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Study of Patients with PCOS (Polycystic Ovary Syndrome) and Its Correlation with Waist Circumference, Glucose Metabolism and Lipid Profile at A Tertiary Care Hospital, Rajasthan

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Abstract

Background: We have paucity of knowledge about association of PCOS with WHR(Waist hip ratio), Lipid profile and with diabetic status of patients, therefore present study is an effort to establish association of these conditions with occurrence and progression of PCOS if there is any.

Methods: After obtaining informed verbal consent of study population selected through analyzing inclusion and exclusion criteria and with help of consecutive sampling, the questionnaire administered to study subjects by the researcher. All relevant information related to study subjects' socio demographic details, anthropometry, clinical profile, biochemical parameters including Impaired Glucose Tolerance and Lipid profile will be collected and entered into Microsoft Excel and will be analysed with help of appropriate software and tests of significance considering level of significance as $p<0.05$.

Results: Mean height of patients was 154.51±3.54 cm. 38.00% patients weight were 55—65 kg group. Mean weight of patients was 63.21±13.25 kg. 40.00% patients waist circumference were <80 cm group. Mean waist circumference of patients was 87.35±11.50 cm. Mean BMI of patients was 26.44±5.44 kg/mt^2. Mean SBP of patients was 107.84±21.75 mmHg and mean DBP of patients was 91.70±20.50 mmHg. Mean FBS of patients was 95.82±16.55 mg/dl and mean RBS of patients was 134.36±18.04 mg/dl. Mean Hb1Ac of patients was 5.35±0.85%. Mean triglyceride of patients was 113.68±19.25 mg/dl, mean LDL of patients was 95.24±14.94 mg/dl, mean cholesterol of patients was 159.98±18.26 mg/dl and mean HDL of patients was 52.16±6.32 mg/dl. Co-relation between waist

circumference and fasting blood sugar & random blood sugar was found statically significant.

Conclusion: PCOS, being a common condition prevailing in women with reproductive age group, is the cause of problem for one in four patients attending a gynecologist. Despite treating the infertility and menstrual complaints of the PCOS patients, it is a treating doctor's duty to take it as an opportunity to screen for metabolic syndrome and advice for healthy diet, physical activity and weight reduction. Healthy life style modification not only improves their menstrual and ovulatory symptoms, but also prevents the future cardiovascular and other morbid ailments.

Keywords: PCOS, LDL,FBS,HDL,Hb1Ac

Introduction

Polycystic ovarian syndrome (PCOS) is a multisystem endocrinopathy in women of reproductive age with the ovarian expression of various metabolic disturbances and a wide spectrum of clinical features like infertility, obesity, menstrual abnormalities and hyperandrogenism. The condition is relatively common and affects about 20% of women of reproductive age. The diverse manifestations of PCOS start at an early age when a girl is maturing into a young woman.[1]

PCOS is one of the major risk factor for metabolic syndrome and the prevalence of metabolic syndrome in PCOS is 40-50%. [2] Since insulin resistance has its metabolic effects both on adolescent and adults,PCOS forms a key for search of metabolic syndrome.[3]

The aim of our study is to find out the prevalence of metabolic syndrome using the IDF criteria in women with PCOS reproductive age group so that appropriate life style modifications, pharmacological and non pharmacological intervention would help in combating and preventing the major deadly cardiovascular diasease, stroke etc. Due to higher risk of metabolic syndrome in our ethnic population more stringent criteria of metabolic syndrome defined by the International Diabetes Federation (IDF) is used in our study.[3-6]

These varied data indicate the need for evaluation ofmetabolic syndrome in different populations, as it would help in planning screening strategies to prevent long-term effects.

We have paucity of knowledge about association of PCOS with WHR(Waist hip ratio),Lipid profile and with diabetic status of patients, therefore present study is an effort to establish association of these conditions with occurrence and progression of PCOS if there is any.

Material And Method

Study Design: Cross sectional Hospital based study.

Inclusion Criteria:

- Women who are willing to participate,
- Women at reproductive age (15-45 years) and who presented with Rotterdam Criteria.

Rotterdam Criteria

Two of the following three criteria are required:

a) Oligo/anovulation

b) Hyperandrogenism
   - Clinical (hirsutism or less commonly male pattern alopecia) or
   - Biochemical(raised Free Androgen index or free testosterone)

c) Polycystic ovaries on ultrasound.

Exclusion Criteria

- Women who are not willing to participate,
- Women < 15 OR >45 Years old,
- Women after menopause,
- Cushing syndrome,
- Hyperprolactinoma,

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- Congenital adrenal hyperplasia,
- Women who are pregnant or lactating,
- Diabetic female,
- Hypothyroidism,
- Women who taking OCP ORany Lipid lowering agent.

Data Collection & Analysis:

After obtaining informed verbal consent of study population selected through analyzing inclusion and exclusion criteria and with help of consecutive sampling, the questionnaire administered to study subjects by the researcher. All relevant information related to study subjects' socio demographic details, anthropometry, clinical profile, biochemical parameters including Impaired Glucose Tolerance and Lipid profile will be collected and entered into Microsoft Excel and will be analysed with help of appropriate software and tests of significance considering level of significance as $p<0.05$.

Results

In present study maximum 77.00% patients age were 21-30 yrs age group. Mean age of patients was 27.20±3.95 yrs. Maximum patients (86.00%) were belong to class IV socio-economic status. PCOS were more common in higher socio-economic status as compare to lower socio-economic status.

Table 1: Waist circumference wise distribution

Waist circumference in cm	No of cases	Percentage
<80	40	40.00
80-90	38	38.00
>90	22	22.00
Total	100	100.00

In present study maximum 40.00% patients waist circumference were <80 cmgroup. Mean waist circumferenceof patients was 87.35±11.50 cm.

Table 2: BMI wise distribution

BMI in kg/mt^2	
Mean	26.44
SD	5.44

Mean BMI of patients was 26.44±5.44 kg/mt^2.

Table 3: Fasting Blood Sugar wise distribution

Fasting Blood Sugar in mg/dl	No of cases	Percentage
<90	42	42.00
90-110	41	41.00
>110	17	17.00
Total	100	100.00

In present study, 42.00% patients FBS was less than 90 mg/dl and 17.00%patients fasting blood sugar level was more than 110 mg/dl.

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Table 4: Blood Sugar wise distribution

Blood Sugar in mg/dl	Mean	SD
FBS	95.82	16.55
RBS	134.36	18.04
Hb1Ac in %	5.35	0.85

Mean FBS of patients was 95.82±16.55 mg/dl and mean RBS of patients was 134.36±18.04 mg/dl. Mean Hb1Ac of patients was 5.35±0.85%.

Table 5: Lipid profile wise distribution

Lipid profile in mg/dl	Mean	SD
Triglyceride	113.68	19.25
LDL	95.23	14.94
Cholesterol	159.98	18.26
HDL	52.16	6.32

Mean triglyceride of patients was 113.68±19.25 mg/dl,mean LDLof patients was 95.24±14.94 mg/dl, mean cholesterol of patients was 159.98±18.26 mg/dl and mean HDL of patients was 52.16±6.32 mg/dl

Table 6: Association between waist circumference and Fasting Blood Sugar

Waist circumference in cm	Fasting Blood Sugar		p-value
	Mean	SD	
<80	89.36	7.32	0.02
80-90	96.31	6.12	
>90	104.21	2.31	

In present study association between waist circumference and fasting blood sugar was found statically significant.

Table 7: Co-relation between Waist Circumference and Blood Sugar

Waist circumference	R-square value	p-value
Fasting Blood Sugar	0.97	0.001
Random Blood Sugar	0.99	0.001
BMI	0.96	0.001

In present study, co-relation between waist circumference and fasting blood sugar & random blood sugar was found statically significant.

Discussion

In present study maximum 38.00% patients weight were 55—65 kg group. Mean Weight of patients was 63.21±13.25 kg. 40.00% patients waist circumference were <80 cm group. Mean waist circumference of patients was 87.35±11.50 cm. Mean BMI of patients was 26.44±5.44 kg/mt^2.

Obesity and insulin resistance occur frequently in association with this syndrome. Cardiovascular risk factors seem to cluster in women with PCOS compared

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with general population [7]

Joshi B et al [8]was found that the mean BMI of patients was 25.32±4.14 kg/mt^2

Shahrami SH et al [9]was found that the mean BMI of patients was 26.28±3.62 kg/mt^2

In present study, 42.00% patients FBS was less than 90 mg/dl and 17.00%patients fasting blood sugar level was more than 110 mg/dl.

Insulin resistance is a key feature of both obese and lean PCOS. It occurs in 70-95% of people with obese PCOS and 30-75% of people with lean PCOS[10]

High insulin is not just a symptom of PCOS—it is also a major driver of the condition. High insulin can impair ovulation and can cause the ovaries to make excess testosterone

Mean triglyceride of patients was 113.68±19.25 mg/dl, mean LDL of patients was 95.24±14.94 mg/dl, mean cholesterol of patients was 159.98±18.26 mg/dl and mean HDL of patients was 52.16±6.32 mg/dl in our study

Dyslipidemia is one of the important risk factor associated with PCOS. In our study we have observed, there is alteration in serum lipid profile. There is significant increase in serum triglycerides, serum cholesterol, serum LDL-C, serum VLDL-C and decrease in the levels of serum HDL-C levels. The increase in triglycerides may be due to the accumulation of triglycerides, which may occur due to the increased lipogenesis, decreased clearance or reduced fatty acid oxidation. Increased secretion of VLDL particles by the liver results in elevated plasma triglycerides concentration. This may occur due to insulin resistance, which is seen in PCOS patients. Insulin resistance also contributes more catabolism of HDL particles and formation of LDL particles [11]

Cholesterol ester transfer protein may contribute for this[12] In addition to the insulin resistance, hyperandrogenism also contributes for altered lipid profile. Hyperandogenism has been associated with increased hepatic lipase activity which has role in catabolism of HDL particles. Thus PCOS patients have more atherogenic lipid profile, than controls. Increased level of triglycerides can be contributory factorfor adiposity in PCOS women [8]

Altered lipid profile (atherogenic), adiposity, insulin resistance may contribute for cardio-vascular diseases. Thus PCOS patients should be screened and monitored regularly, to prevent complications associated with cardiovascular diseases.

Conclusion

PCOS, being a common condition prevailing in women with reproductive age group, is the cause of problem for one in four patients attending a gynecologist. Despite treating the infertility and menstrual complaints of the PCOS patients, it is a treating doctor's duty to take it as an opportunity to screen for metabolic syndrome and advice for healthy diet, physical activity and weight reduction. Healthy life style modification not only improves their menstrual and ovulatory symptoms, but also prevents the future cardiovascular and other morbid ailments.

References

1. Nidhi R, Padmalatha V, Nagarathna R, Amritanshu R. Prevalence of polycystic ovarian syndrome in Indian adolescents. J PediatrAdolesc Gynecol. 2011 Aug; 24(4) : 223-7.
2. Carmina E, Chu MC, Longo RA, RiniGB, Lobo RA. Phenotypic variation in hyperandrogenic women influences the findings of abnormal metabolic and cardiovascular risk parameters. J

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ClinEndocrinolMetab. 2005; 90 : 2545–9.

3. De Leo V, Musacchio MC, Palermo V, et al. Polycystic ovary syndrome and metabolic co-morbidities: therapeutic options. Drugs Today. 2009; 45 : 763–75.
4. Zawadski JK, Dunaif A. Diagnostic criteria for polycytic ovarian syndrome: towards a rational approach. In: Dunaif A, Givens JR, Haseltine FP, Merriam GR, editors. Polycystic ovarian syndrome. Boston : Blackwell Scientific; 1992. p. 337–84.
5. Saxena P, Prakash A, Nigam A, et al. Polycystic ovary syndrome: is obesity a sine qua non? A clinical, hormonal and metabolic assessment in relation to body mass index. Indian J EndocrinolMetab. 2012; 16(6) : 996–9.
6. Saxena P, Prakash A, Nigam A. Efficacy of 2-hour post glucose insulin levels in predicting insulin resistance in polycystic ovarian syndrome with infertility. J Hum Reprod Sci. 2011; 4(1) : 20–2.
7. Bil E, Dilbaz B, Cirik DA, Ozelci R, Ozkaya E, Dilbaz S. Metabolic syndrome and metabolic risk profile according to polycystic ovary syndrome phenotype. J ObstetGynaecol Res. 2016 Jul; 42(7) : 837-43.
8. Joshi B, Mukherjee S, Patil A, Purandare A, Chauhan S, Vaidya R. A cross-sectional study of polycystic ovarian syndrome among adolescent and young girls in Mumbai, India. Indian J EndocrinolMetab. 2014 May; 18(3) : 317-24
9. Shahrami SH, AbbasiRanjbar Z, Milani F, Kezem-Nejad E, Hassanzadeh Rad A, DalilHeirat SF. The Relation between Diverse Phenotypes of PCOS with Clinical Manifestations, Anthropometric Indices and Metabolic Characteristics. Acta Med Iran. 2016 Feb; 54(2) : 134-9.
10. Huang R, Zheng J, Li S, Tao T, Ma J, Liu W. Characteristics and contributions of hyperandrogenism to insulin resistance and other metabolic profiles in polycystic ovary syndrome. ActaObstetGynecol Scand. 2015 May; 94(5) : 494-500
11. Clark NM, Podolski AJ, Brooks ED, Chizen DR, Pierson RA, Lehotay DC, Lujan ME. Prevalence of Polycystic Ovary Syndrome Phenotypes Using Updated Criteria for Polycystic Ovarian Morphology: An Assessment of Over 100 Consecutive Women Self-reporting Features of Polycystic Ovary Syndrome. Reprod Sci. 2014 Aug; 21(8) : 1034-1043.
12. Hosseinpanah F, Barzin M, Keihani S, Ramezani Tehrani F, Azizi F. Metabolic aspects of different phenotypes of polycystic ovary syndrome: Iranian PCOS Prevalence Study. ClinEndocrinol (Oxf). 2014 Jul; 81(1) : 93-9.

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