ORIGINAL ARTICLE

RAISED C-REACTIVE PROTEIN IN PATIENTS WITH POLY CYSTIC OVARIAN SYNDROME

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ABSTRACT

Objective: To determine association between raised C-reactive protein and polycystic ovarian syndrome.

Material & Methods: A cross-sectional study was conducted from October 2020 to September 2021. A total of 100 women (50 normal and 50 patients with diagnosis of polycystic ovarian syndrome) were recruited through convenience sampling technique. 3-5 mL blood was collected from all subjects and C-reactive protein level was determined by using ELISA-kit Bio-Tek ELX-800. Data was analyzed using SPSS version 20.

Results: Out of 50 participants with diagnosis of polycystic ovarian syndrome, 46 (92%) had elevated C-reactive protein. None of the normal participants has elevated C-reactive protein. There was significant association (p=0.0001) between raised C-reactive protein and polycystic ovarian syndrome.

Conclusion: Majority of the patients with diagnosis of polycystic ovarian syndrome might have higher levels of C-reactive proteins.

Key Words: Biochemistry, Laboratory tests, Ovary, Uterus.

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INTRODUCTION

Polycystic Ovarian Syndrome (PCOS) is the well-known endocrinal reproductive health issue which affects almost 5-10% people during the reproductive period.[1] Generally PCOS can be clinically diagnosed in obese women having irregular menstruation, hirsutism, with a typical ovarian morphology.[2] The National Institutes of Health (NIH) conference in 1990 proposed the following minimal criteria for PCOS, firstly clinical and/ or biochemical facts of hyper-androgenic state, and secondly irregularity in menstrual cycle due to oligo- or anovulation.[3] Furthermore, clinically PCOS has different metabolic syndrome (syndrome X) components i.e. dyslipidemia, central abdominal obesity, insulin resistance, atherosclerosis and even instability in clotting mechanisms[4], which in turn causes chronic low grade intravascular inflammation, cardiovascular disease and diabetes mellitus. About 40-50% of obese PCOS women present with impaired glucose and/or type 2 diabetes mellitus by 20-25 year[5], higher arterial hypertension[6], reduced serum HDL and greater level of LDL.[7]

C-reactive protein (CRP) is considered as an inflammation marker, formed by hepatocytes under the influence of pro-inflammatory mediators like tumor necrosis factor alpha and interleukin-6. CRP endorses monocyte chemo attractant protein-1-mediated chemotaxis and stimulates endothelial dysfunction.[8] Elevation of high sensitivity CRP (hs-CRP) is the main factor that eventually causes cardiovascular problems, in this regard the prognostic ability of hs-CRP is self-determining and complementary to lipid profile.[9] Previously, different researchers reported the CRP serum concentrations with PCOS in women, which show the PCOS association with cardiovascular disease.[10-12] Mostly PCOS females showed raised CRP as compared to the controls[13,14], while, in few reports, no difference was observed in the groups.[15,16] Glueck et al. reported the metabolic syndrome in 138 PCOS patients i.e. 46%, out of

which young women were at higher risk of cardiovascular disease (CVD). They based this report on carotid plaques finding among patients versus controls (7.2 vs. 0.7%).[17] Currently, Christian et al.[18] revealed that coronary artery calcium, an indicator of coronary atherosclerosis is common in patients with PCOS than in non obese and obese control which shows that patients with PCOS have higher risk of coronary heart disease and atherosclerosis. Whereas some studies didn't find any significant evidences about the association of CVD with PCOS patients after modification of risk factors including obesity, abnormalities of glycolipid metabolism and hypertension. [19,20] The scenario about the risk of CVD in PCOS patients is conflicting till date. Therefore, we designed a study to reveal the relationship of CRP, a probable marker of CVD, with PCOS; so that we can provide some novel information and a new outlook on this controversial query.

MATERIAL AND METHODS

A cross-sectional study was conducted from October 2020 to September 2021. A total of 100 participants (50 normal and 50 patients with diagnosis of polycystic ovarian syndrome) women were recruited through convenience sampling technique. Consent from the patients was taken in written form and the purpose of study was explained in local language. Predesigned questionnaire was filled having information about medical history and demography. Moreover, 3-5 mL blood was collected from all subjects and C-reactive protein level was determined by using ELISA-kit Bio-Tek ELX-800. Data was analyzed using SPSS version 20.

RESULTS

Of the 100 participants, 33 were obese, 19 were overweight while remaining 48 had normal body composition. **(Table 1)** Out of 50 participants with diagnosis of polycystic ovarian syndrome, 46 (92%) had elevated C-reactive protein. None of the normal participants has elevated C-reactive protein. There was significant association (p=0.0001) between raised C-reactive protein and polycystic ovarian syndrome. **(Table 2)**

Table 1: C-reactive protein level in different BMI categories of cases and control

BMI	Case		P. value	Control		P. Value
	CRP (Elevated)	CRP (Normal)		CRP (Elevated)	CRP (Normal)	
Normal	6	0	0.264	0	42	NA
Overweight	13	0		0	6	
Obese	27	4		0	2	
Total	46	4		0	50	

Table 2: Comparison of C-reactive protein values in the study groups

CRP	Case N(%)	Control N(%)	Total N(%)	P. value
Elevated	46(92)	0	46	
Normal	4(8)	50(100)	54	0.0001
Total	50(100)	50(100)	100	

DISCUSSION

This study successfully presents the distribution of CRP level and BMI in PCOS cases versus the control group. We recorded significantly elevated CRP concentrations in PCOS cases of all BMI categories versus cases which are in correlation with the literature results.[10] Furthermore, Boulman et al concluded that raised CRP most probably can cause CVD in young PCOS women with the growing age.[11] Kalyan et al reported that percentage of CRP to albumin is strongly correlated with PCOS with higher sensitivity and specificity for inflammation as compared to androgen excess.[22] Similarly, Kelly et al also highlighted the chronic subclinical inflammation in PCOS due to the elevated levels of ESR.[10] Literature further revealed that distribution of fat, both visceral and abdominal, is connected independently to inflammatory process, supporting the point that inflammation poses key pathophysiological role in the PCOS independent of adiposity and BMI.[21,22]

Studies also suggested that it is practically not possible to control thousands of PCOS patients for the frequent measurements of their lipid profile, blood pressure and screen their lifestyle. Consequently, a sensible approach is to focus on such patients with PCOS, who have higher risk for CRP and CVD.[21] Furthermore, these patients need tight monitoring for their lifestyle i.e. exercise, diet, obesity, smoking, along with medicinal approach including aspirin, statins and metformin. Whether these approaches can decrease the potential CV mortality and morbidity in PCOS patients require future randomized assessments.[21,22]

CONCLUSION

Conclusively, our results revealed that PCOS women with normal weight have elevated CRP concentrations than the normal weight women exclusive of PCOS. This fact symbolizes that PCOS women with normal weight may be have low-grade inflammation. As the association of cardiovascular disease with inflammation has already been established, future research needs to determine a possible mechanism associated with cardiovascular disease and PCOS.

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