



INSULIN RESISTANCE AND POLYCYSTIC OVARY SYNDROME

Biochemistry

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ABSTRACT

INTRODUCTION: To find out the level of insulin and insulin resistance in polycystic ovary syndrome. **MATERIAL AND METHODS:** The present study was conducted on 30 Polycystic Ovarian Syndrome female patients of age group (15-20, 20-30 and 30-40years) attending the Out Patient Clinics of Department of Obstetrics and Gynaecology, Dr. S.N. Medical College and its associated group of Hospitals, Jodhpur. Glucose, insulin and insulin resistance biochemical parameters were analyzed by commercially available reagents and kits using semi auto and fully auto analyzers. **RESULTS:** we have found a very significant and statically significant change in insulin and insulin resistance in polycystic ovary syndrome in comparison to controls. **CONCLUSION:** Regular evaluation of Blood Sugar, Insulin, Insulin Resistance routinely in PCOS patients that may have utility of complication, risk prediction and diagnostic role in the early detection of metabolic abnormalities, endocrine derangements and active and timely management of these alterations can prevent the risk squeal of co-morbid conditions of development of Diabetes and Cardiovascular diseases in Polycystic Ovarian Syndrome females.

KEYWORDS

PCOS, Cardiovascular Disease, Diabetes, Insulin.

INTRODUCTION: The prevalence of polycystic ovarian syndrome among adolescents and young girls in India was 22.5% by Rotterdam and 10.7% by Androgen Excess Society criteria¹ The short term consequences of PCOS include irregular menses, Obesity, infertility, Hirsutism/acne/androgenic alopecia, glucose intolerance/acanthosis nigricans and long term deleterious effects of PCOS are Diabetes Mellitus² PCOS does not cause anovulation rather; PCOS is the consequence of chronic anovulation³ The principle features of PCOS are insulin resistance and hyperandrogenism and the role of obesity as a contributing factor in the development of PCOS is widely accepted and particularly the abdominal phenotype (central obesity) may be responsible for IR and associated hyperinsulinemia in women with PCOS.^{4,5} In View of this present study was designed to assess various contributing biochemical risk factors and the early diagnostic role of these biochemical parameters in the PCOS subject with an aim to explore the utility of these investigations in the early diagnosis and better management of PCOS and its related complications.

MATERIAL AND METHODS: The present study was conducted on 30 Polycystic Ovarian Syndrome female patients of age group (15-20, 20-30 and 30-40years) attending the Out Patient Clinics of Department of Obstetrics and Gynaecology, Dr. S.N. Medical College and its associated group of Hospitals, Jodhpur. All the investigation work was performed in the Department of Biochemistry, Dr. S.N. Medical College Jodhpur. The results were compared with age matched 25 healthy control female subjects. After an overnight fast of 10-12 hours, venous blood sample was drawn from antecubital vein of each subject by using standard aseptic techniques. Following biochemical parameters were analyzed by commercially available reagents and kits using semi auto and fully auto analyzers. Glucose, insulin and insulin resistance biochemical parameters were analyzed by commercially available reagents and kits using semi auto and fully auto analyzers.

RESULTS: we have found a very significant and statically significant change in insulin and insulin resistance.

Groups	Fasting blood glucose(mg/dl)	Serum Insulin (μIU/mL)	Insulin Resistance
Healthy control n= 25	82.97±6.61 [72.26-99.34]	15.499±4.732 [9-23.79]	3.205±1.111 [1.399-5.529]
PCOS Patients (30)	94.41±10.65 [77-110.34]	34.528±8.051 [19.67-48.34]	8.102±2.207 [4.62-13.72]
p-value	0.0001	0.0001	0.0001

DISCUSSION: Polycystic Ovarian Syndrome (PCOS) is an endocrine reproductive metabolic syndrome affecting women of all reproductive age. It has multiple components with significant and diverse clinical implications including psychological (impaired

quality of life, increased anxiety and depression), reproductive (hyperandrogenism, hirsutism, menstrual irregularity, anovulation, infertility and increased Pregnancy complications) and metabolic (impaired glucose tolerance, hyperinsulinemia, insulin resistance, type2 diabetes mellitus and cardiovascular disease) squeal^{6,7}.

Insulin resistance is proposed as a key pathophysiological feature of PCOS contributing to both metabolic disturbances and reproductive abnormalities. Evidence suggests that women with PCOS have a greater predisposition of obesity which may aggravate PCOS related intrinsic insulin resistance and associated reproductive and metabolic disturbances.⁸ PCOS is also identified as a significant non-modifiable risk factor associated with type2 diabetes mellitus by the International Diabetes Federation and women with PCOS are also proposed to have a more rapid conversion from impaired glucose tolerance to type2 diabetes mellitus.⁹ Further women with PCOS have an elevated prevalence to the metabolic syndrome and are at increased risk for type2 diabetes mellitus and cardiovascular disease. In view of this, present study was carried out to evaluate plasma glucose, insulin, insulin resistance in Polycystic Ovarian Syndrome patients to find out the prevalence of various risk factors in Polycystic Ovarian Syndrome. Our results are in agreement with other study in which a significant increase in fasting sugar (p<0.0001), fasting insulin (p<0.0001), HOMA-IR (p<0.0001) was observed in women with Polycystic Ovarian Syndrome as compared to healthy women.¹⁰

Researcher had also reported that plasma glucose (p<0.0001) and serum insulin concentrations increased significantly in PCOS subjects.¹¹ Women with PCOS are at significantly increased risk for impaired glucose tolerance and type 2 diabetes (31.1% impaired glucose tolerance, 7.5% undiagnosed diabetes) A statistically highly significant increase in serum insulin was observed in Polycystic Ovarian Syndrome subjects (t = 10.409, p<0.0001) when results were compared with healthy control subjects.

Our results are in accordance with another study they also observed a highly significant increase in fasting serum insulin and insulin resistance in Polycystic Ovarian Syndrome subjects as compared with healthy control subjects. A high incidence of hyperprolactinemia was found in infertile women with PCOs. A highly significant increase in the mean insulin resistance was observed in Polycystic Ovarian Syndrome subjects (t = 10.071, p<0.0001) in comparison to healthy control subject.¹²

Our results are in agreement with the study of others in which a significant increase in fasting insulin (p<0.001), HOMA-IR (p<0.001)

was observed in female suffering from Polycystic Ovarian Syndrome as compared to healthy women. Impaired glucose tolerance, Hyperinsulinemia, insulin resistance and hormonal imbalance are key pathophysiological features of PCOS contributing to both metabolic and reproductive disturbances.¹³

CONCLUSION: Therefore, the present study provides us an evidence and outcome that there is a need of regular evaluation of Body Mass Index, Blood Sugar, Insulin, Insulin Resistance routinely in PCOS patients that may have utility of complication, risk prediction and diagnostic role in the early detection of metabolic abnormalities, endocrine derangements and active and timely management of these alterations can prevent the risk sequel of co-morbid conditions of development of Diabetes and Cardiovascular diseases in Polycystic Ovarian Syndrome females. Appropriate prospective studies with large sample size are necessary to directly assess this.

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