Lipid Profile of Women with Polycystic Ovary Syndrome Attending a Tertiary Care Hospital of Dhaka City

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Abstract

Polycystic ovary syndrome (PCOS) is one of the common disorders in women at child bearing age. The purpose of the present study was to investigate the lipid profile in patients with polycystic ovary syndrome.

A total of 103 women with PCOS of 15-36 years of age were included in the present study. Of the 103 PCOS women, 50% were overweight or obese, 29.1% had impaired glucose tolerance (IGT) and 4.9% had type2 diabetes mellitus (T2DM). The mean BMI was generally higher (25.8 ± 5.5 kg/m²). The mean serum cholesterol levels ranged from182 mg/dl to 236 mg/dl in all groups of women. The results of our study showed that women with PCOS had altered lipid profile and glycemic status. Therefore, evaluation of metabolic status is necessary for better management of women with PCOS.

Introduction

One of the most common disorders in women at child bearing age is polycystic ovary syndrome (PCOS), which is a complex disorder affecting not only the normal development of eggs in the ovaries but also other metabolic pathways.[1-3] PCOS is a common endocrine disorder affecting 5-10% women of reproductive age.[4,5] It is associated with diabetes and cardiovascular disease.

Women suffering from PCOS are considered to be at high risk for dyslipidemia due to elevated androgen levels and frequent association of this syndrome with obesity.[6,7] Furthermore, these patients are often hyperinsulinemic and insulin resistant.[8] A number of studies have shown that women with PCOS have lower high-density lipoprotein (HDL) levels, as well as high triglyceride and low density lipoprotein (LDL) levels than age, sex, and weight matched control women.[9,10] Theses metabolic abnormalities predispose patients to vascular disease in the polycystic ovary syndrome.

In view of the above, the present study was undertaken to evaluate the lipid parameters in women with PCOS.

Materials and Methods

Study population

The study was conducted at the Department of Obstetrics and Gynecology and Biomedical Research Group, BIRDEM hospital during the period of January 2006-Decemember 2008. A total number of 103 women with PCOS of reproductive age (15-40 years) were included in the study. An informed consent was obtained from all the participants. PCOS was diagnosed by oligomenorrhea (menstrual cycle interval > 35 days but < 6 months duration) or amenorrhea (if no menstruation for 6 months or more), altered luteinizing (LH) and follicle stimulating hormones (FSH) rate ratio (2:1), and one or more of the following criteria such as subfertility, obesity, hirsitism, cystic acne, ultrasound evidence of bilateral enlarged ovaries with multiple (10 or more) small subcortical follicles (2-10 mm in diameter). PCOS with known diabetes and endocrinopathy (for e.g. hyperadrenalism, hypothyroidism) were excluded from the study.

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Anthropometry and laboratory methods

A detailed history (personal, family, medical) was taken and findings were noted in predesigned case record form. The body weight (kg) was measured on light clothes and height (cm) by using appropriate scales on bare foot (Detect-Medic, Detect Scales INC, USA). Body mass index (BMI) of the subjects was calculated using standard formula. Details anthropometry was measured by standard method.

Oral glucose tolerance test (OGTT) was performed in all subjects following the WHO criteria (1999). The selected subjects were requested to fast overnight (8-12 hours). In the following morning, fasting blood samples (10 cc) was collected in an EDTA containing tube. After two hrs of glucose load (75 gm) another 5 ml blood was drawn in another tube. Serum lipids were determined from fasting sample.

The data were expressed as mean$\pm$SD (standard deviation) and median (range). Student's unpaired t test, Mann-Whitney U test and $\div^2$ test was used for data analysis. P-value of <0.05 was considered statistically significant. All statistical analyses were performed with the SPSS (Statistical Package for Social Science) software for Windows version 11.5 (SPSS Inc. Chicago. IL, USA).

Results

The detail anthropometric characteristics of the study population are shown in Table 1. The mean BMI$\pm$SD of the 103 participants was 25.84 ± 5.54 kg/m². Out of 103 study women 50 (48.5%) had family history of diabetes. Among 103 women with PCOS, 30 (29.1%) showed impaired glucose tolerance (OGTT value: 7.8-11.0 mmol/L), 5 (4.9%) were T2DM (fasting blood sugar >7.0, OGTT value >11.1mmol/L) and 68 (66%) showed normal glucose tolerance (OGTT value <7.8 mmol/L).

Detailed anthropometry, laboratory and other clinical characteristics of women with PCOS having NGT, IGT and T2DM are recorded in Table 2. Mean age of NGT, IGT, and T2DM was 23.68 ± 4.57, 25.03 ± 6.09 and 30.48 ± 2.88 years respectively. The BMI of women having NGT, IGT and T2DM ranged from 24.86 kg/m² to 32.7 kg/m². In NGT group 16.2% had BMI >30 kg/m² where as 23.3% of IGT and 40% of T2DM had BMI >30 kg/m². The mean cholesterol levels in NGT, IGT and T2DM groups ranged from 182 mg/dl to 236 mg/dl. Details of other lipid parameters are shown in the Table 2.

Table-1: *Anthropometric and other characteristics of the study population (n=103)*

Parameters	Values
Age (yr)	24.4$\pm$5.2
Height (m)	1.6$\pm$0.1
Weight (kg)	55$\pm$103
BMI (kg/m²)	25.8$\pm$5.5
Waist (cm)	90.1$\pm$13.9
Hip (cm)	97.1$\pm$11.8
Waist/hip ratio	0.9$\pm$0.1
NGT (<7.8 mmol/L)	68 (66%)
IGT (7.8-11.0 mmol/L)	30 (29.1%)
T2DM (>11.1 mmol/L)	5 (4.9%)

Note: *Results are expressed as Mean$\pm$SD, Number (%) as appropriate; NGT-Normal glucose tolerance; IGT-Impaired glucose tolerance;*

Discussion

Metabolic features associated with PCOS include increased risk for T2DM and cardiovascular disease and an increased prevalence of the metabolic syndrome.[11,12] Women with polycystic ovary syndrome have an atherogenic lipid profile with increased level of total and LDL cholesterol and reduced HDL concentration. In the present study on 103 women with PCOS, 29.1% had IGT and 4.9% had diabetes before reaching their 4th decade of life. The prevalence of IGT (29.1%) is substantially higher in PCOS women than those found in a population based study by Sayeed

Table-2: *Anthropometric, laboratory and other characteristics of women with PCOS having NGT, IGT and T2DM*

Parameters	NGT (n=68)	IGT (n=30)	T2DM (n=5)
Age (yr)	23.7±4.6	25.0±6.1	30.4±2.9
BMI(kg/m²)	24.9±5.7	26.9±4.2	32.7±7.6
Triceps(mm)	26.1±4.8	29.3±6.4	29.3±6.9
Waist/hip ratio	0.9±0.1	0.9±0.1	0.9±0.1
Typical clinical characteristics	63(92.6%)	27 (90%)	4(80%)
Positive family history of diabetes	27(39.7%)	19 (63.3%)	4(80%)
Cholesterol (mg/dl)	182 (110-246)	195(162-307)	236 (140-284)
TG (mg/dl)	128 (51-468)	158 (63-361)	136 (104-275)
HDL (mg/dl)	42 (23-106)	42 (28-60)	42 (23-44)
LDL (mg/dl)	111 (40-162)	120 (67-241)	172 (69-221)

Note: *Values are expressed as Mean $\pm$SD, Range or No (%) as appropriate*

et al (1997) in a Bangladeshi population.[13] He found that 8% had IGT and 5.2% had DM. Though in the present study the women with PCOS are younger (15-36 years) in comparison to Sayeed's study (30-60 years) still the prevalence of IGT in PCOS is much higher. Although the prevalence of T2DM (4.9%) is similar to Sayeed *et al* (5.2%), but, again if we consider age then a prevalence of 4.9% is considerably high in this age group. Therefore, we can say that PCOS is high risk factor for developing IGT and T2DM.

Dyslipidemia is common in PCOS compared to weight matched controls with higher triglyceride and lower high-density lipoprotein cholesterol.[9,11] The dyslipidaemia occurs independent of BMI.[14] The causes of dyslipidaemia in PCOS are again multi-factorial. Insulin resistance appears to have an important role mediated by simulation of lipolysis and altered expression of lipoprotein lipase and hepatic lipase.[15] It is thought that approximately 70% of the patients with PCOS have disturbances in serum lipid levels.[16] A study on Bangladeshi women with PCOS reported increased levels of triglyceride, LDL and total cholesterol.[17] In our study, the lipid profiles of women with PCOS was generally higher than normal healthy women.

The results of our study show that women with PCOS have increased predisposition to metabolic syndrome manifested by altered lipid profiles and glycemic status. The evaluation of the metabolic status is necessary for the global risk assessment of women with PCOS.

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