Role of Serum and Salivary C-Reactive Protein in Oral Potentially Malignant Disorders

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Abstract:

Objectives: The goal of this research was to compare pretreatment serum C-reactive protein (CRP) levels in individuals with oral premalignancy and malignancies to those in the control group.

Materials and Methods: In all, 120 patients of both sexes participated in the research. Three sets of individuals were used for this study. Group I consisted of 40 healthy individuals serving as controls; Group II included 40 patients suspected of having oral malignancies such as leukoplakia, OSMF, and OLP; and Group III included 40 patients with confirmed cases of squamous cell carcinoma (SCC). The samples were analyzed for CRP levels. The automated immunoturbidimetric approach was used to quantitatively quantify serum CRP levels.

Results: Levels of C-reactive protein (CRP) in group I varied widely, from 0.1 to 15.1 mg/l, with a mean SD of 3.52 4.50 mg/l. The CRP values in group II varied from 0.6 to 50.4, with a mean

and standard deviation of 4.56 and 8.91 mg/l, respectively. The C-reactive protein levels in group III varied from 3.5 to 95 mg/l, with a mean SD of 30.70 28.05 mg/l.

Conclusions: The findings imply that plasma CRP level is a possible indication of increased risk of cancer and that elevated CRP levels before to diagnosis are linked to the emergence of oral cancer.

Key words: Leukoplakia; Lichen Planus; Oral Submucous Fibrosis; Biomarkers; Carcinoma; C-Reactive Protein

Introduction:

With an estimated 300,000 new occurrences each year [1], oral cancer is by far the most frequent form of cancer in the head and neck area. There is a less than 50% chance of surviving after 5 years for those who are diagnosed with this condition [1]. Oral squamous cell carcinomas (OSCCs) are preceded by noticeable alterations in the oral mucosa, often appearing as white or red patches [2, 3]. The incidence of oral cancer might be reduced and survival rates for patients with the disease could be improved with early identification and prevention of PMDs of this kind.

Fibrinogen, serum amyloid A (SAA) protein, and C-reactive protein (CRP) are the top 3 most prevalent APPs [3]. CRP, a distinctive systemic inflammatory measure, was originally detected in the plasma of patients with pneumococcal pneumonia during the acute phase of the disease [4]. Hepatocytes release CRP in response to inflammatory cytokines as interleukin (IL)-1, tumor necrosis factor (TNF)-, and interleukin (IL)-6 [4]. C-reactive protein (CRP) elevation has been described as a prognostic indication; nevertheless, only a few studies have proven a connection between elevated CRP and the onset of malignancy. Elevated C-reactive protein levels are related with esophageal squamous cell carcinoma (SCC) and are predictive of a poor prognosis. [5].

Therefore, the purpose of the current research was to verify CRP's function as a trustworthy, clearly recognizable, and cost-effective biomarker in the identification of patients with oral premalignancies and malignancies.

Method:

The research project was also given the go light by the university's ethical committee. One thousand two hundred individuals were randomly assigned to one of three study groups. Patients without cancer (group I), patients with oral PMDs such leukoplakia, OSMF, and OLP (group II), and patients with SCC (group III) totaled 80 people. Pregnant women, those with inflammatory or systemic diseases, and patients undergoing treatment for a malignant or potentially malignant condition were excluded from the study. After being given a thorough explanation of the importance of the research, patients gave their consent. Histopathological examinations confirmed the presence of cancerous and potentially cancerous diseases. Each person had a 2-

milliliter blood sample drawn using a sterile venipuncture procedure. After serum was separated from whole blood by centrifugation, CRP levels were calculated using immunoturbidimetry, a rapid in-vitro symptomatic examination for the quantitative location of CRP in human serum and plasma. When CRP in a sample reacts with a polyclonal anti-CRP antibody adsorbed on latex particles, an agglutination reaction takes place. The degree of this agglutination was linked to the CRP levels in the sample, and was therefore interpreted as a shift in absorbance. The focus was extrapolated after an adjustment curve was constructed using calibrators with known foci. Increasing absorbance at 572 nm indicates increasing CRP levels. [6].

In-depth statistical analysis was performed when the data was loaded into SPSS. (version 21). P values less than 0.05 were considered statistically significant. Means across groups were compared using ANOVA followed by the post hoc Conover test. A second test, the Kruskal-Wallis, was also used.

Results: Age distribution in Group I, Group II and Group III are shown in (Table 1).

Table 1: Age (years) distribution in the studied groups

	Min	**Max**	**Mean**	**SD**
Group I	20	60	45.01	7.50
Group II	20	60	45.10	9.55
Group III	40	60	54.15	9.41

Group I included 20 males and 20 females. Group II included 25 males and 15 females. Group III included 10 males and 30 females (Table 2).

Table 2: Gender distribution in the studied groups

	Group I		**Group II**		**Group III**	
	Number	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**
Female	20	50%	25	62.5%	30	75%
Male	20	50%	15	37.5%	10	25%

There was a significant difference (p=0.001) among the study groups (Table 3).

Table 3: Comparison of mean C-reactive protein (CRP) levels (mg/l) among the studied groups

	Min	**Max**	**Mean**	**SD**	**P value**
Group I	0.1	15.1	3.52	4.50	0.001
Group II	0.6	50.4	4.56	8.91	
Group III	3.5	95	30.70	28.05	
Post-hoc result			3>1,2		

Group II included 20 patients with oral leukoplakia (Group II A), 15 patients with OLP (group II B), and 5 patients with OSMF (Group II C) (Table 4).

Table 4: Comparison of mean C-reactive protein (CRP) levels (mg/l) among subgroups II A, II B, and II C

	Min	**Max**	**Mean**	**SD**
II A (Leukoplakia)	0.5	8.0	2.55	2.01
II B (OLP)	1.0	50.5	9.50	15.10
II C (OSMF)	0.2	5.5	2.45	1.51

Discussion:

Patients in this analysis with PMDs were between the ages of 20 and 60. This matched the results of George et al [9], who discovered that PMDs often strike between the ages of 50 and 69, around five years before the onset of oral cancer. Many variables, including smoking, drinking, infections, genes, immune suppression, and malnutrition, have been proposed as possible causes. [7]. Oral cancer has been shown to affect a disproportionately high number of people on the Indian subcontinent compared to those in Europe, South America, or Oceania.

Most of the participants in Group II smoked cigarettes or used chewing tobacco over the course of our research. The development of PMDs was thought to be mostly due to this. Chewing tobacco was less common than smoking and drinking among this population. There are more men than females in this group, which explains why this is the case. Chewable tobacco is more popular among women than cigarettes. According to Parlatescu et al [8], Leukoplakia is strongly linked to tobacco use, and cigarette smokers are more likely to develop this lesion than their nonsmoking counterparts.

The majority of patients in group III used tobacco products, mostly chewing tobacco. In addition to tobacco, most of them were also using quid. More women are represented in group III, which may explain this phenomenon. According to Radhakrishnan et al [9], Cancers of the mouth and throat often begin where betel quid has been chewed. When compared to patients who neither chewed nor smoked, those who did so had a tenfold greater chance of developing cancer of the oral cavity. Patients whose only exposure to tobacco was via chewing had a six-fold greater risk of cancer than those whose only exposure was through smoking.

Cancer risk, recurrence, and prognosis may all be assessed by measuring CRP levels. C-reactive protein (CRP) levels fluctuate daily and are higher among those who have hypertension, smoke cigarettes or use smokeless tobacco products, or drink alcohol regularly. [7]. Oliveira et al [10]

researched the connection between inflammatory indicators and pain perception in patients with head and neck cancer (HNC) before chemotherapy.

When comparing groups I and II, patients with PMDs (group II) had higher mean CRP levels. Patients with OLP in group II had a mean CRP of 9.50 mg/l, whereas those with leukoplakia had 2.55 mg/l and those with OSMF had 2.45 mg/l. Consistent with previous research by Kumar and Bhateja [3], the results indicated that elevated CRP levels in precancerous individuals are highly linked to the development of oral cancer after diagnosis. The CRP readings in this study's Group III ranged from 3.5 to 95 mg/l. Higher levels of CRP were shown to be associated with more advanced TNM staging and worse overall 5-year survival in a research done by Tariq et al [11]. Therefore, it is reasonable to assume that increased preoperative CRP levels are prognostic markers in patients with OSCC, and that these patients had a worse prognosis than those whose CRP levels were normal before surgery. [11].

Our results showed that OSCC patients (group III) had considerably higher CRP values compared to the healthy controls (group I). (group I). This agreed with the findings of the research by Acharya et al. [12]. individuals with OSCC (group III) in our research had considerably higher CRP values compared to individuals with PMDs (group I and II). (group II). In a similar vein, a research by Metgud and Bajaj [13] found that the mean CRP levels of patients with premalignant oral lesions were greater than those of the controls.

Additional research is needed to analyze pre- and post-treatment blood CRP levels in larger samples to identify the disease state, which is one of the study's limitations.

Conclusion: Blood CRP levels were found to be significantly greater in individuals with malignancies compared to those with PMDs or the control group. Further evidence that CRP is a good biomarker for measuring disease severity was also found, showing that CRP levels were higher in patients with PMDs compared to the control group.

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