The relationship between clinico-biochemical features in women with polycystic ovary syndrome and fertility treatment outcomes

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Introduction

• Polycystic ovary syndrome (PCOS) affects 5-8% of reproductive-age women. The morbidity related to PCOS may include insulin-resistance, type 2 diabetes mellitus (T2DM), obesity, hypertension, cardiovascular disease and infertility.

• We aimed to evaluate the clinico-biochemical characteristics of PCOS infertile women and establish their relationship with fertility treatment outcomes.

Methods

• We reviewed the records of **229** PCOS women (Rotterdam criteria, 2003) surveilled at Hospital Santa Maria, between January 2004 and June 2013.

• Excluded cases of hyperprolactinemia; congenital adrenal hyperplasia; premature ovarian failure; hypogonadism hypogonadotropic.

• Fertility treatment outcomes were measured according to: 1) *number of treatment cycles*; 2) *effective duration of the treatments*.

Results

Baseline features	PCOS n=229
Mean age (y)	29.7 (±3.9)
Mean infertility duration (months)	41 (±29)
Primary infertility	185 (80.8%)
Existence another infertility factor	38 (16.6%)
Mean BMI (kg/m^2)	27.8 (±6.4)
Weight excess (BMI ≥ 25 kg/m^2)	134 (58.5%)
Mean waist circumference (cm)	93.6 (±14.5)
Waist circumference > 80 cm	169 (73.8%)
Hypertension	12 (5.2%)
Familial history of T2DM	72 (31.4%)
Smoking habits	61 (26.6%)
Ovarian polycystic morphology	213 (93.0%)
Clinical and/or biochemical androgen excess	110 (48.0%)
Oligoamenorrea	229 (100%)
Means: FSH (2.5-10.2 U/L)	5.0 (±2.1)
LH (1.9-12.5 U/L)	9.0 (±5.7)
Estradiol (19.5-144.0 pg/mL)	67.9 (±65.0)
Total testosterone (< 73 ng/dL)	63.6 (±33.0)
Prolactin (2.8-29.0 ng/mL)	12.5 (±6.3)
TSH (0.55-4.78 μU/mL)	2.6 (±1.9)
17-OH-Progesterone (0.1-3.0ng/mL)	1.5 (±0.7)
SHBG (18-144 nmol/L)	43.3 (±38.1)
Insulin (3-25 mU/L)	12.1 (±9.6)
Total cholesterol (<190 mg/dL)	179.7 (±33.3)
Cholesterol-LDL (<110 mg/dL)	111.5 (±33.7)
Cholesterol-HDL (>50 mg/dL)	53.4 (±15.1)
Triglyceridemia (<150 mg/dL)	86.8 (±42.9)
Fasting glycemia (<110 mg/dL)	96.1 (±27.7)
Hypertriglyceridemia (>150 mg/dL)	15 (6.6%)
Low cholesterol-HDL (<50 mg/dL)	93 (40.6%)
Positive Oral Glucose Tolerance Test	23 (10.1%) [T2DM: n=2]
Hypothyroidism (TSH>4.78 μU/mL)	17 (7.4%)

Table 1: Baseline clinico-biochemical features of PCOS

Evolutive pregnancy achievement rate	71.6% (n=164)
Number of women who had spontaneous abortions (SA)	n=34 (14.9%)
Total number of SA (n)	43 [5 women had >1]
Mean treatment cycles to achieve evolutive pregnancy	2.8 (±2.4)
Mean duration of effective treatment (months)	4.4 (±6.0)
Mean duration between 1st treatment and evolutive pregnancy (months)	9.9 (±10.8)
Method of achievement pregnancy (n): CC / Gnd / CC+Gnd / Spnt / OD / IUI/ FIV or ICSI	25 / 60 / 15 / 16 / 30 / 12 / 6

Table 2: Overview of the results from fertility treatment in the 229 PCOS women cohort
CC, clomiphene citrate; Gnd, gonadotropins; spnt, spontaneous; OD, ovarian drilling; IUI, intrauterine insemination; FIV, fertilization in vitro; ICSI, intracytoplasmic sperm insemination.

PCOS women that obtained evolutive pregnancy (n=164)		Number of treatment cycles (n)	Effective duration of treatment (months)
Age <35 years	150	2.6 (±2.3)	4.05 (±5.3)
Age > 35 years	14	2.6 (±1.9)	2.93 (±2.4)
Primary infertility	132	2.9 (±2.3)	4.4 (±5.5)
Secondary infertility	32	1.8 (±1.4)	2.3 (±2.3)
Clinical and/or biochemical androgen excess	*Yes* 82	2.9 (± 2.5)	4.1 (±4.4)
	No 82	2.3 (± 1.8)	3.9 (±5.8)
Weight excess (BMI ≥ 25 kg/m^2)	*Yes* 98	2.7 (±2.2)	3.9 (±3.4)
	No 66	2.5 (±2.3)	4.1 (±2.8)
Waist circumference >80cm	*Yes* 126	2.6 (±2.1)	3.8 (±3.8)
	No 38	2.3 (±1.8)	4.1 (±2.1)
Hypertension	*Yes* 7	2.1 (±0.9)	3.1 (±3.1)
	No 157	2.7 (± 2.3)	3.9 (±5.2)
Familial history of T2DM	*Yes* 53	3.4 (±2.5)	4.2 (±3.6)
	No 111	2.3 (±2.0)	3.9 (±5.7)
Smoking habits	*Yes* 43	2.6 (±1.9)	3.8 (±4.0)
	No 121	2.7 (±2.3)	4.0 (±5.4)
Hypertriglyceridemia (>150 mg/dL)	>150 mg/dL 15	3.6 (±2.9)	4.5 (±3.2)
	≤ 150 mg/dL 149	2.4 (±1.8)	3.4 (±3.8)
Low cholesterol-HDL (<50 mg/dL)	< 50 mg/dL 77	2.9 (±2.1)	3.5 (±3.6)
	≥ 50 mg/dL 87	2.2 (±1.8)	3.4 (±3.9)
Oral Glucose Tolerance Test	*Positive* 22	2.5 (±2.3)	3.43 (±3.9)
	Negative 142	2.6 (±1.9)	3.6 (±3.8)
Hypothyroidism (TSH>4.78 μU/mL)	*Yes* 14	3.6 (±1.9)	5.2 (±4.6)
	No 150	2.6 (±2.2)	3.84 (±5.2)

Table 3: Number and effective duration of treatment in the cohort of 164 PCOS that obtained pregnancy
Yellow cells are indicative of differences with statistical significance (p<0.05). Pearson correlation analysis between all biochemical parameters and the fertility outcomes have been done and no significant correlations were obtained

Discussion

Infertile PCOS women with **primary infertility**, **T2DM familial history**, **hypertriglyceridemia** and **low cholesterol-HDL** may have *poorer fertility treatment results*, possibly justifying more intensive approach. Other clinico-biochemical features seem not to have prognostic value for fertility treatments.