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Elevation Salivary C - Reactive Protein (CRP) Levels in Iraqi Women with Polycystic ovary syndrome (PCOS) and Oral diseases

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Abstract

Background: Polycystic ovary syndrome (PCOS) is the most common endocraniopathy in women of reproductive age, affecting (5-10) % of population and it is the leading cause of female infertility.

C-reactive protein CRP, is a member of a group of acute phase of protein which increase their concentrations during certain inflammation disorders and used as a biomarker of inflammation in the body.

Aim of the study: is to assess the salivary level of CRP with were oral disease was stimulated by evaluate gingival inflammation, plaque accumulation in some Iraqi women with PCOS disease in compared with women not have PCOS.

Methods: 19 females with PCOS and 26 females with systemically healthy include in this study. Saliva were collected and CRP were examined and evaluated by using ELISA method in both study and control group. For all groups we examine the oral inflammation was measured depending on gingival and plaque index.

Results: the results reported all PCOS women have significant increase in the salivary CRP than women with no PCOS) mean ± SD (226.8±34SD, 173.8±22.5 respectively). All women with PCOS had significantly increased in gingivitis than with no PCOS women.

Conclusion:

An increase in salivary CRP and gingival inflammation were found in women with PCOS. Also suggested measurement of salivary CRP may be helpful in predicting women with oral disease in PCOS women.

Keywords: CRP, plaque, gingivitis, polycystic ovary syndrome, serum reactive protein.

Introduction

Polycystic ovary syndrome (PCOS) is a common disorder affecting (5-10) % of women of reproductive age [(1)]. Women with PCOS have an adverse cardio metabolic risk profile, including insulin resistance (IR), central obesity, dyslipidemia, and increased prevalence of cardiovascular risk factors. Accordingly, PCOS might be viewed as a gender-specific form of the metabolic syndrome. [(2)]

C - reactive protein (CRP) is an acute phase protein produced in the liver. Serum CRP measurements are

widely used as a bio-marker of inflammation in the body.[2] Elevated levels of serum CRP have been tied to increased risk for heart disease, hypertension, stroke, and other conditions related to inflammation, such as diabetes and autoimmune disorders. The relationship between serum and salivary levels of CRP is not well understood. Salivary CRP levels have been found to be higher in children with allergic asthma, and in pigs with respiratory viral infections. [2] Several investigations regarding the relationship between salivary CRP levels and periodontal disease have also been done [3]. Among these researches, one can refer to the study of Giannobile et al. in 2009 [4] who showed that the saliva and serum CRP levels were elevated in patients with chronic and aggressive periodontitis. The purpose of this study was to evaluate salivary CRP levels, gingival index (GI) and periodontal pocket depth (PPD) indices and the correlation between these indices and CRP saliva levels. Periodontitis is a common chronic infection characterized by an exaggerated gingival inflammatory response against pathogenic bacterial microflora, resulting in alveolar bone and eventually tooth loss. [4] The host immune response to bacterial infection associated with periodontitis involves the production of variety of inflammatory biomarkers and their release into surrounding tissue. [5]

Material and methods

Forty five women and 19 female with PCOS and 26 healthy women with no PCOS include in this study. Whole saliva samples and periodontal measures were obtained from female attended to the Guinea department at Al Karma hospitals and privet clinic from February 2014 to June 2014. Whole saliva samples were obtained by expectorating into poly pro ethylene tubes before clinical periodontal measurements, and in the morning after an overnight fast during which participants were requested not to drink except water or chew gum. This method described by Navazesh [6] was used for saliva sampling, saliva samples were clarified by centrifugation for 10 minutes and a liquated into 500 ml amounts with H_2O, the samples were frozen and stored until the samples collection period was completed.

Salivary CRP level were measured by ELISA method according to SALIMETRICS ELISA Kit by using a micro titer plate is coated with mouse antibody to the human CRP. CRP in standard and goat antihuman CRP antibodies linked to horseradish peroxidase are added.

A sandwich is formed with the pre coated antibody on the bottom , the CRP in the middle, and antibody linked to horseradish on the top after incubation, un bonded components are washed away and bound CRP-peroxidase is measured by the reaction of substrate (TMB), then reaction stopped with sulfuric acid the optical density is read on a standard micro plate reader at 450 nm. The amount of salivary CRP peroxidase detected. Before salivary CRP sampling, clinical periodontal measurements, including the plaque index (PLI) and gingival index (GI). [7]

Statistically data was collected, means, minimum, maximum and standard deviation were calculated, and two sample t-test and ANOVAs test were performed to determine significant differences at $p \leq 0.05$ level.

Results

The results in table-1- showed number, minimum, maximum, means and St. Deviation of studied variables

for both cases(with ovarian polycystic disease) and control(free of disease).The results revealed that the mean of studied variables for cases was higher than control group except age (P >0.05).

Table -2- The result of two sample t-test shows there are significant statistical differences of gingival and plaque index between two groups that means of the gingivitis and plaque mostly associated with ovarian polycystic disease (2.5± 0.4 and 2.4 ± 0.4) respectively. Versus 1.4± 0.3 and 1.2 ±0.2)in control group.

The result in table-3- showed the difference in study parameters according to different age groups in both patient and healthy women, appeared that there is significant difference between the values of two groups regarding C - reactive protein were the mean value of cases is more than control group (226.8±34SD, 173.8±22.5 respectively).

Table-4- showed the difference between study variable according to age groups demonstrated that there is a significant difference among groups regarding gingival, plague index and salivary C- reactive protein CRP (p value≤0.05),the highest mean value was reported in second age group(20-40) for gingival and plaque index and in the third group(above40 years) regarding salivary c-reactive protein CRP. On multiple comparisons by LSD test, no statistical difference was reported between 1st and 2nd group for all variables as seen in table -5-.

Figure-1-revealed that there is a positive correlation ship between gingival index and salivary C - reactive protein values(R=0.8)

Figure-2-revealed that there is a positive correlation ship between plaque index and salivary C - reactive protein values(R=0.7)

Discussion

High sensitivity C- Reactive Protein (high CRP) is produced in the liver in response to inflammation, so this test can measure the extent of chronic inflammation in the body and more specifically, in the heart. Recent studies demonstrate that a CRP reading above normal range may be a more important indicator than high cholesterol in predicting heart attack and stroke. Obesity and insulin resistance affect cells in ways that increase inflammation, so CRP readings can be used to detect inflammation early, before it leads to chronic disease.[9]

The results of the present study showed that salivary CRP concentrations increase in patients with PCOS comparing healthy subjects, confirming this theory that salivary CRP is increased in inflammatory conditions. Also, in the present study, an increase in CRP levels had a direct and significant relationship with increasing values of GI and PLI.So the positive correlation was reported suggestion that salivary CRP which are the markers of oral disease in PCOS, This finding also approves the findings of Kamil et al. [10]

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Table-1-discrptive statistics of studied variables for both cases and control group.

Groups	Parameters	N	Minimum	Maximum	Mean	Std. Deviation
Cases{with ovarian polycystic disease)	**Age**	19	18	55	34.8	11.6
	Gingival index	19	1.9	3.0	2.51	0.4
	Plaque index	19	1.9	3.0	2.41	0.4
	Salivary CRP(pg./ml)	19	180	290	226.8	34.2
Control(free of disease)	**Age**	26	19	53	37.0	11.4
	Gingival index	26	1.0	1.9	1.43	0.3
	Plaque index	26	.9	1.5	1.19	0.2
	Salivary CRP(pg./ml)	26	130	200	173.8	22.5

Table-2-Two sample t- test for gingival and plaque index between two groups.

Variables	Groups	N	Mean	Std. Deviation	T -value	P value
Gingival index	**Cases**	19	2.5	0.4	9.5	0.001(HS)
	Control	26	1.4	0.3		
Plaque index	**Cases**	19	2.4	0.4	12.3	0.001(HS)
	Control	26	1.2	0.2		

HS=highly significant

Table-3- Two sample t- test for salivary c-reactive protien (pg./ml) between two groups.

Variable	Groups	N	Mean	Std. Deviation	T -value	P-value
Salivary CRP(pg./ml)	**Cases**	19	226.8	34.2	6.2	0.001
	Control	26	173.8	22.5		

Table-4-Means of variables of studied cases for different age group by Anova test.

Variables	Age groups	N	Mean	Std. Deviation	95% Confidence Interval for Mean		P value
					Lower Bound	Upper Bound	
Gingival index	Less 20(1^{st})	4	2.0	0.3	1.6	2.5	0.001
	20-40(2^{nd})	8	2.3	0.3	2.0	2.5	
	above40(3^{rd})	7	2.9	0.1	2.8	3.0	
Plaque index	less 20	4	2.0	0.2	1.7	2.3	0.001
	20-40	8	2.2	0.2	2.0	2.3	
	above40	7	2.8	0.4	2.4	3.1	
Salivary CRP(pg. /ml)	less 20	4	193.7	17.9	165.1	222.3	0.001
	20-40	8	211.2	17.8	196.3	226.2	
	above40	7	263.5	18.6	246.3	280.8	

Table-5-Multiple comparisons by LSD for studied groups.

Dependent Variable	(I) age	(J) age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Gingival index	less 20(1st)	20-40(2nd)	-.2625-	.1455	0.09	-.571-	0.046
		above40(3rd)	-.8821-*	.1489	0.001	-1.198-	-.566-
	20-40	less 20	.2625	.1455	0.09	-.046-	.571
		above40	-.6196-*	.1230	0.001	-.880-	-.359-
	above40	less 20	.8821*	.1489	0.001	.566	1.198
		20-40	.6196*	.1230	0.001	.359	0.880
Plaque index	less 20	20-40	-.1625-	.1617	0.330	-.505-	0.180
		above40	-.7929-*	.1655	0.001	-1.144-	-.442-
	20-40	less 20	.1625	.1617	0.330	-.180-	0.505
		above40	-.6304-*	.1367	0.001	-.920-	-.341-
	above40	less 20	.7929*	.1655	0.001	.442	1.144
		20-40	.6304*	.1367	0.001	.341	0.920
Salivary CRP(pg./ml)	less 20	20-40	-17.500-	11.137	0.136	-41.11-	6.11
		above40	-69.821-*	11.399	0.000	-93.99-	-45.66-
	20-40	less 20	17.500	11.137	0.136	-6.11-	41.11
		above40	-52.321-*	9.412	0.001	-72.27-	-32.37-
	above40	less 20	69.821*	11.399	0.001	45.66	93.99
		20-40	52.321*	9.412	0.001	32.37	72.27

*. The mean difference is significant at the 0.05 level.

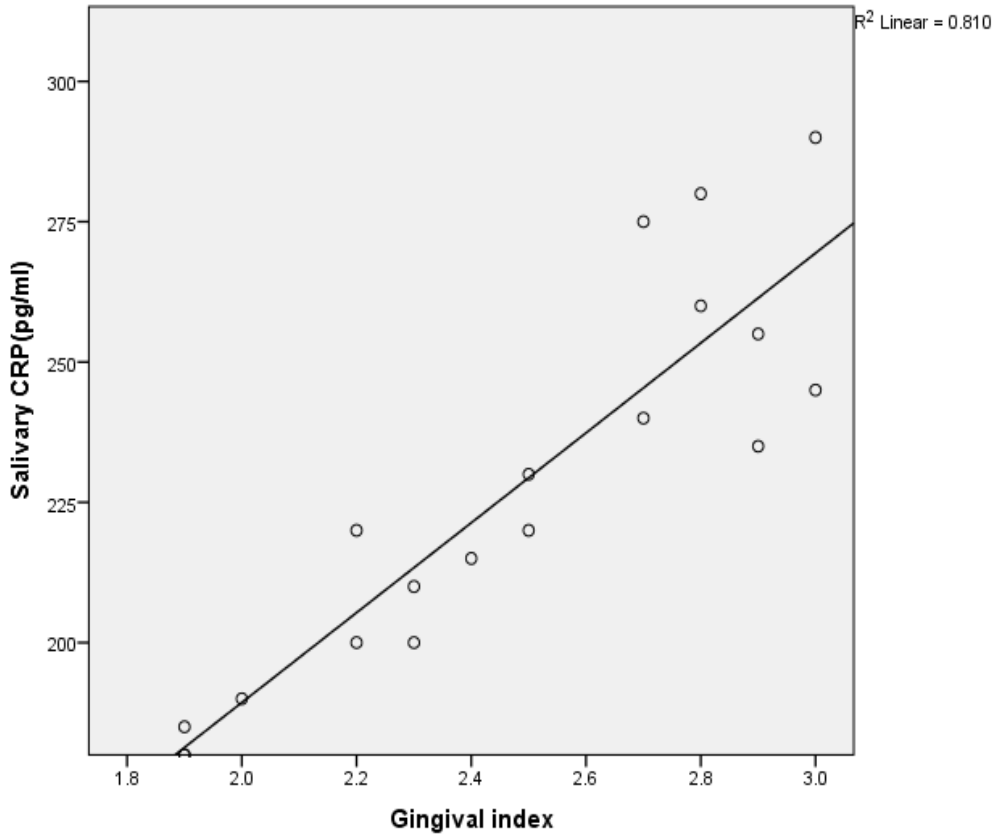

Figure-1- correlation ship between gingival index and salivary C - reactive protein for cases group.

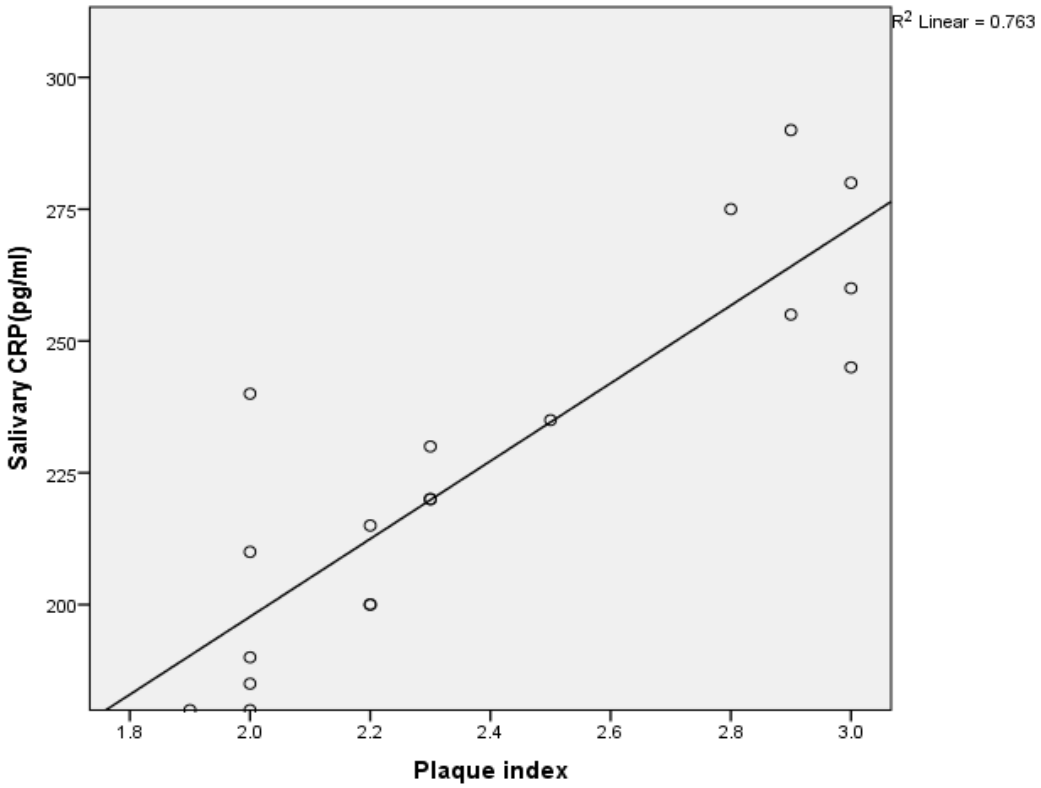

Figure-2-correlation ship between plaque index and salivary C - reactive protein for cases group.