ORIGINAL ARTICLE
ASSOCIATION OF C-REACTIVE PROTEIN WITH HYPERLIPIDEMIA IN PATIENTS WITH POLYCYSTIC OVARIAN SYNDROME IN KHYBER PAKHTUNKHWA

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Background: It has been unknown whether there exist any relations of C-Reactive Protein (CRP) level with hyperlipidaemia in polycystic ovarian syndromes patients. To determine Association of CRP with Hyperlipidaemia in patients with polycystic ovarian syndrome. **Method**: This was a cross sectional descriptive study conducted among 50 each polycystic ovarian syndrome and normal women. After taking a written consent from participants predesigned questionnaire was filled including information regarding demography and medical history. A 3 to 5 ml blood was taken from patients and controls and transferred to laboratory for determination of CRP level and lipid profile. The test results were collected, compiled, entered and analyzed using SPSS Version 20 for determination of any kind of association of CRP with Hyperlipidaemia in patients with polycystic ovarian syndrome. **Results**: The mean age of study participants was 29.72±4.00 for cases and 29.04±3.99 for control. The cases and control were with the same age range, however there was a significant difference p=0.00 in BMI of the cases and control. There was no significant association observed between CRP and lipid profile parameters among polycystic ovarian syndrome patients. **Conclusion:** There exist no association between increasing CRP level and hyperlipidaemia in polycystic ovarian syndrome patients however CRP and lipid profile parameters showed high values among these patients.
Keywords: C-Reactive Protein; Lipid profile; Polycystic ovarian syndrome; Body Mass Index

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is considered as endocrine related disorder affected the adult women population specially of reproductive age.[1] There has been no uniform definition presented about polycystic ovarian syndrome. A consensus definition of PCOS was developed by European Society for Human Reproduction, American Society for Reproductive Medicine and Embryology, which was based on clinical or biochemical evidence of hyperandrogenism, polycystic ovaries and oligo- and/or an-ovulation. Polycystic ovarian syndrome is diagnosed on the basis of these three features such as, chronic anovulation, hyperandrogenism and polycystic ovaries on ultrasonography.[2,3]

In 1990 National Institutes of Health (NIH) categorized the prevalence of polycystic ovary syndrome, in unselected populations of women of reproductive age is between 6.5 and 8%. It was determined that Mexican American showed higher prevalence of polycystic ovary syndrome than white or black American women.[4] The health consequences of polycystic ovarian syndrome are multiple. The major group considered as risk population to develop Coronary artery disease and Diabetes Mellitus are patients with PCOS. There is strong association of diabetic mellitus in polycystic ovarian syndrome women.[5] Insulin resistance and Hyperinsulinaemia are greatly associated with the clinical appearance of PCOS by enhancing the discharge of the male hormone androgen in women, however obesity has been found as one of the most important causes of this syndrome.[6]

It has been unclear yet that either woman with polycystic ovary syndrome is on increased risk of developing cardiovascular disease, on the other hand the risk factors for developing cardiovascular diseases has been assessed, including hyperlipidaemia, hypertension state, hyperandrogenaemia, prothrombotic and inflammatory markers.[7] It is likely that PCOS is a pro-inflammatory condition. This inflammatory condition is linked with cardiovascular diseases and Type 2 diabetes mellitus. Inflammation is thought to play an important role in Atherosclerosis and its associated complications. The nonspecific marker of inflammation such as C reactive protein (CRP) is considered as the strongest risk predictors of

cardiovascular problems in patients with or without type-2 Diabetes Mellitus.8 Constantly, increasing levels of CRP contribute to the risk of T2DM in PCOS women by inducing inflammation in them.

Dyslipidaemia or hyperlipidaemia is a disorder of lipids metabolism, when there is over production or under production of lipids. These changes may be noticeable when there is rise in the levels of serum cholesterol, low density lipoproteins and triglycerides and a decline in the levels of high-density lipoproteins concentration. It was found to be a major prognostic risk factor for cardiovascular diseases.[9]

The CRP is proven to be a strong predictor for cardiovascular disease in both genders and is completely independent of serum lipids level.[10–12] It has been unknown whether there exists any association of CRP level with hyperlipidaemia in polycystic ovarian syndrome patients. This study was conducted to determine this association of CRP with hyperlipidaemia in polycystic ovarian syndrome patients.

MATERIAL AND METHODS

This was one-year cross sectional descriptive study conducted among 50 polycystic Ovarian syndrome and 50 normal women attending endocrinology and gynaecology outpatient department of tertiary care Hospitals of Peshawar including Khyber teaching Hospital, Lady reading hospital, and Hayat Abad Medical complex Peshawar from the duration of May 2015 to April 2016. Formal ethical approval of the study was taken from ethical Review board. Patients were selected on the basis of convenient sampling techniques and according to the inclusion criteria as newly diagnosed PCOS patients for test group and age matched healthy female subjects having no major illness for control group. Informed written consent for the study was taken from head of department of endocrinology and gynaecology of these hospitals. A written consent was also taken and the study purpose was described to each participating subject of the study. Predesigned questionnaire was filled including information regarding demography and medical history. A 3 to 5 ml blood was taken from patients enrolled in both study group normal and polycystic ovarian syndrome group and transferred to laboratory for determination of CRP level and lipid profile. The test results of CRP and lipid profile was collected from laboratory of each individual and the whole data was compiled, entered and analyzed using SPSS Version 16.

RESULTS

The study included 50 cases with polycystic ovarian syndrome and 50 controls (women without diseases). The table 1 shows the association of CRP with serum lipid profile. The association was found using Pearson's correlation. In our study there was no significant association found between CRP and various parameters of lipid profile.

Table-1: Comparison of lipid profile parameters between elevated CRP and normal CRP patients in cases and control

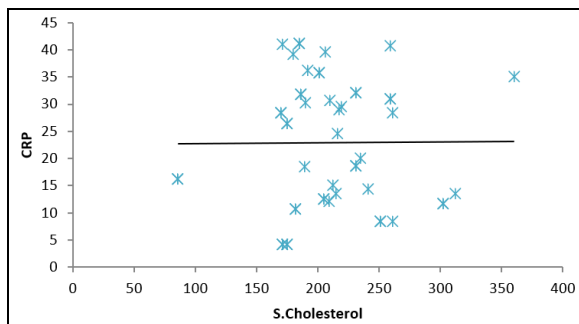| Lipid parameters	Case		*p*-value	Control		*p*-value
	CRP (Elevated)	CRP (Normal)		CRP (Elevated)	CRP (Normal)	
Cholesterol (mg/dl)	214.85±49.94	173.00±2.30	0.103	NIL	172.80±18.93	
Triglyceride (mg/dl)	229.15±91.42	165.00±34.64	0.173		132.66±42.60	
HDL (mg/dl)	36.04±7.85	39.25±11.92	0.455		43.70±6.46	
LDL (mg/dl)	132.97±41.40	100.75±13.79	0.131		102.57±18.29	NA

Figure-1: Association of CRP level with cholesterol in cases
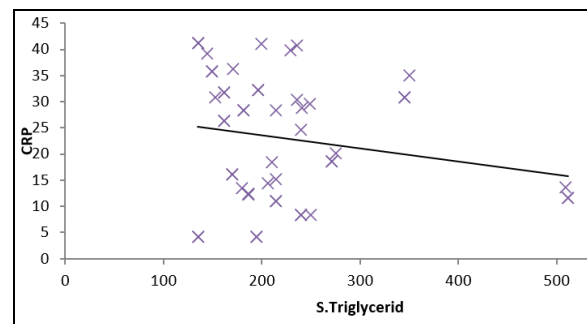

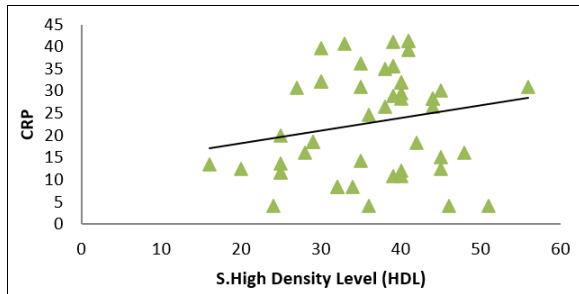**Figure-2: Association of CRP level with serum triglyceride level in cases**

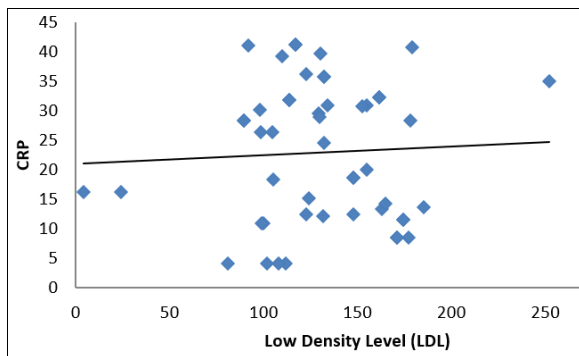**Figure-3: Association of CRP level with HDL in cases**

Figure-4: Association of CRP level with LDL in cases

DISCUSSION

This research demonstrate the association of CRP and lipid profile in Poly Cystic ovarian syndrome (PCOS) patients, and it was already determined that CRP and Lipid profile remain elevated in PCOS patients.[12,13] This study included the subjects with mean age around 29.72±4.00 and is in consistence with other studies[12,14] where mean age of women are young however in one study the mean age of study participants were 28.2±6.4 similar to that of our study[12].

Present study also provided that lipid profile test was significantly differ between PCOS and control group p=0.00. Few studies justified this fact that PCOS women bear high level of lipid profile parameters.[15] This study provided that CRP level are not significantly associated with Lipid profile among PCOS women $p>0.05$. Other studies described that PCOS patients presented high level of CRP and lipid profile test[16] but the relation between these parameters was not determined before.

It can be concluded from the study that CRP level matter among PCOS patient but its significance cannot be justified along with lipid profile, so hyperlipidemias are considered as an independent risk factor for cardiac diseases, and its abnormal value in these patients are reported in different studies such as among non-obese Korean community.

Few studies have investigated Dyslipidaemia in women with polycystic ovary syndrome[16].

CONCLUSION

The study concluded that PCOS patients present high level of lipid profile parameters and CRP level among polycystic ovarian syndrome patents and there exist no association between lipid profile and CRP level in these patients. The study provides baseline information regarding the CRP association with lipid profile.

AUTHORS' CONTRIBUTION

SA, HI, NK: Conceptualization of the study design, write-up. SD, UR, RI, MAK: Data collection, data analysis, data interpretation, proof reading

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