Anti-Islet Cell Antibody and Anti-ovarian Antibody Levels in Iraqi Women with Polycystic Ovary Syndrome

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Abstract

Objective: The objective of this analysis was to assess serum islet cell anti-bodies concentrations and anti-ovarian anti-bodies in the relationship between the PCOS patient and the stable control group.

Material and Method: In this study, 250 Iraqi women aged between 20-50 years were studied. The patients were divided into two groups: study group (n=125, PCOS women) and age-matched controls group (n=125 normal women). The blood sample was obtained on the 2nd day of menstruation cycle. Islet cells Ab and anti ovarian Ab concentrations were determined in both groups.

Results: Women with PCOS had higher serum islet cell concentrations higher than control levels ($p < 0.05$). The levels of islet cells Ab and Anti-ovarian Ab were substantially positively associated with BMI, high levels of anti-mullerian hormone (AMH) and insulin resistance.

Conclusion: The evidence from this study indicated that serum Islet cells Ab and anti-ovarian Ab levels in women with PCOS were observed to be higher compared with controls. Elevated serum Islet cells Ab and anti-ovarian Ab levels can be associated with high AMH and insulin resistance.

Keywords: *Islet cells, anti-ovarian Ab, anti-mullerian hormone, body mass index, polycystic ovary syndrome.*

Keywords: *Anti-Islet, Antibody, Anti-ovarian, Iraqi women.*

Introduction

Islet cell autoantibodies are produced when beta cells of pancreas are damaged and they can bind to glutamic acid decarboxylase (GAD), protein tyrosine phosphatase, islet antigen-2 (IA-2), insulin, and zinc transporter (ZNT8) and lead to further destruction of islet cells of pancreas. The destruction of beta cells of pancreas causes hyperglycemia, which can be treated by insulin therapy to control hyperglycemia, but it leads to increase in weight gain as well as ovarian hyperandrogenism[1,2].

Islet cell autoantibodies react with islet cell antigens in particular sequence reacting with insulin or GAD first, followed by IA-2 and ZNT8. The sequence of autoimmunity to different islet cell proteins indicates that destruction of insulin producing cells is progressing in a particular sequence. These autoantibodies can be used to estimate an individual's risk of developing type I diabetes. Anti-islet cell antibodies reported in 83% of PCOS patients[1]. The first sign of a possible autoimmune endocrine condition is typically the regulatory hormone or an androgen secretory product. A large proportion of prematurity is associated with ovarian autoimmunity. Like normal menopause, premature menopause is associated with elevated FSH and decreased estrogen and inhibin B development[3].

The study aimed to study and evaluate the serum islet cell anti-bodies concentrations and anti-ovarian anti-bodies in the relationship between the PCOS patient and the stable control group

Materials and Method

The study was conducted from February 2019 to January 2020. A total of 250 women with and without polycystic ovarian syndrome (PCOS) who were collected from the high Institute of infertility diagnosis Assisted reproductive technology (ART)/Al-Nahrain University. The history and all data were taken for each PCOS patients. The study was approved by the Institutional Review Board (IRB) of Baghdad University. Control: The control group was collected from healthy normal women.

Samples Collection: The first step was the collection of information from the patients, and then the second step was blood samples collection. Blood samples were collected from all the patients and controls, two milliliters of venous blood were collected in sterile screw cap plastic gel tubes.

Serum Separation: Serum was obtained from the blood samples were left for 30 minutes at room temperature, then centrifuge at 3000 rpm. For ten minute, then serum for each sample was collected in appendrof tubes and stored in deep freeze at -20°C until the time for using in ELISA technique for detection of islet cells Ab level and anti-ovarian Ab. The ELISA were collected acording to DRG-United state of America manufacturing.

Results

The level of serum islet cell antibodies (ICA) showed significant differences in PCOS patients in comparison with healthy control. The level was 1.92E2± 147.96 (Pg/ml), 84.04± 99.63 (Pg/ml) in PCOS and healthy control respectively. The serum level was ranging between 0 and 520 Pg/ml, table 1.

Table 1: Islet cell antibodies (ICA) level in PCOS patients and healthy control groups.

Serum ICA (Pg/ml)	Number	Mean	Std. Deviation	P-value
Patients	125	1.92E2	147.96	<0.0001
Controls	125	84.04	99.63	

*E2: ×100

The level of serum anti-ovarian Ab (AOAB) showed significant differences in PCOS patients in comparison with healthy control. The level was 2.12E2± 130.44 (Pg/ml), 92.37± 112.81 (Pg/ml) in PCOS patients and healthy control group respectively. The serum level was ranging between 0 and 520 Pg/ml, table 2.

Table 2: Anti-ovarian Ab (AOAB) level in PCOS patients and healthy control groups

Serum AOAB (Pg/ml)	Number	Mean	Std. Deviation	P-value
Patients	125	2.12E2	130.44	<0.0001
Controls	125	92.37	112.81	

*E: ×100

Discussion

This study showed high level of serum ICA in PCOS patients when compared with healthy control group. Islet cell auto-antibodies are produced when beta cells of pancreas are damaged[4]. The destruction of beta cells of pancreas causes hyperglycemia, which can be treated by insulin therapy to control hyperglycemia, but it leads to increase in weight gain as well as ovarian hyperandrogenism[5].

Auto-antibodies of islet cells respond with islet cell antigens in a complex sequence that first interacts with insulin or GAD. This pattern of autoimmunity to various proteins of islet cells suggests that in a specific series, degradation of insulin-producing cells is progressing. These auto-antibodies can be used to estimate the risk of an person developing type I diabetes[6].

Anti-ovarian antibodies (AOAB) have been detected in highly level in serum samples of women

undergoing of PCOS than healthy control women. Many past studies have shown that the presence of serum AOAB does not correlate with the clinical manifestation of PCOS. Despite these antibodies being present, their pathogenic role is highly questionable[7, 8]. AOAB may occur several years before the occurrence of clinical symptoms, as detected in 33-61% of women with unexplained infertility; a situation that may indicate early stages of autoimmune ovarian insufficiency[9]. For most autoimmune diseases, screening for specific antibodies is probably the best way of evaluating immunological involvement[10]. According to results of current research the syndrome could be possibly associated with some autoimmune diseases.

Gonadotropins can stimulate IL-1β and then it inhibits both LH and Human chorionic gonadotropin (LH/hCG) and FSH-stimulated progesterone and estradiol secretion by the follicular theca and granulosa cells, affecting cAMP production that suggests a follicle-stage dependent regulatory role of IL-1 on ovarian follicles[11]. A previous study demonstrated that the human granulosa-luteal cells express IL-1β transcript, and LH can stimulate this transcription in a dose-dependent manner, on the contrary, IL-1β significantly decreased LH-dependent estradiol production in these cells. Previous past results suggest that LH may exert its action on the steroidogenesis of granulosa cell, at least in part, the activation of the IL-1β gene[12]. In the brain, interleukin-1β can reduce the release of monoamines: serotonin (5-HT), dopamine and noradrenaline. The role of IL-1β in the monoamine metabolism in the basal ganglia can help for plasticity of anxiety and depression in the brain[13].

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