Article

Association between Amylin and Visfatin in patients with Polycystic Ovarian Syndrome In Babylon province.

Lina Kadhim Thejeel [*1] , Zinah Abbass Ali [1] and Hanan Khudair Hussein[2]

[1]Department of Chemistry and Biochemistry, College of Medicine, University of Babylon, Iraq.

[2]Department of Women and children, College of Medicine, University of Babylon, Babylon, Iraq.

Corresponding Author* Email: linakadhim89@gmail.com ,

Email: zenaabbass1980@gmail.com

Email : hanan.alkadhim@uobabylon.edu.iq

Abstract

Background: Polycystic ovarian syndrome represent one of the greatest public endocrinopathies diseases categorized by excess androgens that affects early reproductive age. Women with PCOS have hyperandrogenism due to disorder of normal ovarian or adrenal function that lead to the production of excess androgens. In PCOS patients hyperandrogenism caused by impaired folliculogenesis.

Objectives: This study aimed to measure the levels of Amylin, Visfatin, HOMA-IR,HbA1C in serum of Iraqi females who were consuming Polycystic ovarian syndrome .study correlation between the variables mentioned above

Material and methods : The study included approximately 80 women , ages 20 to 38 year, who were split into two groups of 40 women who have Polycystic ovarian syndrome.The second group comprises of 40 women who appearance to be in respectable health and serves as the control group. Women who smoke, have chronic circumstances like high blood pressure, or who usage illicit drugs wereexcluded from both group.Altogether females (patients and controls) have a body mass index that is used to determine their quantity of overweight (BMI)

.**Results**: A considerable increase in serum level of Amylin , Visfatin HbA1C and HOMA-IR levels in PCO women than the control group ,$p< 0.05$.

Conclusion: this study focusing on less frequently known peptides and proteins that might be interrelate with the pathogenesis of PCOS. Beside the role of these proteins in pathogenesis of PCOS and the probability and efficacy of assessing their levels in clinical practice.

Key words: PCOS ,Amylin,Visfatin.

INTRODUCTION

Polycystic ovaries comprise a great number of harmless follicles with size greater than 8mm (approximately 0.3in). The follicles are below advanced sacs when the eggs develop. In the case of PCOS, these sacs are not capable to release an egg. It's unknown how many women have PCOS, but it might be exact common, and affect about 1 from 10 women in the UK. Further than half of these women with no symptoms. The main structures of PCOS are **[1]:**

- disturbance in menstruation – that means the ovaries have irregularly release of eggs.
- androgen excess – that may causes physical signs like excess hair in face or the body.
- polycystic ovaries – when the ovaries become enlarged with many follicles that surround the eggs.

If patients have at least 2 of these signs, it might be identified with PCOS .

The prevalence of PCOS is depended on the method of diagnosis, Word Health Organizations (WHO) estimate the prevalence of PCOS worldwide is 2% to 26% **[2]** with a great prevalence in obese patients at estimated 73%, the kind of obesity is android, with advanced waist to hip ratio and fat in the front abdominal wall **[3].**

A dysfunctional interface of behavioral, environmental, and genetic factors causes PCOS. Development of ovaries, as well as secreting higher levels of androgens than normal theca cell are the greatest common clinical presentations of PCOS. Bigger androgenic secretion result from increased enzyme activity in the steroid production pathway [**4]**.

Proteins and peptides have a roles in metabolic homeostasis and represented the potential biomarkers in some health conditions, like obesity, diabetes mellitus and polycystic ovarian syndrome (PCOS), the abnormality of these biomarker linked with ovulation and metabolic abnormalities **[5].**

Amylin (a small peptide hormone) is a peptide hormone with 37-amino-acid, produced by the beta cells of the pancreas. Also it is represent the islet amyloid peptide. Though insulin stimulates the utilization of glucose by peripheral tissues, amylin have a role in control glucose level by suppressing glucagon secretion from the cells, and suppressing the endogenous production of glucose from the liver. As well as, amylin slowing gastric emptying by reduce the absorption of glucose, stimulate satiety and reducing intake of food **[6].** .

Visfatin previously identified as pre-B cell colony-enhancing factor, a protein with 52 k Dalton expressed in several tissues with bone marrow, adiposities, lymphocytes, muscle and liver. It is binds with insulin receptor and stimulate insulin actions; thus, it stimulates uptake of glucose in adiposities and muscle cells and inhibit the release of glucose from hepatocytes. Supposed that visfatin action like an endocrine action, paracrine, and autocrine. The autocrine effects of visfatin might have a role in insulin sensitivity regulation in the liver **[7].**

Materials and Methods

The study involved independent 80 females, the age ranged between (20-38) years old, which were divided into two groups (40) women with Polycystic ovarian syndrome, subdivided to 40 femal with Overweight (BMI 25-29.8 kg/m2) .The

second group is the controlgroup, and it contains 40 women who seem to be in good health ,age ranged between (20-38) years old. The Polycystic ovarian syndrome females were inter -viewed using a structured questionnaire to determine the smoking women and revenue other information like their medical history ,family history , surgical history and body mass index .A study was done in the Babylon teaching hospital for maternity and children in Hilla city and private clinics between July to December. An ELISA was used to estimate the serum concentration of Amylin , Visfatin , HbA1c,SHBG,Total Testosterone, Insulin by (enzyme-linked immunosorbent assay) and fasting blood Glucose by spectrophotometric method . SPSS software was used to conduct the statistical analysis.

Inclusion and Exclusion criteria

Inclusion criteria include overweight Polycystic ovarian syndrome women , Reproductive age (20-38) year. Exclusion criteria comprise Hirsutism., Acne., Hypertension. Thyroid disease ,Patients who were taken any hormonal medicine.

Statistical Analysis

The results of study were shown as mean ± SD, for the evaluation of data Student's t-test and the linear regression analysis were use**.** Confidence interval (CI) 95% and P value were used for expression of data. SPSS (version 20) were performed for statistical analyses. P value was considered to be significant at 0.05 or less.

Ethical approval

All participants in this study were informed before to collecting samples, and verbal agreement was obtained from each of them. The protcol of study and the info of subject and agreement form were revised and accepted by a local ethics committee in Babylon Medical College.

RESULTS

Table 1. Biochemical features of the control and Polycystic ovarian syndrome populations

Parameters	PCO 40	Control 40	P. value
BMI(kg/m^2)	27.2± 2.1 (25-29.8)	26.5±3.1 (24.5-29.2)	p >0.05
Age(years)	30.5 ± 6.6 (20-38)	29.4±7.2 (22-36)	p >0.05
HbA1c%	6.714 ±2.11	5.07±0.31	P< 0.05
SHBG (ng/ml)	40.10± 1.25	54.73± 12.60	P< 0.05
Total Testosterone (ng/ml)	0.5 ± 0.07	0.23 ±0.09	P< 0.05
FAI	4.94± 0.87	1.66± 2.05	P< 0.05
Fasting Insulin	13.55±3.73	4.89±0.54	P< 0.05
Fasting glucose (mg/dl)	128.10±28.35	70.72±15.94	P< 0.05
HOMA-IR	5.14 ± 2.03	1.33 ± 0.19	P< 0.05
Amylin (ng/ml)	766.01±19.05	478.40±61.9	P< 0.05
Visfatin (ng/ml)	4.13 ±0.17	3.03 ±0.23	P< 0.05

significant = P< 0.05

Table 2: a correlation (r) among the measured parameters sequence variables against each other Correlation (r)

	variables against each other	Correlation (r)	Sig. value
1-	Amylin vs Visfatin	-0.678	p < 0.05
2-	Amylin vs IR	+0.55	p < 0.05
3-	Visfatin vs FAI	-0.495	p < 0.05

DISCUSSION

PCOS is a additional common endocrine disorder related with hyperandr ogenemia, which is associated by obesityand infertility.

Proteins and peptides have a roles in metabolic homeostasis and represented the potential biomarkers in some health conditions, like obesity, diabetes mellitus and polycystic ovarian syndrome (PCOS), the abnormality of these biomarker linked with ovulation and metabolic abnormalities, like dys-lipidemia, obesity and hyperinsulinemia **[8]** .

Amylin is a peptide secreted with insulin and have a role in glucose metabolism. It is deposition begins in type 2 diabetes **[9].**

Amylin accumulation are detected in pancreatic cells and before the beginning of fasting hyperglycemia. Then, amylin levels are probable to elevated in serum of insulin resistance patients **[10]** .

Mollet ,A *et al* **[11]**, achieved a case-control study comprise of 20 women with PCOS and 10 women with normal ovulation, and matching regarding BMI. PCOS patients have significant elevation of serum amylin than control group with positive correlation ($p<0.05$) between fasting insulin and amylin levels in PCOS patients. The response of amylin was correlated with glucose response in PCOS women. An additional study, showed that amylin levels in serum are significantly higher in control

than PCOS patients, anyway these patients have normal weight (BMI <25 kg/m2) or overweight (BMI >25 kg/m2). These results represent the mechanisms that prevent higher serum amylin level due to disturb glucose metabolism in PCOS patients **[12].**

In visceral adipose tissue, visfatin is an adipocytokine with insulin-like hypoglycemic effect. Our results revealed that visfatin levels in serum were elevated significantly ($P < 0.05$) in PCOS patients than in the control group, suggesting the presence of high blood-visfatin symptom in PCOS patients. Our results were in agreement with ,Jin *et al* [**13]** denoted that PCOS women had higher serum level of visfatin than controls. The causes of higher visfatin levels in PCOS women is unknown. The important pathophysiologies of PCOS are IR and hyperin- sulinemia that causes an improved risk of obesity, Type 2 diabetes and excess androgen. Obesity, IR, and hyperandrog- inism may play roles in higher serum level of visfatin in PCOS women **[14].**

The present study demonstrated significant (p value < 0.05) negative association for Amylin vs Visfatin and Visfatin vs FAI ., while significant positive correlation (p value < 0.05) for Amylin vs IR

CONCLUSION

Based on the result of this investigation,. proteins and peptides have a role in regulation of metabolism might be a possible biomarkers in some medical disorders, like polycystic ovarian syndrome (PCOS).

REFERENCES

[1] Zeng, X., Xie, Y. J., Liu, Y. T., Long, S. L., & Mo, Z. C. (2020). Polycystic ovarian syndrome: correlation between hyperandrogenism, insulin resistance and obesity. *Clinica chimica acta*, *502*, 214-221.

[2] Yadav, S., & Tarware, R. (2019). Waist hip ratio: an anatomical predictive marker of risk of PCOS. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, *8*(4), 1630-1633.

[3] Kim, S. H., Ahn, M. B., Cho, W. K., Cho, K. S., Jung, M. H., & Suh, B. K. (2019). The relation of serum nesfatin-1 level with anthropometric and metabolic parameters in children and adolescents: A prospective observational study. *Medicine*, *98*(19).

[4] Jayawardena R, Ranasinghe P, Ranathunga T, Mathangasinghe Y, Wasalathanththri S, Hills AP.(2020) Novel anthropometric parameters to define obesity and obesity-related disease in adults: A systematic review. Nutr Rev ;78:498-513.

[5] Amiri M, Ramezani Tehrani F. (2020)Potential adverse effects of female and male obesity on fertility: A narrative review. Int J Endocrinol Metab ;18:e101776.

[6] Zakariassen HL, John LM, Lutz TA(2020). Central control of energy balance by amylin and calcitonin receptor agonists and their potential for treatment of metabolic diseases. Basic Clin Pharmacol Toxicol 127: 163–177.

[7] Polak K, Czyzyk A, Simoncini T, Meczekalski B.(2017) New markers of insulin resistance in polycystic ovary syndrome. J Endocrinol Invest ;40:1-18.

[8] Shirazi FK, Khodamoradi Z, Jeddi M (2021) ,Insulin resistance and high molecular weight adiponectin in obese and non-obese patients with Polycystic Ovarian Syndrome (PCOS). BMC Endocr Disord. , 21:45.

[9] Liberini CG, Koch-Laskowski K, Shaulson E, McGrath LE, Lipsky RK, Lhamo R, GhidewonM, Ling T, Stein LM, Hayes MR.2019 Combined Amylin/ GLP-1 pharmacotherapy to promote and sustain long-lasting weight loss. Sci Rep 9: 8447, . 8447doi

[10] Lutz TA, Coester B, Whiting L, Dunn-Meynell AA, Boyle CN, Bouret SG, Levin BE, Le Foll C (2018) ,Amylin selectively signals onto POMC neurons in the arcuate nucleus of the hypothalamus. Diabetes 67: 805– 817.

[11] Mollet A, Gilg S, Riediger T, Lutz TA.(2004) .Infusion of the amylin antagonist AC 187 into the area postrema increases food intake in rats. Physiol Behav 81: 149–155.

[12] Brings A, Borghardt JM, Skarbaliene J, Baader-Pagler T, Deryabina MA, Rist W, Scheuerer S. (2018) ,Modeling energy intake and body weight effects of a long-acting amylin analogue. J Pharmacokinet Pharmacodyn 45: 215–233.

[13] Jin Ju Kim1,2, Young Min Choi ,(2018) . Serum visfatin levels in non-obese women with polycystic ovary syndrome and matched controls Vol. 61, No. 2.

[14] Kandasamy S, Inmozhi R, Sivagamasundari N, Bupathy A,Sethubathy S and Gobal V (2010): Evaluation of endocrine parameters, and glucose intolerance status in obese subjects with polycyctic ovary syndrome ISSN; 0976- 4550:709-16.