ORIGINAL REPORT

Bipolar Disorder in Women with Polycystic Ovarian Syndrome (PCO)

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Abstract- This study was designed to determine the prevalence of bipolar disorder in women with polycystic ovarian syndrome (PCO). One hundred and ten women with definite diagnosis of PCO and one hundred and ten age-matched infertile women due to other reasons except for PCO were enrolled in this case-control study. Ten ml fasting venous blood sample obtained to measure fasting glucose, LH and FSH. Height, weight and waist-to-hip ratio (WHR) were also recorded by an expert technician. A psychiatrist examined all 220 cases in order to determine the prevalence of depression and bipolarity. Mean age of each group participants were not significantly different while FBS, LH and LH/FSH levels were significantly higher in PCO patients. Eighty eight case were depressed in PCO group while 96 were depressed in control group (P=0.03). Bipolar disorder were higher in PCO group in comparison with controls (8 vs. 0, P=0.004). Psychiatric disorders should be considered in PCO women.

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Introduction

Polycystic ovary syndrome (PCO) is one of the common causes of infertility that characterized by hirsutism, acne, hair loss and obesity as the results of hyperandrogenism (1,2).

PCO affects 5-10% of women in their reproductive age (3,4) and affects different aspects of their life such as marital life, self-perception and feelings (5). Previous studies showed that psychosocial well-being, sexual satisfaction and health-related quality of life (HRQOL) are impaired in cases with PCO (6-8).

In a study by Kerchner *et al.,* depression, anxiety disorders and binge eating disorder (BED) were higher among women with PCO compared with controls (9). Bipolar disorder is a psychological disorder defined as impressive change of mood, behavior, thoughts and energy level (10). Bipolar cases suffer from mental and physical problems more than healthy controls (11,12).

Previous studies illustrated menstrual abnormalities, hyperandrogenism and anatomic or hormonal evidence for PCO in bipolar women (13-15) who were under treatment of anti-convulsion medications.

The goal of this study was to determine prevalence of bipolar disorder in women with PCO.

Materials and Methods

In this case-control study, 110 women with definite diagnosis of PCO according to Rotterdam criteria who attended infertility clinic of Vali-e-asr Hospital (affiliated hospital of Tehran University of Medical Sciences) were enrolled. One hundred and ten age-matched infertile women due to other reasons except for PCO with normal menstruation cycles were considered as controls.

Exclusion criteria for both groups include: diabetes mellitus, smoking, oral contraceptive (OCP), sodium valproate and phenytoin medication.

All participants were asked to fill informed consent before entering to the study. Study had been approved by ethics committee of Tehran University of Medical Sciences. Ten ml fasting venous blood sample were obtained from all patients and controls to measure fasting glucose, LH, FSH. Height, weight and waist-to-hip ratio (WHR) were recorded by an expert technician.

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A psychiatrist with thirty years experinece, examined all 220 cases in order to determine the prevalence of depression and bipolarity in them. Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition criteria by means of MINI (Mini International Neuropsychiatric Interview, version 4.4 was applied for psychiatric evaluation of women.

SPSS software version18.0, (Statistical Product and Service Solutions, SSPS Inc., Chicago) was applied for data analysis. Results are presented as mean ± SD and frequencies. The Student's *t*-test and Mann-Whitney U-tests used for continuous variables and the Pearson X^2 test with Fisher's exact test was applied for categorical variables. *P*-value less than 0.05 was considered statistically significant.

Results

Two hundred and twenty women enrolled in the study. Mean age of each group participants were not significantly different while FBS, LH and LH/FSH levels were significantly higher in PCO patients (Table1). Eighty eight case were depressed in PCO group while 96 were depressed in control group (*P*=0.03). Bipolar disorder were higher in PCO group in comparison with controls (8 vs. 0, *P*=0.004).

Discussion

Our study showed that bipolar disorder is more prevalent in women with PCO than other infertile women. Our results are compatible with Klipstein *et al.* finings (9). They evaluated 78 women with PCO diagnosis and investigated bipolar disorder in 28% while in current survey only 5% of PCO women met bipolar criteria. In a study by Rassi *et al.,* 72 women with PCO were examined for psychiatric co-morbidities. Their results showed that 57% of evaluated women presented at least one psychiatric disease while major depression was the most prevalent disorder followed by bipolar disorder (16). We found that depression is higher significantly in control group than cases with PCO.

On the other hand, Rasgon *et al.* found that menstrual disturbances in women with bipolar disorder are common whether they use valproate or not (9). McIntyre *et al.* reported that menstrual abnormalities, hyperandrogenism and metabolic syndrome were higher in valproate-treated bipolar females compare with lithium treated women (14). The rationale mentioned for these findings is that medications used for bipolar treatment could affect hypothalamic-pituitary-gonadal (HPG) axis and reproductive function (17). For instance, valproate application has been suggested to be in relation with elevated fasting biochemical parameters, leptin level and ultrasound evidence of polycystic ovaries (18). Joffe *et al.* examined bipolar women and suggested association between new-onset oligomenorrhea with hyperandrogenism in valproate-treated women (19).

Table 1. Clinical, hormonal, and metabolic features of the women with PCOS and healthy controls.

Variable	Controls (n=110)	PCOS (n=110)	*P*-value
Age	30.99 ± 7.30	29.59 ± 5.60	0.111
Duration of infertility (year)	4.53 ± 2.01	5.21 ± 1.72	0.03
BMI (kg/m^2)	29.03 ± 3.40	30.54 ± 4.10	0.08
WHR	0.83 ± 0.06	0.91 ± 0.04	0.06
Fasting glucose (mmol/l)	5.10 ± 0.4	4.53 ± 0.70	0.04
LH (mU/ml)	6.03 ± 3.20	8.90 ± 5.70	<0.001
LH/FSH	1.07 ± 1.01	2.91 ± 0.33	0.02

BMI, body mass index; Values are means ± SD.

WHR: Waist-to-hip ratio

Table 2. Prevalence of depression and bipolar disorder in each group.

	PCO group	Control group	*P*-value
Bipolar disorder	8 (7.2%)	0	0.004
Depression	88 (80%)	96 (87%)	0.03

Although our patients only screened for bipolar disorder and depression and did not apply any medication, fasting blood sugar (FBS) and LH levels were significantly higher in PCO women than other group. Also, these parameters were higher in bipolar PCO patients than other PCO cases. These findings can be indicatives of metabolic relationship between PCO and mood disorders. In a cohort study, Rasgon *et al.* screened PCO women for mood disorders such as depression and discovered that 50% of examined cases were depressed and reported positive association between depression and obesity, insulin resistance and hyperandrogenism (20). The fact that hypothalamic–pituitary–gonadal defect in PCO women plays a crucial role in bipolar development could be explained by thyroid and adrenocortical endocrinopathies found by others (21). In present study, 80% of women with PCO were depressed which is higher than Rasgon *et al.* findings. In conclusion, as PCO is the most common endocrine disorder among reproductive age women and affects social and personal aspects of people, considering psychological issues in such cases and precise psychiatric evaluation of affected women is recommended.

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