Original Article

Oxidative stress parameters in established cases of polycystic ovarian syndrome

Mamta Singh[1*], Shiv Shankar Bharti[2]

[1]Senior Resident, AIIMS, Patna Bihar, INDIA.
[2]Tutor, Department of Biochemistry, M.G.M Medical College and LSK Hospital, Kishanganj-855107, Bihar, INDIA.
Email: kajal6160@gmail.com

Abstract

Problem statement: Polycystic ovarian syndrome, (PCOS) is a condition in which a sex hormones estrogen and progesterone levels are out of balance. This leads to the growth of ovarian cysts. PCOS can cause problems with women's menstrual cycle, fertility, cardiac function, and appearance. Overproduction of the hormone androgen may be another contributing factor. Androgen is a male sex hormone that women's bodies also produce. Women with PCOS often produce higher-than-normal levels of androgen. This can affect the development and release of eggs during ovulation. And it is the most frequent endocrine disease in women. Approximately one in 15 women experiences PCOS and an enlarged Ovary is observed on ultrasound in 22 % of women during their reproductive years. Others common clinic manifestations include oligomenorrhea, hyperandrogenism, insulin resistance, reproductive obesity. **Methods:** Hospital based observational case and control study, Department of Biochemistry, Obstetrics and Gynaecology OPD in M.G.M Medical College, Kishangnaj and AIIMS Patna, Bihar. As cases and the sample size was 16 control were selected in 1: 1 ratio for each PCOS patient, So the sample size was also 16. Therefore the total sample was 32. Respectively the subjects were between 20 – 35 years of age. **Results:** During the respective age of women, PCOS is the common symptom and incidence of PCOS is increasing gradually due to various reasons. Fasting blood glucose estimation of serum LH, FH, Prolactin and T3, T4, TSH were performed to assess the oxidative stress, estimation of serum **MDA** was also performed. Values were compared both case and control group and statistical analysis were calculated by the help of SPSS software. **Conclusion:** In our study, estimation of the related parameters has been performed along with estimation of serum MDA occurring in the subjects. Insulin resistance is the main feature of PCOS. 38% of study population showed increased fasting blood glucose. Blood MDA level was found to be significantly higher in the PCOS group (p=0.01) and Serum Prolactin level was also higher values in this subjects.

Keywords: PCOS, oligomenorrhea, hyperandrogenism, insulin resistance, obesity.

[*]**Address for Correspondence:**
Dr. Mamta Singh, Senior Resident, AIIMS, Patna Bihar, INDIA.
Email: kajal6160@gmail.com

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INTRODUCTION

Polycystic ovary syndrome (PCOS) is the most common endocrinopathy in women of reproductive age affecting 5 – 10 % of population, it is the leading cause of female infertility[1] It is aheterogeneous disorder of chronic involution and hyperan-drogensim and it is often associated with obesity and insulin resistance[2]. The new definition of PCOS suggested that the diagnosis of PCOS mustt be based on the presence of two of the three following criteria: (i) oligo - and/ or anovulation, (ii) clinical and/or biochemical signs of hyperandrogenism, and (iii) polycystic ovaries on ultrasonography and exclusion of related disorder[3,4]. The ultrasound criteria for polycystic ovaries is defined as the presence of 12or more follicles measuring 2 to9 mm in diameter and /or an increased ovarian volume > 10 cm3 on transvaginal ultrasound scanning, PCOS is diagnosed even when only one polycystic ovary is present[5]. PCOS is an ovarian dysfunction caused by androgens, which inhabit folliculogenesis and lead to poly follicular morphology, which then disturbs the menstrual cycle and leads to an ovulation.[6] Among women experiencing

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oligoanovulation, 65 – 87 % have PCOS[7]. Hypersecretion of androgens is the most widespread biochemical feature in PCOS women[8]. PCOS accounts for 70 – 80 % of hyperandrogenism and is associated with elevated serum total or free testosterone concentrations[9]. Acanthosis nigricans, a disorder seen as dark and velvety skin with hyperpigmentation and papillomattosis, manifests itself normally in the axillae, skin flexures, and nape of the neck. Among women with PCOS only 3 % express acanthosis nigricans[10], which is associated with insulin resistance and, consequently, hyperinsulinemia[11]. Increased oxidant status has been shown to correlate with insulin resistance. Insulin resistance can be found in 25 – 60 % of women with PCOS[12]. Among PCOS women, more than 60 % manifest infertility (Primary / Secondary), and 19 % experience amenorrhea[10]. Moreover, pregnancy in PCOS women is likely to be completed by gestational diabetes, preeclampsia, pregnancy hypertension, and preterm labor leading to miscarriage [13]. Obesity is more common in women with PCOS and it can lead to severe hyperandrogenism. Androgen excess is a known contributor to visceral adiposity in women, which provides high metabolically active tissue that stimulates the ovaries and adrenal to proceed with androgenisation

MATERIAL AND METHODS

Type of Study: Hospital based observational study.

Study Design: Case control study

Study Area: Department of Biochemistry Obstetrics and Gynaecology OPD in M.G.M Medical College and Lions Seva Kendra Hospital, Kishanganj, Bihar and AIIMS Patna, Bihar.

Study Population: PCOS patients as case and Non, PCOS group as control were selected.

Inclusion Criteria

Subjects presenting with the symptoms of PCOS and having no other disease like diabetes mellitus, hypertension, tuberculosis or any other in factory disease were the case of the study.

Exclusion Criteria

Patients suffering from diabetes mellitus, hypertension, tuberculosis and other infectious disease were excluded from the study.

Biochemical Investigation:

Blood sample was collected from the ante-cubital vain with proper asepsis. Fluoride containing vials were used for the collection of sample for plasma fasting glucose estimation and plain vials were used for **Thyroid profile, LH, FSH, Prolactin** and Serum **MDA** estimation after overnight fast. At the initial steps, the serum was separated by centrifugation and the subsequent investigation procedure was followed. Standardized Semi Auto Analyzer, **Chemilumine scence (Lilac)** and **Spectrophotometer** was used for estimation. The details on the principle and procedure of different investigations are followed.

Statistical Analysis

Comparison of changes were made with the help of SPSS, t-test was calculated on the basis of mean and standard error of mean. Comparison was made between normal control to other group.

RESULTS

Since Insulin resistance is the main feature of PCOS, fasting blood glucose levels were measured for all the subjects included in our study. About 38 % of study population showed increased fasting blood glucose levels.

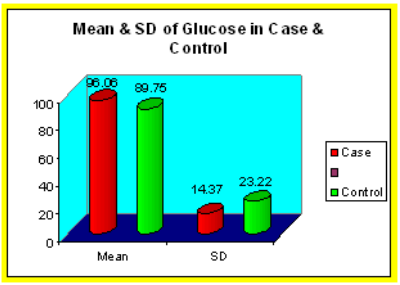

Figure 1:

P Value = 0.710 Pearson = 0.139

Regarding oxidative stress parameters estimation of serum **MDA** has been performed and 56 % of subjects of PCOS had increased MDA concentrations compeered to control. Blood MDA level was found to be significantly higher in the PCOS group (0.21 I 0.03, vs 0.10 ± 0.03, p = 0.01).were seen in PCOS patients compared with control (p = 0.009).

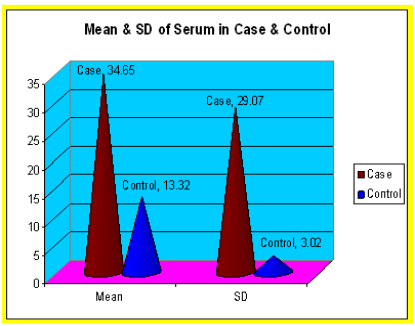

Figure 2:

Diagram of serum MDA in case and Control

Prolactin level within normal limit and only 6% of control showed a higher prolactin level. Serum LH estimation reveals higher LH concentration at about 44% of study population and which is statistically significant (p. Value 0.049). (Chi square = 3.865). Mean value of control 3.26 and S.D is ± 2.13 vs Mean SD cases 8.95: SD ± 12.8.

There is no significance in serum FSH levels of the subjects vs study. The Thyroid profile for all the subjects had been performed and showed no significance between the parameters in PCOS T3, T4, TSH.

CONCLUSION

This study demonstrated that PCOS subjects had significantly elevated concentration of plasma MDA independent of obesity. PCOS patients in this study were further divided into two subgroup in terms of insulin resistance, The result showed that MDA level is significantly higher in young, non-obese PCOS patients. A negative point of this study was that some of the important patient characteristics, such as BMI and age, were not recorded. Further study with a large number of patients may indicate any predictive value for assessment of complications and medical treatment of PCOS.

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