Original Research Article

Estimation of Hs C Reactive Protein in Patients with Premalignant and Malignant Lesions

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Abstract

Introduction: Hs CRP, a typical systemic inflammation marker, were first discovered in the plasma of patients during the acute phase of pneumococcal pneumonia. HsCRP is produced in hepatocytes in response to inflammatory cytokines such as interleukin (IL)-1, tumor necrosis factor (TNF)-α, and IL-6. Thus, its level in tissue fluids marks the underlying conditions of inflammation and cellular proliferation.**Methodology:** In this study we were included total 4 groups. For each group we had taken 50 cases. In this study, Group I included healthy control, Group II included Oral leukoplakia, Group III included Oral submucous fibrosis & Group IV were included patients with Oral cancer. This study was conducted in Department of Biochemistry, Career Institute of Medical Sciences & Hospital, Lucknow. **Results:** High-sensitivity C-reactive protein (hs-CRP), an acute-phase plasma protein that increases during systemic inflammation, is one of the most frequently used inflammatory markers. The result of this study revealed that the hs CRP levels were analyzed for each group and the mean and standard deviation were analysed. All values are significant in this study.**Conclusion:** This study concludes that Hs CRP levels are deranged significantly in pre-malignant as well as malignant condition. The analysis of these biomarkers shows an increasing trend from healthy control to PMDs and malignant condition.

Keywords: Hs CRP, Malignant Condition, Inflammatory Markers, Leukoplakia.

Introduction

Hs CRP, a typical systemic inflammation marker, were first discovered in the plasma of patients during the acute phase of pneumococcal pneumonia. Hs CRP is produced in hepatocytes in response to inflammatory cytokines such as interleukin (IL)-1, tumor necrosis factor (TNF)-α, and IL-6. Multiple studies have highlighted the significance of Hs-CRP as an important inflammatory biomarker[1,2].One of the important components responsible for the maintenance of cell integrity is lipids, which are also required for various biological functions like cell division and growth of normal and malignant tissues. Free radicals and reactive oxygen species are formed due to tobacco carcinogens which cause oxidation/ peroxidation of polyunsaturated fatty acids. This peroxidation further releases peroxide radicals. This affects the essential constituents of the cell membrane and might be involved in carcinogenesis/ tumorigenesis[3]. The lipid peroxidation causes an increased utilization of lipids such as total cholesterol, lipoproteins and triglycerides. The increased requirement of accomplished either from circulation, by synthesis through the metabolism or from degradation of major lipoprotein fractions like very low-density lipoprotein (VLDL), low-density lipoprotein (LDL), or high-density lipoprotein. Early detectionof malignant transformation improvesthe clinical outcome of patients.

The search for a biomarker that could predict the changes in the premalignant lesions would immensely help in the recognition of high-risk lesions. Therefore, if patients with clinically suspicious lesions can be analysed with biomarkers along with routine histopathological tests for the prediction of its malignant potential, the chances of minimizing the morbidity and mortality will be high. Prevention and early detection of such potentially malignant disorders (PMDs) have the potential of not only decreasing the incidence but also improving the survival of those who develop oral cancer. Many researchers have been searching for specific reliable and easily identifiable biomarkers to differentiate cancer patients from healthy individuals and also to detect patients with precancerous lesions who are at high risks of developing cancer[4].

The present study estimates the Hs C reactive protein level in patients of premalignant and malignant lesions

Materials & Methods

Study Group: In this study we were included total 4 groups. For each group we had taken 50 cases. In this study, Group I included healthy control, Group II included Oral leukoplakia, Group III included Oral submucous fibrosis & Group IV were included patients with Oral cancer

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Study Area: This study was conducted in Department of Biochemistry, Career Institute of Medical Sciences & Hospital, Lucknow.

Study Duration: This study was conducted over a period of two years.

Data Collection: Blood (5.0ml) was collected by venipuncture which is the preferred method of blood sampling that causes less pain than heel prick. The procedure was planned ahead and under all aseptic conditions and maintaining the universal standards of quality control, the sample was collected. This minimized the chances of infection and once the sample was obtained, the patient-sampling matching (labelling) was done. The sample was processed in research laboratory after collection of blood sample; and centrifuged for 10 min at 3000 rpm at room temperature. The supernatant was transferred in the fresh tube with proper labelling for the analysis of serum CRP.

Data Analysis: Data were analysed by using SPSS software.

Results

In this study were included 200 participants. Out of total study participants 92% were male and 08% of the female. The hs CRP levels were analyzed for each group and the mean and standard deviation are represented Table 1. The f-ratio value is 56.41856. The p-value is < 0.00001. The result is significant at p < .05. Pairwise comparison between the ANOVA data for Tukey's post hoc test is also depicted in table 6. Within the treatment, it was found to be statistically significant.

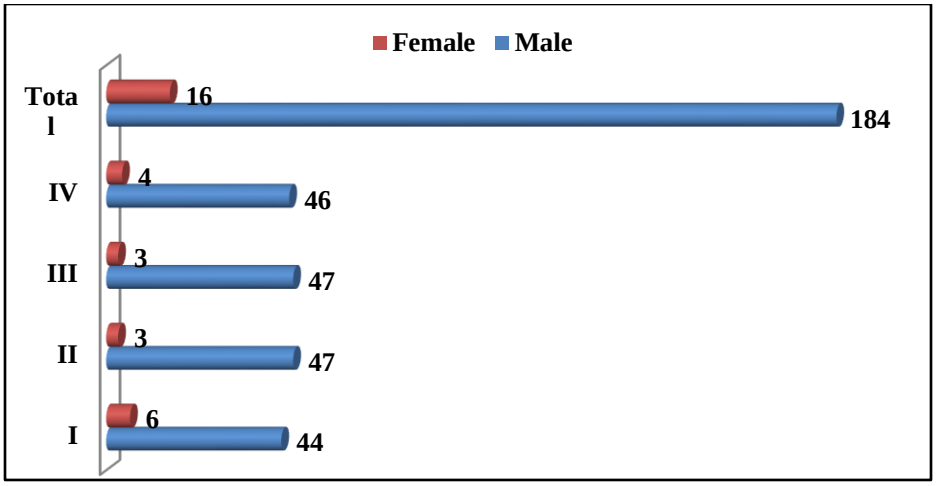

Fig 1: Distribution of cases according to gender

Table 1: Mean, variance and standard deviation of serum Hs CRP for study group

Study Groups	I	II	III	IV	Total
N	50	50	50	50	200
∑X	158.4	196	183.6	278.1	816.1
Mean	3.168	3.92	3.672	5.562	4.081
$\sum X^2$	538.4	823.96	718.54	1596.65	3677.55
Std. Dev.	0.8641	1.0656	0.9515	1.0087	1.3214

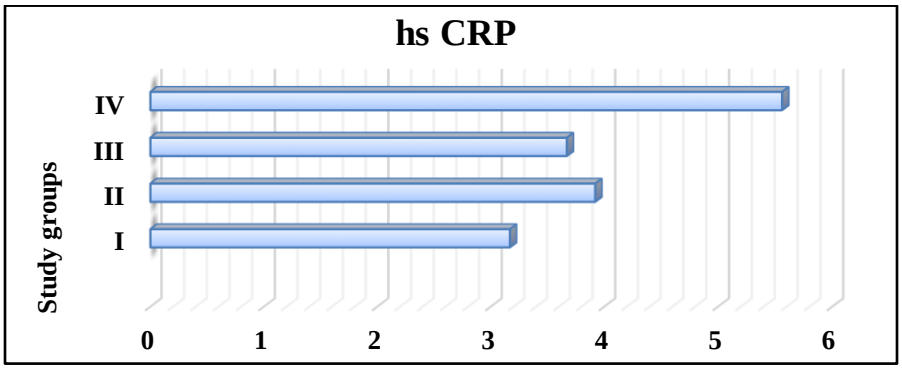

Fig 2: Mean Hs CRP levels for the study groups

Table 2: Tukey's post hoc test for hs CRP within groups (T1=Group1, T2=Group 2, T3=Group 3, T4=Group 4)

Pairwise Comparisons		$HSD_{.05}$ = 0.5055 $HSD_{.01}$ = 0.6152	$Q_{.05}$ = 3.6645 $Q_{.01}$ = 4.4601
T_1:T_2	M_1 = 3.17 M_2 = 3.92	0.75	Q = 5.45 (p = .00090)
T_1:T_3	M_1 = 3.17	0.50	Q = 3.65 (p = .05097)

	M_3 = 3.67		
T_1:T_4	M_1 = 3.17 M_4 = 5.56	2.39	Q = 17.36 (p = .00000)
T_2:T_3	M_2 = 3.92 M_3 = 3.67	0.25	Q = 1.80 (p = .58225)
T_2:T_4	M_2 = 3.92 M_4 = 5.56	1.64	Q = 11.90 (p = .00000)
T_3:T_4	M_3 = 3.67 M_4 = 5.56	1.89	Q = 13.70 (p = .00000)

Discussion

In the present study, serum CRP levels were evaluated and compared amongst the study groups. The mean ± SD CRP levels were 3.17±0.86 mg/l in group I and 3.92±1.06 mg/l in group II, 3.67±0.95 in group III and the highest value of 5.56±1.01 mg/dl was observed in oral cancer patients. A similar study conducted by Tariq et al demonstrated that higher levels of CRP corresponded with higher TNM staging and poor overall 5-year survival. The study showed that OSCC patients with elevated preoperative serum CRP levels showed the worst prognosis, and almost all of them died within five years, while the patients with normal preoperative CRP were alive even after 5 years of surgical resection[5].A similar result was also obtained in a study conducted by Vankadara S et al where serum Hs CRP levels were found elevated in patients with PMDs and cancer[6].High-sensitivity C-reactive protein (hs-CRP), an acute-phase plasma protein that increases during systemic inflammation, is one of the most frequently used inflammatory markers. CRP is an indicator of the acute phase of inflammation with pentameric non-glycosylated polypeptide subunits with each component composed of 206 amino acid residues[7].CRP is produced primarily in the liver and is regulated by proinflammatory cytokines, especially interleukin-6. CRP levels in blood are normally very low and difficult to detect in healthy individuals but increase rapidly with inflammation. CRP is an acute phase protein, the levels of which alter on daily basis, increases with aging, increased blood pressure, smoking, coffee and alcohol consumption, decreased physical activity, raised levels of triglycerides, insulin resistance and diabetes, high-protein diet, chronic tiredness and suffering from sleep disturbances, and depression[8].Multiple Research done on pro inflammatory cytokines and CRP in oral cavity cancer patients determined the relationship between the serum levels of acute phase markers and the results confronted with squamous cell carcinoma antigen. The results showed increased levels during the acute phase of malignancy and interpreted that they can be used as additional biomarkers and responsible for local recurrence rate after nonradical surgery in head and neck cancer[9,10]. Recent studies have suggested that hs-CRP level is positively associated with cancer. Two hypotheses have been proposed to explain the relationship between hs-CRP level and cancer. First, it has been suggested that elevated hs-CRP levels are a result of an underlying cancer. Alternatively, chronic inflammation and elevated hs-CRP might have a causal role in carcinogenesis. In this latter view, inflammation-associated oxidative damage could initiate carcinogenesis by causing inactivating mutations in tumor-suppressor genes or post-translational modifications in proteins involved in DNA repair or apoptotic control. In addition, inflammatory cytokine signalling via intracellular enzymes and transcription factors may inhibit apoptosis and promote the growth and proliferation of cancer cells. Moreover, activation of inflammatory pathways might facilitate tumor progression by promoting cell motility, vascular permeability, and angiogenesis[11,12].

Conclusion

The results of present study provide the conclusion that the derangement of biochemical composition occurs during the process of carcinogenesis. These components can be easily recognised and accurately assessed and can serve as potential biomarkers for detecting a disease as early as during its premalignant stage. The Hs CRP levels are deranged significantly in pre-malignant as well as malignant condition. The analysis of these biomarkers shows an increasing trend from healthy control to PMDs and malignant condition. The process of carcinogenesis alters the integrity of cells and tissues and the levels of serum HS CRP, which otherwise are present in very low amount in healthy individuals alters drastically during malignancy.

Conflict of Interest: Nil Source of support:Nil

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