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TO ASSESS ROLE OF C-REACTIVE PROTEIN TO ALBUMIN RATIO AS A NEW BIOMARKER FOR POLYCYSTIC OVARY SYNDROME

Obstetrics & Gynaecology

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ABSTRACT

Women with Polycystic Ovary Syndrome (PCOS) are found to have greater chronic subclinical inflammation.CRP/albumin ratio is a marker for inflammation related to metabolic dysfunction The aim of the study was to assess role of C-reactive protein to albumin ratio as a new biomarker for polycystic ovary syndrome.45 women fulfilling Rotterdam criteria for diagnosis of PCOS were selected.Inflammatory markers - Procalcitonin, Interleukin 6, C-reactive protein (CRP) and CRP/albumin ratio were measured. Data was analysed and conclusions drawn.CRP/albumin ratio was found to have better sensitivity and lower false positive rates (0.96,0.09) as compared to Interleukin 6 (0.96,0.27), hsCRP (0.93,0.09) and Procalcitonin (0.40,0.13). CRP/albumin ratio may be particularly useful and cost-effective method to assess inflammation in women with PCOS,which may help to early diagnose the metabolic effects of PCOS.

KEYWORDS

C-reactive protein, C-reactive protein albumin ratio, Interleukin, Procalcitonin, Polycystic Ovary Syndrome

INTRODUCTION

Women with polycystic ovarian syndrome (PCOS) are found to have greater chronic subclinical inflammation.Inflammation is also likely to be associated with other prominent aspects of PCOS including insulin resistance and cardiovascular disease risk factors [1].Variuos inflammatory markers Interleukin 6 ,hsCRP and Procalcitonin have been used to detect early inflammation [2].CRP/albumin ratio is a new marker for inflammation related to metabolic dysfunction [3].The objective of the study was to assess the role of CRP/albumin ratio as a new biomarker for inflammation in women with PCOS.

METHOD

This was a descriptive study conducted in a tertiary care hospital over a period of one year.Study included 45 women, aged 18-40 year fulfilling the Rotterdam criteria for diagnosis of Polycystic Ovary Syndrome.Institutional ethical committee and review board approval was taken. Written informed consent was taken of all participants.Pregnant or lactating women or those with history of inflammatory diseases like chronic liver or obstructive lung disease or rheumatoid arthritis, were excluded. Women with Cushing's syndrome,non-classical congenital adrenal hyperplasia (NC-CAH), androgen-secreting tumors, thyroid diseases or hyperprolactinemia were also not included. Venous blood sample of women was collected for inflammatory markers - Procalcitonin, Interleukin 6(IL-6), C-reactive protein (CRP) and CRP/albumin ratio were measured were measured using chemiluminescence (Immulite 2000, Siemens). Data was analysed and conclusions drawn.

RESULTS AND DISCUSSION

In our study, the levels of most inflammatory markers, procalcitonin , hsCRP and raised CRP/albumin ratio were raised.IL6 levels were normal.

Study done by Tarkun et al found that IL-6 concentrations were significantly higher in women with PCOS [4] Keskin et al (2014), reported that women with PCOS have increased inflammatory markers indicating that the inflammation seen in PCOS might be related with the presence of the disorder rather than with obesity. They found that hsCRP was higher in PCOS women and correlation analysis revealed a moderate correlation between neutrophil /lymphocyte ratio and hsCRP ($r\ 0.459, p < 0.001$) [5].

In the study by Haldun, no difference was observed between the PCOS and control groups in terms of both hs-CRP and albumin and CRP albumin ratio [6].

In our study,a significant positive correlation was observed between hsCRP and CRP/albumin ratio ($r=0.94, p<0.001$).

In the study by Kalyan et al in 2018 ,the receiver operating characteristic curve for CRP/albumin ratio as a selective biomarker for PCOS was 0.865 (95% CI 0.824 to 0.905), which was more sensitive than CRP alone [7].

Excess body fat enhances the release of pro inflammatory cytokines, which can cause insulin resistance and hyperinsulinemia and put the PCOS women at risk of developing metabolic syndrome [8].

CRP is associated with metabolic disorders associated with obesity and insulin resistance.Systemic CRP levels have been found to be higher in women with PCOS. The low-grade chronic inflammatory process associated with atherogenesis might be related to relatively small increases in CRP, only measurable using high sensitivity methods. hs-CRP is considered to be a more sensitive marker of inflammation as compared to CRP since it can detect even the lowest concentration of CRP levels in the blood [9].

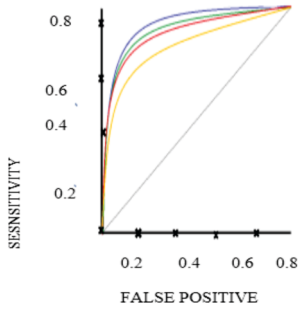
Chronic inflammation in PCOS patients can be identified using serum markers such as IL-6 and Interleukin-18[10]. Procalcitonin (PCT) has also been considered as a novel biomarker of obesity-related, low-grade inflammation in polycystic ovary syndrome.

Albumin is a negative acute phase response protein produced by the liver. Serum levels of albumin are reduced in individuals experiencing chronic inflammation.It is also possible that there is increased oxidation and glycation of albumin in women with PCOS, which can impact the structure, function and metabolism of the protein.Albumin is one of the most abundant serum proteins, and among its many roles is the transport of hormones [11]. Thus, reduced albumin levels can potentially contribute to higher free androgens in women with PCOS and exacerbation of disease phenotype.

Hence,increased hs-CRP concentrations and CRP/albumin ratio maybe suggestive of low-grade chronic inflammation seen in PCOS and these may be used in PCOS women as sensitive markers for accurate diagnosis of the inflammatory activity .

Table 1.Inflammatory Markers In Women With PCOS

Marker	Range	No. (%)	Mean
Procalcitonin (ng/mL)	0-0.01	20	0.03 (+0.08)
	0.02-0.025	4	
	0.026-0.03	11	
	0.04-0.07	11	
hsCRP mg/l	0-2.97	12	4.4 (+2.7)
	3-4.8	11	
	4.9-7.32	11	
	7.33-15	11	
CRP/ALB RATIO	0-0.63	12	1 (+0.6)
	0.64-1.11	11	
	1.12-1.8	11	
	1.81-3.58	11	
Interleukin 6 pg/ml	0-3.07	12	4.2 (+0.8)
	3.08-4.14	10	
	4.15-5.92	12	
	5.93-8.2	11	



MARKER	SENSITIVITY	FALSE POSITIVE
CRP/albumin	0.96	0.09
Interleukin-6	0.96	0.27
CRP	0.93	0.09
Procalcitonin	0.40	0.13

Figure 1.Reciever Operator Curves For Inflammatory Markers

CONCLUSION

Chronic low-grade inflammation has emerged as a underlying state in women with PCOS and a likely direct contributor to insulin resistance and heart disease risk.CRP/albumin ratio may be particularly useful and cost-effective method in assessing the effectiveness of new interventions targeting inflammation in women with PCOS to manage the condition and its long-term health consequences.

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