Fasting Insulin Level in Obese and Non-ObesePatients with Polycystic Ovarian Syndrome

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Background: Polycystic ovarian syndrome (PCOS) is a common syndrome which affects 5-10% of premenopausal women. This syndrome is genetic in origin having ammenorrhoea hirsutism and obesity. Insulin resistance is commonly seen in them. The aim of the study was to find out insulin resistance in both obese and non obese patients with polycystic ovarian syndrome. This finding can change the line of management in these patients.

Methods: This study was conducted at the Department of Obstetrics and Gynaecology Services Hospital, Lahore from January 2003 to March 2004. Fasting insulin level of 60 female patients (PCOS) half obese and half non obese was found out and compared with 40 normal healthy matched controls (half obese and half non obese).

Results: In obese and non obese cases average fasting insulin level was significantly raised than controls. It was more marked in obese than non obese cases. Obesity itself is a factor which aggravates the insulin resistance it was found that 30% of obese and 20% non obese (PCOS) were insulin resistant.

Conclusion: Fasting insulin level is a useful screening method to find out the insulin sensitivity in patient with PCOS. In these patients we can suggest the insulin lowering drugs rather than routine ovulation induction and hormone therapies for irregular cycles, anovulation and infertility.

Key Words. Fasting insulin, Obese and non-obese, PCOS.

Introduction

Polycystic ovarian syndrome was originally described in 1935 by stein and leventhal as a syndrome consisting of ammenorrhoea, hirsutism and obesity in association with enlarged polycystic ovaries.[1] Later on diagnosis was made on endocrine criteria, such as elevated levels of serum luteinizing hormone or ratio of luteinizing hormone, to follicle stimulation hormone.[2] PCOS affects 5-10% of pre-menopausal women.[3] It seems to run in families. Sisters and daughters of women with PCOS have about fifty fifty chance of having this disorder.[4] Exact etiology is uncertain. There is some evidence of autosomal transmission potentially a gene or series of genes renders the ovaries susceptible to insulin stimulation of androgen secretion while blocking the follicular maturation.[5] Hyperinsulinemia and insulin resistance are common features of large number of patients affected by PCOS. The pathogenesis of insulin resistance remains unclear. Insulin resistance may be related to excessive serine phosphonylation of insulin receptor and decrease tyrocine receptor phosphorylation and impaired insulin action.[6] 50% of women are overweight or obese with body mass index above 27 and it is android type.[7] In obesity number of receptors are decreased and target tissues become less sensitive to insulin: This explains insulin resistance in obesity and type II diabetes mellitus.[8] Insulin resistance increase the secretion of ovarian androgens but also promotes an increase in the proportion of free (active hormone).[9] The women with PCOS have increased level of non SHBG (Sex hormone binding globulin) bound estradiol due to decrease in SHBG level. Tonically increased levels of biologically active estradiol stimulation increases GnRH pulsatility and produce tonically elevated LH levels with an ovulation.[10] The chronically elevated LH levels and LH/FSH ratio greater than three suggest the diagnosis in women with clinical features of PCOS.[11]

Materials and Method

This study included 60 female patients from obstetrics and gynaecology OPD Services Hospital, Lahore. They were in reproductive age group (15-49 yrs.) already diagnosed and documented as polycystic ovarian syndrome on the basis of:

(i) History and thorough physical examination.

(ii) Blood tests (LH/FSH) and pelvic ultrasonic finding of polycystic ovaries. Half of them were obese with bodymass index (BMI) 30 and >30 and half non-obese with BMI 29.9 and < 29.9. Forty healthy females of same age group obese and non-obese were taken as control groups.

Method

Both patients and controls with 10-12 hours fast were called. 5 ml of venous blood was taken from anticubital vein and was allowed to clot in a plastic tube. After 1-2 hours the plastic tube was centrifuged and clear serum was stored in marked plastic cups at-20 C for later analysis of insulin by Enzyme Immunoassay (EIA). Insulin Assay with DRG cat DIA 2938 International INC. USA.

Results

The average fasting level of insulin was raised significantly ($p<0.01$) in patients with PCOS when compared with their control group.

The average value of fasting insulin in obese cases was more 16.86 (u IU/L) than non-obese group 12.4 (u IU/L).

These findings are summarized in the following table:

Table 1: Fasting insulin in cases obese and controls non obese groups.

Fasting Insulin		No.	Mean	Std. dev	t"-test
Obese	Cases	30	16.86	6.77	P<0.01
	Controls	20	7.14	2.95	
Non-	Cases	30	12.4	8.6	P<0.01
Obese	Controls	20	6.3	2.0	

Table 2: The clinical findings in patients of PCOS

Feature	Obese	N o n - Obese
History of prolonged Menstrual cycle	73.3%	60%
History of weight gain	100%	73.3%
History of infertility	86.7%	80%
Family History of PCOS	26.7%	20%
Presence of Hirsutism	66.7%	66.7%

Discussion

The results of this study show that clinical features of PCOS are marked in obese patients than non-obese. A similar study was done in two groups divided on the basis of BMI. Previously non obese PCOS women (121) in whom BMI was taken less then 30 because obesity itself is a factor that influence phenotype of syndrome.[12]

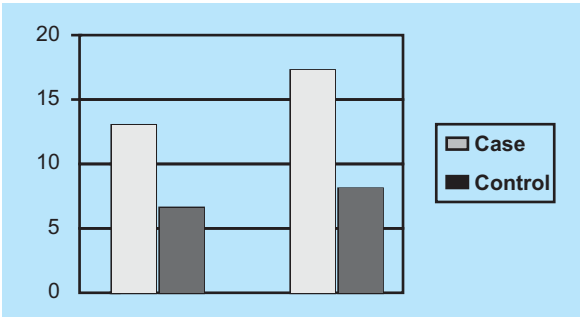

Fig. 1: Fasting insulin obese groups/Fasting Insulin Non-obese group.

Insulin resistance and resultant Hyperinsulinemia may be assessed by fasting insulin level which was done in previous studies showing that PCOS women had significantly higher fasting insulin levels than controls ($P<0.001$).[13]The fasting insulin level has also been advocated as measure of insulin resistance in non-diabetic general population.[14] But normal values for screening different populations have not been firmly established. By using the fasting insulin level as screening method for insulin sensitivity it was found than 30% of obese and 20% of non-obese were insulin resistant. (Conway 1989) found that 30% of non-obese women with PCOS have mild degree of insulin resistance.[15]

Conclusion

Insulin resistance and resultant hyperinsulinemia an important finding in PCOS may be diagnosed by fasting insulin level which is increased in both obese and non-obese PCOS. These women are likely to benefit from the therapies that lower the circulating insulin levels in the form of metformin and other insulin sensitizing drugs.

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