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Polycystic ovary syndrome and Insulin Resistance

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Abstract

Polycystic ovary syndrome (PCOS) is an imbalance of the female sex hormones also is one of the most common metabolic and reproductive disorders among women of reproductive age, associated with menstrual dysfunction and androgen excess which significantly impacts their quality of life. They may be at increased risk of multiple morbidities including obesity, type2 diabetes mellitus, infertility and cardiovascular disease. ***Insulin resistance*** (IR) is characterized by impaired glucose response to specific amount of insulin. Increasing interest in research on the mechanisms and significance of the relationship between insulin resistance and ovarian syndrome have both increased rapidly over the past 10 years. This report will review all of the risk factor and relationship between insulin resistance and ovarian syndrome but will focus primarily on the polycystic ovary syndrome (PCOS), which is the most common disorder in which these abnormalities occur together. It will also discuss the pathogenesis of polycystic ovary syndrome and its relationship to insulin resistance

Keywords: PCOS, Ovary, Insulin, Obesity, Diabetes

Introduction

Polycystic ovary syndrome (PCOS) is the most common, although the least understood cause of androgenic excess in premenopausal women, initially described 1935 and is also known as **Stein- Leventhal syndrome**. It is a multisystem endocrinopathy. Including menstrual dysfunction, infertility, obesity, acne, hirsutism, acanthosis nigricans and metabolic disorder.

POCS effect 4-6% of women incidents is fast increasing due to change in lifestyle and stress.

A large proportion of women with PCOS are suffering from insulin resistance, they have abnormal insulin activity which lead to risk of diabetes. Insulin stimulated glucose utilization are significantly decreased in PCOS. Hyperinsulinemia seems to play a major role in the pathogenesis of hyperandrogenism of PCOS. Hyperinsulinemia stimulates androgen secretion by the ovarian theca, excess growth of basal cells of the skin resulting in acanthosis nigricans, and abnormal hepatic and peripheral lipid metabolism. (1)

The *insulin resistance* and hyperinsulinemia in PCOS supported the fact that the administration of various insulin-reducing drugs and sensitizing agents which as **metformin** has been found to improve clinical features in many of PCOS patients. (2)

Aim of the study was to determination the relationship between polycystic ovary syndrome (PCOS) and insulin resistance including other risk factors.

Materials and methods

A total of 50 PCOS cases diagnosed according to Rotterdam criteria 2003 i,e at least two of the following three features 1.oligomenorrhea or amenorrhea 2.Clinical or biochemical hyperandrognism and 3. Polycystic ovaries on ultrasound with the exclusion of other etiologies.

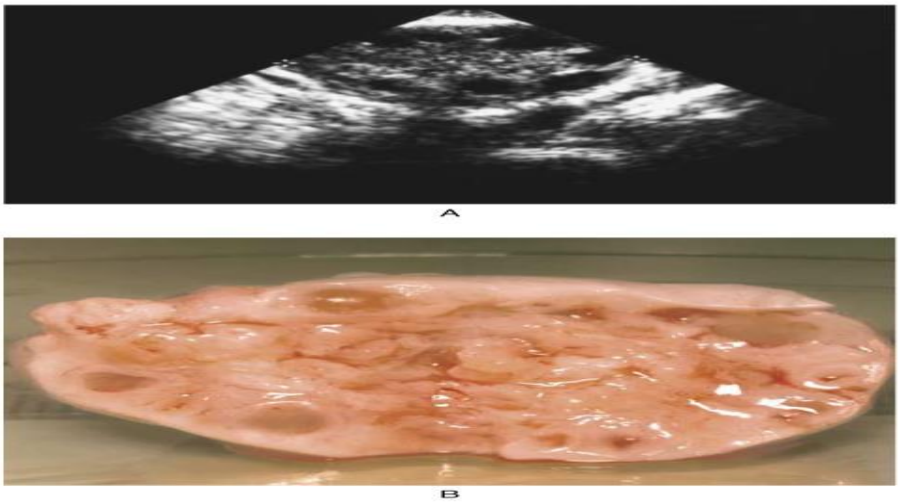

Figure1: It shows 12 or more small follicles each of 2-9mm in size placed peripherally along the surface of the ovary.(7)

Serum glucose levels were measured with spectrophotometry by glucose oxidase – peroxidase method. It were estimated in serum by using ELISA (Enzyme Linked Immunosorbent Assay). Homeostatic Model Assessment- Insulin Resistance (HOMA-IR) and body mass index (BMI) is a simple calculation using a Person height and weight were calculated by their formulas BMI=Kg/m2. (3)

Results

PCOS patients had significantly higher values of BMI, fasting serum glucose, fasting serum insulin and HOMA-IR. Fasting serum glucose was however in the normal range in both cases and control. (3) All research improved high relation between polycystic ovarian syndrome and hyperinsulinemia. One of studies show connection between PCOS and cardiovascular disease (8) where the other was with Gestational

diabetes mellitus (5). Insulin resistance is considered the main pathogenic factor in the background of increased metabolic disturbances in women with PCOS.(6) In 1980, the association between hyperinsulinemia and PCOS was first noted by ***Burghen et al***. who found a significant positive correlation between insulin, androstenedione and testosterone levels among PCOS women (Burghen et al., 1980(5)

Discussion

No single etiologic factor fully accounts for the spectrum of abnormalities in the polycystic ovary syndrome patients.

The study suggested a strong association of PCOS with insulin resistance. (3

PATHOPHYSIOLOGY In response to stimulation by luteinizing hormone, the ovarian theca cell synthesizes androgens. Whereas luteinizing hormone regulates the androgenic synthesis of theca cells, follicle-stimulating hormone is responsible for regulating the aromatase activity of granulosa cells, determining how much estrogen is synthesized from androgenic precursors. When the concentration of luteinizing hormone increases relative to that of follicle-stimulating hormone, the ovaries preferentially synthesize androgen.

Insulin play an important role in the pathogenesis of hyperandrogenemia in the polycystic ovary syndrome.). Insulin acts synergistically with luteinizing hormone to enhance the androgen production of theca cells. Insulin also inhibits hepatic synthesis of sex hormone–binding globulin, the key circulating protein that binds to testosterone.

In Infertility associated with PCOS has been attributed to numerous factors, including oligo-anovulation, dysfunctional gonadotropin secretion, elevated systemic and/or local ovarian androgen levels, and dysfunction of any or several ovarian growth factors and their binding proteins.(4)

Where DR. ***sanna mustaniemi*** found in their studies increasing risk of GDM (Gestational diabetes mellitus)in women with PCOS was related to obesity and increased maternal age.(5)

Subsequent studies have found genetically relation in PCOS where is still in completely described. Where they done a studies of family members with PCOS patients. (6)

In 1992, ***Dahlgren et al***. identified a 7 times higher risk of myocardial infarction in patients with PCOS compared to healthy controls.(8) The genetic and environmental factor is responsible for the etiology of this condition. Unhealthy lifestyle, diet or any infectious mediators increase the risk of PCOS (9)

Conclusions: Polycystic ovarian syndrome (PCOS) is one of the most common disorders affecting women of reproductive age. our findings show there was a high prevalence of metabolic syndrome ,insulin resistance, chronic anovulation and cardiovascular disease in thaw with PCOS.

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