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ORIGINAL ARTICLE

Diagnostic Evaluation of Polycystic Ovarian Disease

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ABSTRACT

Background: Polycystic ovary syndrome is a heterogeneous endocrine disorder that affects about one in 15 females worldwide. The major endocrine disruption is excessive androgen secretion or activity, and a large proportion of women also have abnormal insulin activity. Many body systems are affected, resulting in several health complications, including menstrual dysfunction, infertility, hirsutism, acne, obesity, and metabolic syndrome. Several biochemical tests play an important role in diagnosing and predicting health consequences of this disease.

Aims: To determine the signs and symptoms of polycystic ovarian syndrome in gynaecology outpatient department of Jinnah Hospital Lahore and to describe the clinical presentations, biochemical findings and ultrasound findings in patients with polycystic ovarian syndrome.

Design Descriptive case series

Setting: Department of Obstetrics & Gynecology, Jinnah Hospital Lahore from 1st March 2018 to 28th February 2019.

Methodology: One hundred patients of reproductive age group with signs and symptoms of polycystic ovarian syndrome were included. A detailed history and examination was carried out. Then diagnosis of polycystic ovarian syndrome was confirmed by laboratory tests and ultrasound findings.

Results: 72% patients presented with menstrual irregularities.56% patients had BMI> 25kg/m2 .72% patients had hirsutism. Out of total patients 62% patients were married and 38% were unmarried. Among those who were married 24(38.7%) patients presented with primary infertility and 17(27.4%) presented with secondary infertility.44% patients had raised total serum testosterone. Diabetes mellitus was present in 14% of patients. Ultrasound criteria were fulfilled in 77% patients with polycystic ovarian disease.

Conclusion: Most common clinical presentations of polycystic ovarian disease were found to be menstrual irregularities, hirsutism and obesity. Hyperinsulinemia and hyperandrogenism was also more commonly found in obese XIV and hirsute women. Also ultrasound is a very useful diagnostic tool for polycystic ovarian disease.

Keywords: Polycystic ovarian disease, diagnostic evaluation, health consequences, diabetes mellitus, insulin resistance.

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is a complex hormonal disturbance that affects the entire body and has numerous implications for general health.[1] It is the commonest endocrine disorder in women and affects approximately 15-20% of reproductive aged women, characterized by hyperandrogenism and chronic anovulation. Polycystic ovarian syndrome is associated with hyperinsulinemia, insulin resistance, increased risk of glucose intolerance and type II diabetes. Family studies have indicated a genetic susceptibility to polycystic ovaries.[2]

The definition of the polycystic ovarian syndrome has been much debated. There are many extra-ovarian aspects to the pathophysiology of polycystic ovarian syndrome, yet ovarian dysfunction is central.[3] According to the refined definition, Polycystic ovarian syndrome is presence of two out of three criteria:(i) oligomenorrhea/anovulation; (ii) hyperandrogenism; (iii) polycystic ovaries, with the exclusion of other aetiologies. The morphology of the polycystic ovary has been redefined as an ovary with 12 or more follicles measuring 2-9 mm and / or increased ovarian volume (>10 cm^3).[4]

Obesity is observed in 35-60% of women with polycystic ovarian syndrome. Hyperandrogenism is associated with a preponderance of fat localized to truncal abdominal sites. Women with Polycystic ovarian syndrome have a higher waist hip ratio. The central distribution of fat is independent of BMI & associated with XVI higher plasma insulin and triglyceride concentration.[5,6]

Impaired glucose tolerance and diabetes are known risk factors for cardiac disease.18-20% of obese women with polycystic ovarian syndrome demonstrate impaired glucose tolerance.[7] Many females with type 2 diabetes under the age of 45.0 years have polycystic ovaries. Insulin resistance combined with abdominal obesity is thought to account for the higher prevalence of type 2 diabetes in polycystic ovarian syndrome. There is a concomitant increased risk of gestational diabetes.[8]

The endocrinologic work-up of a hyperandrogenic female begins with exclusion of disorders that mimic polycystic ovarian syndrome and respond to specific therapy, particularly virilizing tumors, hyperprolactinemia, non classic congenital adrenal hyperplasia, and Cushing syndrome. Cortisol and thyroid function tests are indicated in obese patients to exclude other causes of obesity.[9] Once a diagnosis of polycystic ovarian syndrome has been established, identifying abnormal glucose tolerance, insulin resistance or dyslipidemia is important because polycystic ovarian syndrome is a risk factor for the early development of type 2 diabetes mellitus and associated cardiovascular risk factors.[10] Kyrou et al[11] advised the baseline lipid panel plus a glucose tolerance test because fasting glucose concentration is poorly predictive of the two hour level in polycystic ovarian syndrome.

In view of the long term perils confronted by women suffering from polycystic ovarian syndrome like endometrial hyperplasia and carcinoma endometrium, this study has been analyze various clinical presentation of patient with Polycystic ovarian syndrome and also how sensitive biochemical tests and ultrasound facilities available in a well equipped tertiary care hospital in diagnosis. The patient can then be appropriately treated and long term consequences adequately prevented.

MATERIALS AND METHODS

This descriptive case series was conducted at Obstetrics/Gynecology Department, Federal Government Services Hospital Islamabad from 1st March 2018 to 29th February 2019. One hundred sample size was calculated with 80% power of test &5.0% level of significance by taking expecting 5%. Patients or reproductive age with at least two of the following symptoms obesity, oligimenorrhoea, hirsutism, infertility were included from the study. All pregnant females and females before age of menarche and post-menopausal were excluded.

A detailed history and examination was carried out. Then diagnosis of polycystic ovarian syndrome was confirmed by laboratory tests and ultrasound findings. The ESHRE/ASRM diagnostic criterion was adopted for the diagnosis of polycystic ovarian disease. Pre-designed proformas were filled at the time of presentation and then further investigations and ultrasound findings were noted. Data was analyzed in SPSS version 21.

RESULTS

The mean age was 22.27 years. The mean weight, height, waist hip ratio and BMI were 70.08 kg, 1.61 meters, 0.83 and 26.5 kg/m^2 respectively. 14% were below 20 years of age, 52% were between 20 and 30 years, 24% between 31and 35 years and the rest 10% were aged above 35 years. There were 62% patients married and 38% were unmarried (Table 1).

Clinical presentation of PCOD patients observed in 72% had menstrual irregularities.73% of the patients had abnormal hair distribution (hirsutism). Obesity was a clinical feature in 62% of the patients. Ultrasound features of polycystic ovaries were observed in 77% of the patients. Out of 62 married women 41(66.1%) presented with infertility, 24(38.7%) with primary infertility, 17(27.4%) with secondary infertility and 1(1.61%) with recurrent miscarriages. Among the hundred women with PCOD 28% had normal menstrual cycle. The cause menstrual irregularities observed in 56% women had oligomenorrhoea, 26% had a cycle length of 36-90 days and30% had the menstrual cycle that was > 90 days long.16% of the patients had amenorrhoea (Table 2).

Out of 100, 2% were underweight, 36% females were within the normal range of weight and 32% were overweight. Ferriman and Gallway score had a mean value of 13.02. Out of total patients 28% had a score of 4-8 i.e. normal score and 72% of patients had hirsutism and a score more than 8. Among these 72 patients 20(27.77%) had a score of 9-12, sixteen (22.22%) patients had a score of 13-16 and 36(50%) patients had a score >16 (Table 3).

In this study the fasting lipid profile of all patients was done which included total serum cholesterol having mean value of 187.1 mg/dl (range120-244mg/dl).Raised values were taken as above 200mg/dl and out of total patients with PCOD 46% had raised levels. The triglycerides had a mean value of 148.7mg/dl (range 110-200mg/dl) and 48% patients had triglyceride levels > 150mg/dl. Out of these 56 patients 32(57.14%) had a waist hip ratio below 0.85 and 24(42.85%) had WHR>0.85. Total serum testosterone levels were raised in 44 patients out of which 12(27.27%) patients had normal WHR and 32(72.72%) had WHR >0.85. So the number of patients with WHR>0.85 was greater (Table 4).

In the women with normal cycle length i.e. 28-35 days the mean endometrial thickness was 4.46mm ranging from 3-7mm. With the cycle length of 36- 90 days, mean CET was 7.1mm(range 5-9mm) and when cycle length was >90 days the mean thickness of endometrium was 10.2mm(range 8-13mm). Out of total patients 76 patients had normal fasting insulin levels and out of these2 (2.63%) were underweight, 30(39.47%) had normal BMI, 28(36.84%) were overweight and 16(21%) were obese i.e. 10 patients had fasting insulin levels 10-15uU/ml out of which 4(40%) were obese, 2 (20%) were overweight AND 4(40%) had normal weight. Fasting insulin level was above 15uU/ml in 14 patients out of which 10(71.4%) were obese, 3(21.4%) were overweight and 1(7.14%) had normal BMI range (Table 5).

Out of the 62 married patients, 41(66.1%) had infertility. Among these patients 24(38.7%) had primary infertility and 17(27.4%) had secondary infertility. Out of the 41 patients with infertility 14(34.14%) had normal weight, 9(21.95%) were overweight and 18(43.9%) were obese. Among those with primary infertility 6(25%) had BMI 30kg/m2 . out of the patients with secondary infertility 8(47.1%) had normal weight, 7(41.17%) were overweight and 2(11.76%) were obese.

Table 1: Frequency of age and marital status (n=100)

Variable	No.	%
Age (years)		
<20	14	14.0
20-30	52	52.0
31-35	24	24.0
>35	10	10.0
Marital status		
Married	62	62.0
Unmarried	38	38.0

Table 2: Frequency of menstrual irregularities in PCOD patients

Menstrual pattern	No.	%
Oligomenorrhoea	56	56.0
Cycle 36-90 days	26	26.0
Cycle >90 days	30	30.0
Amenorrhoea	16	16.0
Regular cycle	28	28.0

Table 3: Ferriman and Gallway score of hirsutism in PCOD patients

Score	No. of patients	Mean score
4-8 (normal)	28	5.42
9-12	20(27.77%)	10.6
13-16	17(23.61%)	14.62
>16	36(50%)	19.55

Table 4: Relationship between waist hip ratio and serum testosterone

Total serum testosterone	Waist Hip Ratio	
	<0.85	>0.85
Normal range <0.82ng/ml	32(57.1%)	24(42.85%)
Increased levels >0.82 ng/ml	12(27.27%)	32(72.72%)

Table 5: Relationship between BMI & Fasting Insulin levels PCOD

Fasting Insulin Level	Underweight	Normal Weight	Overweight	Obese
<10uU/ml	2(2.63%)	30(39.47%)	28(36.84%)	16(21%)
Hyperinsulinemia 10-15uU/ml	-	4(40%)	2(20%)	4(40%)
Hyperinsulinemia>15uU/ml	-	1(7.14%)	3(21.42%)	10(71.4%)
Percentage of hyperinsulinemia	-	14%)	15.15%	46.66

DISCUSSION

The polycystic ovary syndrome is a heterogenous collection of signs and symptoms that gathered together form a spectrum of disorder with a mild presentation in some, while in others a severe disturbance of reproductive, endocrine and metabolic function. In the present study we adopted the diagnostic criteria agreed at The Rotterdam ESHRE/ASRM consensus meeting held in 2004. The mean age ranged between 16 and 39 years and a mean age of 27.28 years, and majority of the patients i.e. 52% were aged between 20-30 years and it was consistent with the finding in a study conducted in 2020 in which 57.8% patients were in this age group. In another study in Multan large proportion of patients were in this age group.[12,13]

In this study, 73% had hirsutism and 62% with obesity (Table 2) and these findings are similar to study by Abdalmageed in 2019 and also to several other studies.[14-16]

Ultrasound findings of polycystic ovaries were observed in 77% of the patients and the hormone profile of all subjects was recorded and percentages of patients with raised values were calculated LH was raised in 62% of patients in the current study which was 40% and 72% in study conducted at Multan in 2006 in which 80 % of PCOD patients had positive ultrasound features.[17] Recurrent miscarriage was a presenting feature in 1.61% of PCOD patients which was almost same as the incidence in general population. Thus recurrent miscarriages were not increased in PCOD patients in this study and this finding is similar to findings in other studies.[18]

Infertility was the presenting feature in 66.1% among the 62 married patients, 38.7% had primary infertility and 27.4% had secondary infertility. Also infertility was more common presenting feature in patients who had a BMI>25 kg/m^2 i.e. 66.86% compared to 34.14% among patients with normal weight.

Obesity was also a prominent presentation in this study with 62% patients having BMI>25kg/m^2, among which 30%were obese and 32% were overweight. One study in 2019, percentage of obese patients was also 30%.[19] Three parameters of fasting lipid profile Cholesterol, triglycerides and high density lipoprotiens were measured in this study. It was observed that 46% of patients had serum cholesterol >200mg/dl, 48% had triglyceride levels more than 150mg/dl while 47% of patients had HDL levels below 50 mg/dl.

In another study conducted at Rawalpindi the percentage of patients with raised HDL levels was 58%,while cholesterol and triglyceride levels were raised in 12% and 21% of patients respectively.[20] This shows that a significant percentage of PCOD patients have deranged lipid profile putting these patients at a greater risk of developing cardiovascular morbidity in future. An increase in endometrial thickness was observed on ultrasound as the cycle length increased as the mean endometrial thickness was 10.2mm when cycle length was >90 days and 11.9 mm in patients with amenorrhoea and this finding was similar to other studies.[21]

In this study impaired fasting and random impaired glycemia was seen in 16% and 15% of patients respectively. Diabetes mellitus was present in14% of patients when fasting blood sugar levels were observed and in 10% of patients when random blood sugar levels were taken. These findings were similar to the observation in several other studies aswell.[22,23]

It is suggested that women with PCOS should periodically have an OGTT and must be closely monitored for deterioration in glucose tolerance. Hyperinsulinemia was found in 24% of total patients. In the current study, 14% of normal weight patients had hyperinsulinemia, 15.15% of overweight and 46.66% of obese patients had hyperinsulinemia. This showed that although hyperinsulinemia was present in normal weight patients but it was more pronounced in patients with BMI>30 kg/m^2, which was consistent with many other studies.[9,24]

CONCLUSION

Most common clinical presentations of polycystic ovarian disease were found to be menstrual irregularities, hirsutism and obesity. Hyperinsulinemia and hyperandrogenism was also more commonly found in obese and hirsute women. Also ultrasound is a very useful diagnostic tool for polycystic ovarian disease. By obtaining a detailed history and performing complete physical examination, a considerable number of PCOD patients can be diagnosed. Biochemical, hormonal and ultrasound investigations are necessary in many cases and are helpful in predicting future health risks in PCOD patients.

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