DOI: https://doi.org/10.53350/pjmhs22162707

ORIGINAL ARTICLE

Oxidative Marker and Insulin Resistance in Women with PCOS

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ABSTRACT

Introduction: Polycystic Ovary Disorder may be a multifactorial reproductive issue and a leading cause of female infertility around the world. Confirmations have appeared that Oxidative Stress and diminished antioxidant status are often connected with PCOS. Oxidative stretch (OS) which plays a key part within the pathogenesis of CVD has also been documented in obese women with PCOS. Oxidative stress may have a part within the pathophysiology of PCOS and impact female reproductive system leading to infertility but the exact cause of OS in PCOS isn't totally understood.

Objective: To determine the levels of Glucose, Malondialdehyde, serum insulin and insulin resistance in non-obese and obese PCOS women.

Material and Methods

Study design: Case Control

Settings: Lady Atchison Hospital Lahore

Duration: Six months i.e. 1st January 2021 to 30th June 2021

Data Collection procedure: Case control study was conducted to analyzed 100 PCOS patients and 100 controls. Fasting plasma glucose was measured. Insulin resistance was calculated by HOMA-IR. Malonaldehyde is determined as Thiobarbituric corrosive reactive substances Insulin was assessed by chemiluminescent microparticle immunoassay.

Results: The levels were higher of serum glucose in both obese and non-obese PCOS patients. Serum levels of insulin in obese PCOS patients were high as compared to non-obese PCOS patient. The level of CRP is in the higher side in PCOS patients whether obese or non-obese when it compared to control ones. The level of MDA also on the higher side in PCOS patients whether obese or non-obese when it compared to control ones

Conclusion: Within the present study, we found expanded oxidative stress and low review inflammation shown by raised levels of MDA and CRP in ladies with polycystic ovary syndrome irrespective of obesity. They can be utilized as markers for women PCOS. In any case, the serum insulin levels and IR in non-obese patients with PCOS in spite of the fact that expanded in connection to BMI balanced controls, the values were inside the reference range.

Keywords: Glucose, Insulin Resistance, Oxidative stress, PCOS, Insulin

INTRODUCTION

Polycystic Ovary Disorder may be a multifactorial reproductive issue and a leading cause of female infertility around the world. Confirmations have appeared that Oxidative Stress and diminished antioxidant status are often connected with PCOS. Oxidative stretch (OS) which plays a key part within the pathogenesis of CVD has also been documented in obese women with PCOS. Oxidative stress may have a part within the pathophysiology of PCOS and impact female reproductive system leading to infertility but the exact cause of OS in PCOS isn't totally understood[1].

Studies suggest that the presence of Insulin resistance and hyperglycemia in women with PCOS are significant variables to extend the Oxiadative stress. Oxidative stress characterized as an imbalance between the production of ROS and antioxidant resistance framework is an important component in PCOS women. Products of lipid peroxidation responses have been widely employed as biomarkers for OS. Malonaldehyde (MDA) created amid the decay of polyunsaturated fatty acids, is one of the steady conclusion items of lipid peroxidation that can serve as a great biomarker. Few studies have appeared that around 30–40% of women are pre-diabetic and 12.6% have Sort 2 Diabetes[2]. The anomalies such as IR, inflammation, adipose tissue dysfunction , impeded fasting glucose (IGF), and impaired glucose tolerance (IGT) have all been considered constitutes of "pre-diabetes[3]".

The way of life of women with PCOS presents the corner stone for an ideal treatment and has appeared to improve body composition, hyperandrogenism, and IR in women with PCOS. Adjustments such as weight reduction and work out have been found to make strides menstrual disturbance and infertility in obese PCOS women. A decrease in central fat and progressed IR affectability has moreover made strides their reproductive systems[4, 5].

MATERIAL AND METHODS

A case-control study was conducted on 50 analyzed PCOS patients (25 stout and 25 non obese) and 50 controls (25 obese and 25 non obese) within the age bunch of 20–35 years. Obese had a BMI >27 and non-obese had BMI <23. Fasting plasma glucose was measured. Insulin resistance was calculated by HOMA-IR. Malonaldehyde (MDA) is determined as Thiobarbituric corrosive reactive substances

Insulin was assessed by chemiluminescent microparticle immunoassay

Ethical committee approval was taken from ethical committee. An educated consent was taken from the participants. Physical examination of each subject was carried out. The stature and weight of all people were measured. Body mass file (BMI) was calculated by kg/m2. Determination of PCOS was done agreeing to the Rotterdam ESHRE revised consensus 2003. Mean and standard deviation were compared using t-test from SPSS version 23.

RESULTS

The levels were higher of serum glucose in both obese and non-obese PCOS patients. Serum levels of insulin in obese PCOS patients were high as compared to non-obese PCOS patient. The level of CRP is in the higher side in PCOS patients whether obese or non-obese when it compared to control ones. The level of MDA also higher in PCOS patients whether obese or non-obese when it compared to control individuals.

Table 1: Parameters of PCOS and Controls in Obese & Non Obese Women

No	Parameter	Non Obese			Obese		
		Cases	Control	P value	Cases	Control	P value
1	Fasting blood glucose	95± 10.5	90±8.0	<.001	32.5±2.95	34.5±4.50	<.001
2	CRP	12.2±1.5	3.2±2.0	<.001	12.5±1.10	3.90±3.20	<.001
3	BMI	21.2±2.49	24.5±4.67	<.001	32.5±3.4	34.6±4.25	<.001
4	INSULIN	6.5+1.10	2.85±1.40	<.001	12.5+3.20	6.35±1.40	<.001
5	Insulin resistance	1.35±0.40	0.40±0.30	<.001	3.20±0.9	2.20±0.45	<.001
6	MDA	7.50±0.25	1.88±0.45	<.001	9.20±0.60	2.85±0.50	<.001

DISCUSSION

In our study, the mean fasting blood glucose was significantly increased in both obese and non-obese PCOS cases compared to controls together[6] with noteworthy elevation in serum levels of insulin and IR. Hyperinsulinemia and IR are respected as the center mechanism in both obese and non-obese polycystic ovary syndrome (PCOS). Pathogenesis have shown that there's expanded blood glucose and >27 BMI develop diabetes in obese PCOS ladies 31% of obese PCOS patients versus 10.3% of lean PCOS patients and 7.5% of obese PCOS patients versus 1.5% of lean PCOS patients, separately. In our study, in spite of the fact that the serum insulin levels and IR were increased compared to their individual BMI adjusted controls, the serum levels were inside the reference range in the non-obese ladies with PCOS. Insulin signaling, intervened through a protein tyrosine kinase receptor, has been examined in PCOS patients[7]. Dunaif et al. detailed over the top serine phosphorylation, which restrains insulin receptor tyrosine kinase activity, of insulin receptors in insulin- resistant PCOS patients. IR rate of PCOS patients ranges from 50% to 70%. IR encourages OS since hyperglycemia and higher levels of free fatty acid lead to reactive oxygen species (ROS) production 0.15 A few studies have connected seriousness of hyperinsulinemia to the degree of clinical sign. PCOS patients have illustrated oxidative push due to hyperglycemia, insulin resistance, and persistent inflammation. OS is expanded due to IR as hyperglycemia and higher levels of free fatty acid leads to abundance generation of ROS. Hyperglycemia too plays a part in inflammation by producing Tumor Necrosis Factor (TNF a) from multinucleated cells (MNC). Studies conducted in incline sound regenerative age women having

hyperglycemia recommend that overabundance androgen increases the era of ROS from leukocytes, p47phox gene expression and arrangement of MDA[8]. The presence of OS in absence of obesity can be due to slim down initiated OS and hyperandrogenism being the progenitor. OS increases chronic inflammation and vice versa. In our study, there was expanded serum levels of CRP in both obese and non-obese PCOS patients compared to controls. Similar perceptions were made by Gonzalez et al. (2006), and Sundharan et al. (2016a, 2016b). In any case, Wild et al. (2002) appeared no noteworthy contrast in CRP levels between PCOS ladies and controls. The plausible cause of rise in CRP in obese people is due to an increase in the secretion of cytokines from fat tissue[9,10].

CONCLUSION

Within the present study, we found expanded oxidative stress and low review inflammation shown by raised levels of MDA and CRP in ladies with polycystic ovary syndrome irrespective of obesity. They can be utilized as markers for women PCOS. In any case, the serum insulin levels and IR in non-obese patients with PCOS in spite of the fact that expanded in connection to BMI balanced controls, the values were inside the reference range. As they are risk components for CVD, PCOS ladies should be assessed for status of serum lipid profile and oxidative stress and their adjustment by antioxidant supplementation, can be advantageous in treatment of PCOS cases. It moreover reduces the overall morbidity and improves the prognosis of PCOS.

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