14)		8 (5-15)	
HbA1c (%)	6.75 (6.5-8.6)		8.2 (7.0-8.9)	
Insulin dose (U/kg)	0.55 (0.4-0.8)		0.6 (0.4-0.7)	
Ferriman-Gallwey score	3 (1-3)	5 (3-9)	2 (1-2)	2 (1.5-6)
eGDR (mg/kg/min)	10.36 (9.4-10.8)		9.55 (9.1-10.3)	

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

Table 2. Hormonal and ultrasonographic characteristic of studied groups

	PCOS+T1DM (n=18)	PCOS (n=47)	T1DM-no PCOS (n=21)	Control (n=22)
LH (mIU/ml)	4.32 (3.35-6)	4.46 (3.5-7.5)	3.78 (2.5-4.7)	3.43 (2.8-4.3)
FSH (mIU/ml)	3.91 (3.3-5.8)	4.39 (3.4-4.9)	4.7 (4.2-5.5)	5.21 (4.8-6.4)
Estradiol (pg/ml)	53.72 (40-72)	61.6 (41-96.8)	70 (45.9-97.6)	45 (28.3-66.7)
Testosterone (ng/ml)	0.79 (0.5-1.08)	0.81[3] (0.5-1.1)	0.54 (0.4-0.7)	0.49 (0.3-0.8)
O-V (ml)	14.66[1,2] (10.7-18.8)	14[3] (11.2-18.9)	9.61 (9-10.7)	9.49 (8-12.9)
O-FN	20.5[1,2] (18-32)	26[3,4] (19-33)	13 (10-14)	14 (13-16)
O-FD (mm)	9.25 (7.5-10.8)	8 (8-9.5)	8 (7.4-9.2)	9.5 (8.5-10.3)

Values are median (interquartile range)
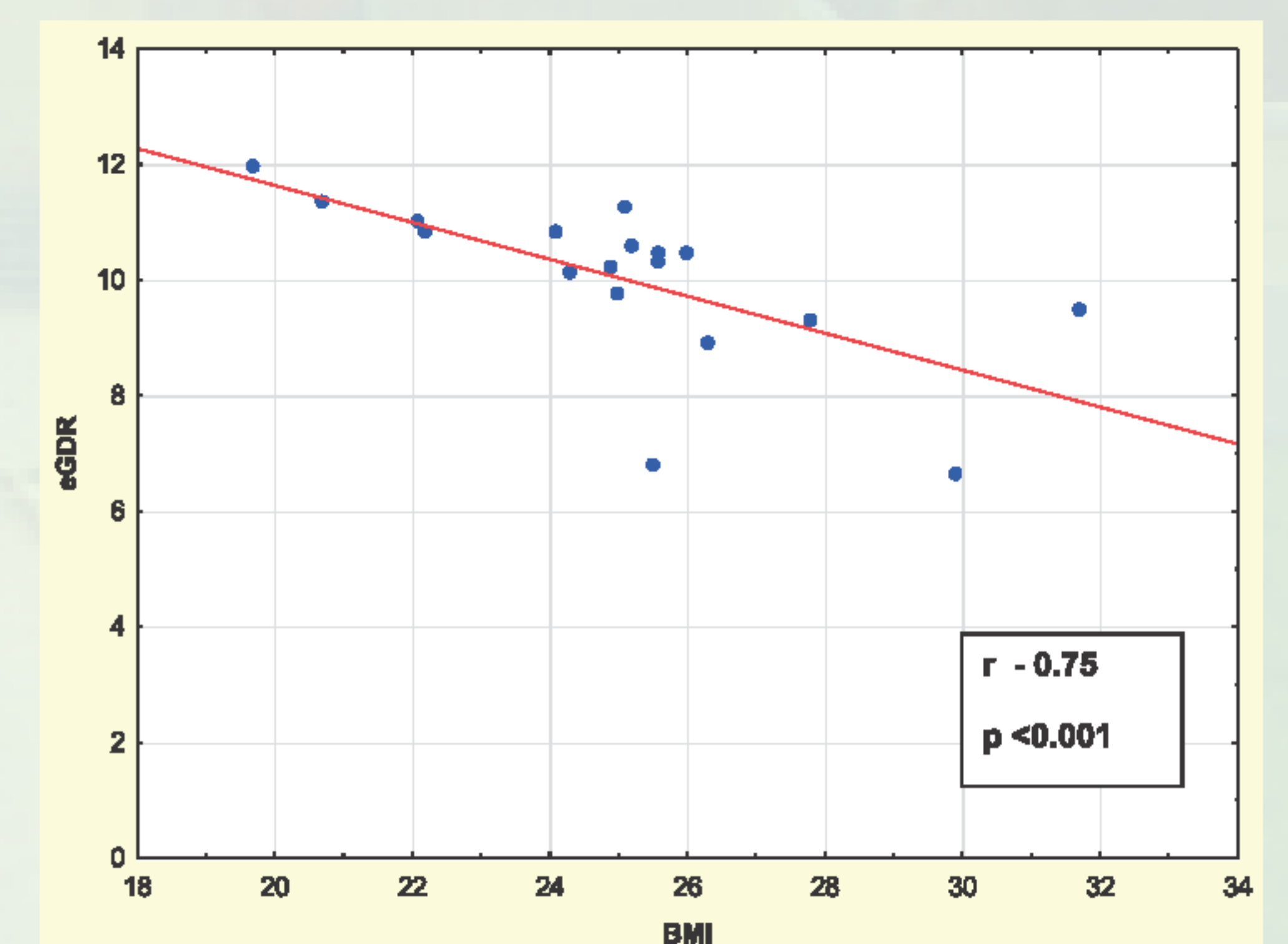O-V ovarian volume, O-FN ovarian follicle number, O-FD ovarian follicle diameter
[1] p<0,05 PCOS+T1DM vs T1DM
[2] p<0,05 PCOS+T1DM vs control
[3] p<0,05 PCOS vs control
[4] p<0.05 PCOS vs T1DM

Figure 1. Correlation of eGDR and BMI in PCOS+T1DM

r - 0.75
p <0.001

CONCLUSION

We conclude, that phenotypic characteristic of T1DM+PCOS women is similar to PCOS. Further study are required to better understand the pathogenesis of PCOS in type 1 diabetic women.

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