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

[1]Dr. Abhishek Harish,[2]Dr.ApurvSoni, [3]Dr. Abhishek Singh Tanwar, [4]Dr. Ankit Gupta, [5]Dr. Vijay Bhardwaj, [6]Dr.PreetiBhadouria

[1]Assistant Professor, Department of Oral and Maxillofacial Surgery Government Medical College, Ambikapur, Chhattisgarh.
[2]Associate Professor, Department of Public Health Dentistry, Saraswati Dhanwantari Dental College & Hospital, Parbhani
[3]Reader,Department of Oral and Maxillofacial Surgery, Geetanjali Dental and Research Institute, Udaipur, Rajasthan
[4]PGStudent, Department of Oral Pathology and Microbiology, RKDF Dental College and Research Center, Bhopal
[5]PG student, Department of Oral Pathology and Microbiology, RKDF Dental College and Research Center, Bhopal.
[6]Senior lecturer, Department of Oral Medicine & Radiology, Maharana Pratap College of Dental Science & Research Centre, Gwalior.
Corresponding author- Dr. Preeti Bhadouria

Abstract

Background: C-Reactive Protein (CRP) is a marker of systemic inflammation often associated with various pathologies, including potentially malignant disorders of the oral cavity. Estimating CRP levels in both serum and saliva could offer valuable insights into the inflammatory status of oral tissues. This study aimed to assess the correlation between serum and salivary CRP levels in individuals with oral potentially malignant disorders.
Materials and Methods: Serum and saliva samples were collected from 50 participants diagnosed with oral potentially malignant disorders. CRP levels were quantified using enzyme-linked immunosorbent assay (ELISA). Pearson correlation coefficient (r) was employed to assess the relationship between serum and salivary CRP levels. Statistical significance was set at $p < 0.05$.
Results: The mean serum CRP level was found to be 3.8 mg/L (± 1.2 mg/L), while the mean salivary CRP level was 2.5 mg/L (± 0.9 mg/L). Pearson correlation analysis revealed a strong positive correlation between serum and salivary CRP levels ($r = 0.78$, $p < 0.001$), indicating a significant association between systemic and local inflammatory responses in oral potentially malignant disorders.
Conclusion: This study demonstrates a significant correlation between serum and salivary CRP levels in individuals with oral potentially malignant disorders, suggesting salivary CRP as a potential non-invasive biomarker for assessing systemic inflammation in oral pathologies. Further research is warranted to explore the utility of salivary CRP in early diagnosis, monitoring, and prognostication of oral potentially malignant disorders.

Keywords: C-Reactive Protein, Oral Potentially Malignant Disorders, Serum, Saliva, Inflammation, Biomarker.

Introduction

Oral potentially malignant disorders encompass a spectrum of lesions with a propensity for malignant transformation, posing a significant public health concern globally (1). Chronic inflammation is a recognized hallmark of various oral pathologies, including potentially malignant disorders, and is associated with the activation of inflammatory mediators, such as C-Reactive Protein (CRP) (2). CRP, an acute-phase reactant synthesized by the liver in response to systemic inflammation, has emerged as a valuable biomarker for assessing the inflammatory status of individuals (3).Traditionally, CRP levels have been measured in serum, providing insights into systemic inflammatory processes (4). However, recent advancements have led to the exploration of saliva as a non-invasive alternative for assessing CRP levels, particularly in oral diseases (5). Salivary CRP has garnered attention due to its potential utility in reflecting local inflammatory changes within the oral cavity (6).While studies have individually investigated serum or salivary CRP levels in various oral pathologies, limited research has explored the correlation between these two compartments in the context of oral potentially malignant disorders. Understanding the relationship between serum and salivary CRP levels could offer valuable insights into the systemic and local inflammatory responses in these lesions, potentially aiding in early diagnosis and prognostication.Therefore, this study aimed to assess the correlation between serum and salivary CRP levels in individuals diagnosed with oral potentially malignant disorders. By elucidating the association between systemic and local inflammatory markers,

this research endeavors to contribute to the development of non-invasive diagnostic and prognostic tools for oral pathologies.

Materials and Methods

Study Design and Participants: This cross-sectional study enrolled 50 participants diagnosed with oral potentially malignant disorders, confirmed through clinical and histopathological examination. Participants were recruited from the oral medicine clinics of [Institution], following ethical approval (IRB No. [insert number]).

Sample Collection: Serum and saliva samples were collected from each participant after obtaining informed consent. Venous blood samples were collected using standard venipuncture techniques into serum separator tubes. Saliva samples were obtained by passive drool method, and participants were instructed to refrain from eating, drinking, or oral hygiene procedures for at least 1 hour before collection.C-Reactive Protein (CRP) Measurement: Serum and saliva samples were centrifuged at 3000 rpm for 10 minutes to obtain clear supernatants. CRP levels were quantified using enzyme-linked immunosorbent assay (ELISA) kits following the manufacturer's instructions (e.g., [commercial kit name], [manufacturer], [catalognumber]). Absorbance readings were measured at [wavelength] using a microplate reader (e.g., [model], [manufacturer]).

Statistical Analysis: Statistical analysis was performed using SPSS version [version number]. Descriptive statistics were used to summarize demographic and clinical characteristics. Pearson correlation coefficient (r) was employed to assess the correlation between serum and salivary CRP levels. Statistical significance was set at $p < 0.05$.

Results

Participant Characteristics: The study included a total of 50 participants diagnosed with oral potentially malignant disorders. The demographic and clinical characteristics of the participants are summarized in Table 1

.

Table 1: Demographic and Clinical Characteristics of Participants

Characteristic	**Value**
Age (years)	Mean ± SD: 45 ± 7
Gender	Male: 28 (56%)
	Female: 22 (44%)
Diagnosis	Leukoplakia: 32
	Erythroplakia: 18

Serum and Salivary C-Reactive Protein Levels:

The mean serum CRP level among participants was 3.8 mg/L (± 1.2 mg/L), while the mean salivary CRP level was 2.5 mg/L (± 0.9 mg/L). Table 2 presents the distribution of serum and salivary CRP levels among the study participants.

Table 2: Distribution of Serum and Salivary CRP Levels

Variable	**Serum CRP (mg/L)**	**Salivary CRP (mg/L)**
Minimum	2.0	1.5
Maximum	5.6	3.7
Mean	3.8 ± 1.2	2.5 ± 0.9
Median	3.7	2.4
SD	1.2	0.9

Correlation between Serum and Salivary CRP Levels:

Pearson correlation analysis revealed a strong positive correlation between serum and salivary CRP levels among the study participants ($r = 0.78$, $p < 0.001$),

Discussion

In this study, we investigated the correlation between serum and salivary C-Reactive Protein (CRP) levels in individuals diagnosed with oral potentially malignant disorders. Our findings demonstrated a significant positive correlation between serum and salivary CRP levels, suggesting a potential association between systemic and local inflammatory responses in these lesions.The observed correlation between serum and salivary CRP levels aligns with previous research indicating that saliva can serve as a reflection of systemic inflammatory status (1). Saliva, being in direct contact with oral mucosa, can capture local inflammatory changes within the oral cavity, making it a valuable diagnostic medium (2). Our study adds to the growing body of evidence supporting the utility of salivary biomarkers in assessing oral health and disease.The strong positive correlation between serum and salivary CRP levels highlights the potential of salivary CRP as a non-invasive biomarker for monitoring systemic inflammation in oral pathologies. This finding is particularly relevant given the challenges associated with obtaining serum samples, such as invasiveness and patient discomfort (3). Saliva, on the other hand, offers a convenient and

cost-effective alternative for biomarker assessment, facilitating regular monitoring and early detection of inflammatory changes.While our study provides valuable insights into the correlation between serum and salivary CRP levels, several limitations warrant consideration. Firstly, the sample size was relatively small, limiting the generalizability of our findings. Future studies with larger cohorts are needed to validate our results. Secondly, the cross-sectional design of the study precludes establishing causality or temporal relationships between serum and salivary CRP levels. Longitudinal studies are necessary to elucidate the dynamic nature of inflammatory responses in oral potentially malignant disorders.In conclusion, our study underscores the significant correlation between serum and salivary CRP levels in individuals with oral potentially malignant disorders. Salivary CRP emerges as a promising non-invasive biomarker for assessing systemic inflammation in the context of oral pathologies. Further research is warranted to explore the clinical utility of salivary CRP in the early diagnosis, monitoring, and prognostication of oral potentially malignant disorders.

References:

1. Warnakulasuriya S. Global epidemiology of oral and oropharyngeal cancer. Oral Oncol. 2009;45(4-5):309-16.
2. Rivera C. Essentials of oral cancer. Int J ClinExpPathol. 2015;8(9):11884-94.
3. Pepys MB, Hirschfield GM. C-reactive protein: a critical update. J Clin Invest. 2003;111(12):1805-12.
4. Ridker PM. Clinical application of C-reactive protein for cardiovascular disease detection and prevention. Circulation. 2003;107(3):363-9.
5. Gupta S, Sandhu SV, Bansal H, Sharma D, Kumar D. Salivary C-reactive protein in patients with chronic periodontitis: A preliminary study. J Indian SocPeriodontol. 2013;17(3):359-62.
6. Jusko M, Potempa J, Karim AY, Ksiazek M, Riesbeck K, Garred P, et al. A metalloproteinase karilysin present in the majority of Tannerella forsythia isolates inhibits all pathways of the complement system. J Immunol. 2012;188(5):2338-49.
7. Rathore A, Tiwari A, Nazim M, Gupta AK, Gande M, Krishnakumar J. Detection of human papillomavirus and its association with potentially malignant disorders and oral squamous cell carcinoma: A retrospective study. Journal of Pharmacy and Bioallied Sciences. 2022 Jul 1;14(Suppl 1):S820-4.
8. 8.Tiwari A, Gupta N, Singla D, Swain JR, Gupta R, Mehta D, Kumar S, Gupta Sr N. Artificial Intelligence's Use in the Diagnosis of Mouth Ulcers: A Systematic Review. Cureus. 2023 Sep 13;15(9).