

ULTRASOUND AND ELECTROMYOGRAPHY EVALUATION OF THE PELVIC FLOOR MUSCLE IN HYPERANDROGENIC WOMEN

Hypothesis / aims of study

Androgens and anabolic steroids increase muscle mass and strength in general [1]. Due to the characteristics of hyperandrogenism in PCOS, it is plausible that women with PCOS may have increased muscle mass compared with controls [1]. The hyperandrogenism may lead to improve muscle function including pelvic floor muscle (PFM). In a recent study we found that women with PCOS presented less complaints of urinary incontinence than controls, however no difference was found in relation to pelvic floor muscle strength measured by perineometry [2]. There is no single method able to evaluate all functions of PFM. The sum of more than one method can gather more precise information about PFM function [3]. The aim of this secondary analysis was to compare PFM activity and thickness between women with and without PCOS.

Study design, materials and methods

This is an observational, cross-sectional and case-control study evaluating the PFM by ultrasound and by surface electromyography (EMG) of women with and without PCOS. Seventy-two patients were included after given written informed consent to participate, and were divided into two groups 1) PCOS non-obese women (n= 33) with the diagnosis of PCOS according to the Rotterdam criteria, including the presence of clinical and/or laboratory hyperandrogenism (>80 ng/dl). Comparison group non-obese women (n= 39) with regular menstrual cycles. The participants were instructed about the location and function of the PFM and then the assessment was conducted through digital vaginal palpation in order to verify the ability of contraction of each volunteer. The active electrode (vaginal probe) was inserted into the vaginal and the reference electrode placed in the upper anterior iliac crest. The EMG protocol of assessment consisted of 60 seconds of rest followed by five quick contractions (flicks), five contractions of 10 seconds, a contraction of 60 seconds and finally 60 seconds of rest. A perineal ultrasound was used to measure the thickness of the muscular layer of the PFM situated caudal to the pelvic diaphragm and anterior to the anorectum [3]. The sample size calculation was performed based on a pilot sample composed of 10 women in each of the groups. The level of significance was set at 5 % and a test power of 80 % was considered. The minimum sample size to be included was 33 per group. A descriptive analysis was performed to characterize the sample, and analysis of variance (ANOVA) was used to determine the homogeneity of the sample. To compare the groups regarding continuous variables it was used t-Student Test. To verify the association between the groups and the qualitative variable it was used the Qui- Square.

Table 1: Demographic variables mean of muscular thickness layer and electromyography of PFM of the Polycystic Ovary Syndrome (PCOS) and comparison groups.

Variables	PCOS (N = 33)	COMPARISON (N= 39)	P value
Mean age (SD)	27.0 (5.5)	30.0 (4.9)	0.02*
Mean BMI (kg/m ²) (SD)	23.1 (3.1)	23.7 (3.3)	0.46
Ethnicity	White	22 (66.6%)	28 (71.7%)
	Hispanic	2 (6%)	2 (5.1%)
	Black	9 (27.2%)	9 (23%)
Years of education	10 or less	8 (24.2%)	2 (5.1%)
	10 to 12	19 (57.5%)	20 (51.2%)
	12 or more	6 (18.1%)	17 (43.5%)
Mean of muscular thickness layer of the PFM (mm) (SD)	12.7 (3.62)	13.4 (3.63)	0.48

Data are presented as means standard deviations (SD) or number with percentages (%).

* P ≤0.05 indicates significant difference

Interpretation of results

The results showed that there were no difference between the groups in ultrasound and EMG evaluation. Although there was a difference between the groups regarding to the age, the small variation in age it's probably not clinical relevant. The assessment using EMG is largely used in literature, as well as evaluation of PFM thickness by ultrasound. It is likely that the presence of hyperandrogenism alone in PCOS group is not sufficient to improve PFM function. Although literature have reported high prevalence of urinary incontinence in women without PCOS [2].

Table 2: Means and standard deviation of electromyography contractions of the pelvic floor muscle of the Polycystic Ovary Syndrome (PCOS) and comparison groups.

Types of contraction mean and SD	Groups	EMG		P value
		PCOS (N=33)	Comparison (N=39)	
five quick contractions (flicks)		73.2 (13.3)	71.5 (12.3)	0.62
five contractions of 10 seconds		55.7 (21.5)	54.1 (15.8%)	0.74
A contraction of 60 seconds		49.2 (20.1)	47.3 (15.8)	0.68

Data are presented as means standard deviations (SD) or number with percentages (%).

* P ≤0.05 indicates significant difference

Results

Seventy-two women were included in the study. Table 1 shows mean and standard deviation of back ground variables, and muscular thickness layer of the PFM of PCOS and comparison groups. The groups were homogeneous in relation of BMI and ethnicity. The groups were different in relation to age (p=0.02), and years of education (p=0.01). The evaluation using ultrasound showed no difference between means of muscular thickness layer (p=0.48). The means and standard deviation of electromyography contractions of the PFM are demonstrated in table 2, there were no differences between the groups regarding to the EMG.

Concluding message

This study did not find statistically significant difference in PFM activity and thickness between women with and without PCOS.

References

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3. Bø K, Sherburn M. Evaluation of female pelvic-floor muscle function and strength. *PhysTher*. 2005;85(3):269-82.

Disclosures

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