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ASSESMENT OF COMPONENTS OF METABOLIC SYNDROME IN POLYCYSTIC OVARIAN SYNDROME AND HEALTHY WOMEN : A CASE CONTROL STUDY.

Biochemistry

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ABSTRACT

Objective: To evaluate the antidepressant activity of combination of Cilostazol (20mg/kg) and Hydroalcoholic extract of Zingiber Officinale (175mg/kg).
Methods: In the present study, antidepressant activity of the combination was compared with that of fluoxetine in mice by forced swim test.
Results: Cilostazol (20 mg/kg) and Zingiber Officinale (175mg/kg) administered intraperitoneally showed antidepressant activity which was significant in decreasing the immobility time when subjected to forced Swim Test. However the activity of Combination was found to be less than that of fluoxetine (20mg/kg).
Conclusion: The combination of cilostazol and Zingiber Officinale (175mg/kg) posseses potential antidepressant activity which could be of clinical importance for the patients suffering from depressive disorders after evaluating it by further advanced studies.

KEYWORDS

Polycystic ovarian syndrome, Metabolic syndrome.

INTRODUCTION

Polycystic ovarian syndrome (PCOS) was originally described in 1935 by Stein and Leventhal as a syndrome manifested by amenorrhea, hirsutism and obesity associated with enlarged polycystic ovaries. Diagnosis is based upon the presence of any two of the following three criteria (ASRM/ESHRE ,2003). Oligo and /or anovulation, Hyperandrogenism (clinical and /or biochemical) Polycystic ovaries.1 Prevalence of PCOS is variable,ranging from 2.2% to as high as 26%. In India, around 10% of the women are affected by PCOS.2 PCOS is the most common endocrine disorder among reproductive-aged women and the main cause of infertility due to anovulation.It has a metabolic component consisting of hyperinsulinemia and insulin resistance with increased risk of cardiovascular disease and has a strong association with metabolic syndrome.3,4 Metabolic syndrome is another cluster of endocrine disturbances, including insulin resistance, dyslipidemia, obesity, and hypertension.5 PCOS patients may have features suggestive of MS much earlier than the development of diabetes mellitus and cardiovascular disease. Early detection of MS component in PCOS women will help in bringing the awareness and timely initiation of measures of involved life style changes.6 So this study was designed to estimate various component of MS in PCOS patients and to compare them with healthy controls.

Material and method:

The Present study was conducted in a tertiary care hospital with cooperation from the Department of OBGY during period of may 2016 to October 2017. The participants were divided into 2 groups –Study (PCOS patients) and healthy control group of (n = 60) subjects each between 15 – 40 years of age.

Criteria- for diagnosis of MS in PCOS is Modified American Heart Association/National Heart Lung and Blood Institute definition (ATP III 2005) include

1. Waist circumference of >80 cm
2. Fasting plasma glucose of ≥100 mg/dl
3. Blood pressure ≥130/85 mm Hg
4. Fasting Triglycerides ≥150 mg/dl
5. High Density Lipoprotein [HDL-C] <50 mg/dl

Metabolic syndrome present when 3 of the above 5 criteria get fulfilled.

The anthropometric parameters recorded in both group were- Waist circumference and Blood pressure. Waist circumference was measured using measuring tape in cm. Blood pressure recorded in sitting position with sphygmomanometer.

The biochemical parameters measured in both group were- serum levels triglyceride (TG)(based on a series of coupled enzymatic reactions using glycerol kinase and peroxidase) , high density lipoprotein cholesterol (HDL-C)(Anti human-β-lipoprotein antibody), Fasting plasma glucose (FPG) using hexokinase method on Beckman coulter AU 5800 chemistry autoanalyser.

5 ml of venous blood was collected in plain bulb from median cubital vein with all aseptic precautions after taking informed consent from all study subjects.

The case and control group were compared using unpaired t test. All the calculations were done by using Microsoft Office Excel 2007 and statistical analysis was done using the SPSS software,Version 11.5. Data was analyzed using unpaired t test . $P < 0.05$ was considered to be statistically significant.

Results:

Table I Age distribution of study subjects

	Controls (n = 60)	Cases (n = 60)	P value
Age (yrs) Mean± SD	29.95 ± 2.36	30.38 ± 2.33	0.31

There was no significant difference in age between controls and cases. Thus, the two groups were comparable.

Table - II Comparison of parameters of metabolic syndrome in study groups (unpaired t test)

Parameters of metabolic syndrome	Controls (n = 60) (mean+ SD)	Cases (n = 60) (mean+ SD)	P value
Waist circumference (cm)	47.31 ± 7.81	59.31 ± 13.95	<0.0001***
Systolic Blood pressure (mm of Hg)	116.9 ± 6.66	118.1 ± 6.63	0.324NS
Diastolic Blood pressure (mm of Hg)	74.50 ± 5.11	75.33 ± 5.68	0.401 NS
Triglycerides (mg/dl)	110.9 ± 6.47	144.7 ± 14.37	<0.0001***
HDL- cholesterol (mg/dl)	55.1 ± 3.46	45.56 ± 9.99	<0.0001***
Fasting plasma glucose (mg/dl)	77.7 ± 8.86	82.41 ± 15.09	0.0392**

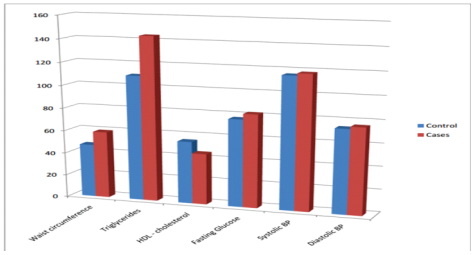
(* p≤ 0.05** p≤0.01, ***p≤0.0001, ns- non significant)

Anthropometric parameters : In the present there was statistically

significant difference observed in waist circumference between patient and control (p < 0.0001).The mean of systolic blood pressure and diastolic blood pressure in controls and cases showed no significant difference.(p values >0.05).
Biochemical parameters :

There was statistically significant difference in serum triglycerides, HDL cholesterol and fasting plasma glucose between cases and controls (p value <0.0001) , (p value <0.0001) (p value <0.0392) respectively.

Graph 1 : Comparison of mean of different components of metabolic syndrome in the study groups



DISCUSSION :

Study of metabolic syndrome in polycystic ovarian syndrome cases:

In the present study we have used the modified American Heart Association/National Heart Lung and Blood Institute definition (ATP III 2005) which includes (i) defining the ethnic-specific difference in central obesity by using the World Health Organization recommendation for waist circumference ≥80 cm in Asian women, and (ii) and reducing the threshold for impaired fasting glucose to 100 mg% in accordance with the American Diabetes Association.

1. Waist circumference of >80 cm
2. Fasting plasma glucose of ≥100 mg/dl
3. Blood pressure ≥130/85 mm Hg (Systolic BP ≥ 130 mm Hg and Diastolic BP ≥ 85 mm Hg)
4. Fasting Triglycerides ≥150 mg/dl
5. High Density Lipoprotein [HDL-C] <50 mg/dl

Metabolic syndrome present when 3 of the above 5 criteria get fulfilled.

Waist circumference : In the present study the mean waist circumference of PCOD women group was significantly higher compared to the healthy women. High waist circumference is one of the factor associated with metabolic syndrome. High WC can be due to impaired suppression of ghrelin secretion following meals and increased risk of reactive hypoglycemia , which leads to increase appetite and weight gain and it had been observed that the prevalence of eating disorders was appoximately 40% in women presenting with hirsutism Glintborg et al.7

Lipid profile parameters also showed significant alteration in PCOD group.

TG -In the present study the mean of serum triglyceride is significantly higher in cases compared to controls . (p - < 0.0001). High TG levels may be due to the influence of hyperandrogenism and insulin resistance which is most commonly seen in patients with PCOS kiranmayee et al.8 Hyperinsulinaemia and hyperandrogenemia causes adipocytes to undergo increased catecholamine-induced lipolysis and release of free fatty acids into the circulation. Increased free fatty acids in the liver stimulate secretion of VLDL which ultimately leads to hypertriglyceridaemia as noticed in our study .[9]

HDL – cholesterol – In the present study the mean of HDL-cholesterol is significantly lower in cases compared to controls. A low HDL reflects a sedentary lifestyle and intake of diet rich in saturated fat.7 The reduced HDL level might be due to insulin resistance. Insuliln resistance leads to hypertriglyceridemia which in turn decrease the cholesterol content of HDL as a consequence of reduced cholesteryl ester content of the lipoprotein core in addition cholesteryl ester transfer protein mediated alteration in triglyceride making the particle small and dense causing increased clearance of HDL from circulation. The relationship between insulin resistance and changes in HDL might be indirectly occurring in connection with the changes in triglyceride-rich lipoprotein metabolism.[10]

Glucose- In the present study the mean of fasting glucose is significantly higher in cases compared to controls .(p - < 0.0392). The exact mechanism for insulin resistance is still unknown. Patients with PCOS might have similar insulin receptor amount and affinity and therefore insulin resistance in PCOS may probably mediated through changes in insulin receptor mediated signal transduction cascade Glintborg D et al .8 The defects in insulin action lead to impaired suppression of glucose production by the liver and kidney and reduced glucose uptake and metabolism in insulin-sensitive tissues, i.e. muscle and adipose tissue and to compensate for defects in insulin action, insulin secretion must be modified to sustain euglycemia but this compensatory mechanism fails usually because of defects in insulin secretion, resulting in IFG.10

CONCLUSION :

The parameters studied in the present research work, if considered together can provide a strategy to prompt intervention to prevent or delay dyslipidemia, impaired glucose and central obesity by early lifestyle modification. Considering the prevalence of PCOS in our country, such investigations may help for earlier diagnosis of the disease however they are to be carried out with the larger population and with certain additional parameters.

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