ISSN 0973-2063 (online) 0973-8894 (print)
Bioinformation 22(10): 7248-7251 (2026)
©Biomedical Informatics (2026)

BIOINFORMATION
Discovery at the interface of physical and biological sciences
BIOMEDICAL INFORMATICS
www.bioinformation.net
Volume 22(10)
Research Article

Received October 1, 2026; Revised October 31, 2026; Accepted October 31, 2026, Published October 31, 2026
DOI: 10.6026/973206300227248

SJIF 2026 (Scientific Journal Impact Factor for 2026) = 8.478
2022 Impact Factor (2023 Clarivate Inc. release) is 1.9

Declaration on Publication Ethics:
The author's state that they adhere with COPE guidelines on publishing ethics as described elsewhere at https://publicationethics.org/. The authors also undertake that they are not associated with any other third party (governmental or non-governmental agencies) linking with any form of unethical issues connecting to this publication. The authors also declare that they are not withholding any information that is misleading to the publisher in regard to this article.

Declaration on official E-mail:
The corresponding author declares that lifetime official e-mail from their institution is not available for all authors

License statement:
This is an Open Access article which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited. This is distributed under the terms of the Creative Commons Attribution License

Comments from readers:
Articles published in BIOINFORMATION are open for relevant post publication comments and criticisms, which will be published immediately linking to the original article without open access charges. Comments should be concise, coherent and critical in less than 1000 words.

Disclaimer:
Bioinformation provides a platform for scholarly communication of data and information to create knowledge in the Biological/ Biomedical domain after adequate peer/editorial reviews and editing entertaining revisions where required. The views and opinions expressed are those of the author(s) and do not reflect the views or opinions of Bioinformation and (or) its publisher Biomedical Informatics. Biomedical Informatics remains neutral and allows authors to specify their address and affiliation details including territory where required.

Edited by Yogesh Singh Bisht & Ruby Singh
E-mail: yogeshbishttech@gmail.com & bioinformationruby@gmail.com
Citation: Anwar *et al.* Bioinformation 22(10): 7248-7251 (2026)

C-reactive protein concentration as a prognostic factor for inflammation in the management of odontogenic infections

Eram Anwar[1], Chinmaya Chauhan[2], Sonali Mishra[2], Rajeev Kumar Singh[2], Hiralal Ash[2] & Ananjan Chatterjee[3,*]

[1]Department of Surgical Oncology, Indira Gandhi Institute of Medical Sciences, Patna, India; [2]Department of Oral and Maxillofacial Surgery, Buddha Institute of Dental Sciences and Hospital, Patna, India; [3]Department of Oral and Maxillofacial Pathology, Buddha Institute of Dental Sciences and Hospital, Patna, India;*Corresponding author

Affiliation URL:
https://www.igims.org/

ISSN 0973-2063 (online) 0973-8894 (print)
Bioinformation 22(10): 7248-7251 (2026)
©Biomedical Informatics (2026)

https://www.bidsh.org/

Author contact:
Eram Anwar - E-mail: eramanwar2016@gmail.com
Chinmaya Chauhan - E-mail: chinmaya.dba@gmail.com
Sonali Mishra - E-mail: mishsonali07@gmail.com
Rajeev Kumar Singh - E-mail: rajeev68apc@gmail.com
Hiralal Ash - E-mail: hiralalash@gmail.com
Ananjan Chatterjee - E-mail: ananjan15186@gmail.com

Abstract:
Odontogenic infections can spread through fascial spaces and cause systemic inflammation. Therefore, it is of interest to evaluate the CRP and clinical outcomes in 50 patients aged 18–60 years with odontogenic infections. Patients underwent surgical drainage and extraction, with CRP measured before treatment and on post-operative day 7. Mean CRP decreased from 19.33 ± 17.04 to 1.45 ± 0.92 mg/L ($p < 0.001$), while swelling and pain decreased from 82% to 6% and 72% to 8%, respectively (both $p < 0.001$). Thus, CRP may provide an objective and accessible marker for monitoring inflammatory resolution in odontogenic infections.

Keywords: C-reactive protein (CRP), odontogenic infections, pericoronitis, space infections, inflammation, acute-phase reactant, prognostic biomarker

Background:
Odontogenic infections are among the most common causes of emergency visits to oral and maxillofacial surgery units and may spread along the anatomically continuous fascial spaces of the head and neck to cause airway compromise, mediastinitis, sepsis and even death **[1]**. C-reactive protein (CRP) is an acute-phase protein synthesized predominantly by hepatocytes in response to inflammatory cytokines, particularly interleukin-6 **[2]**. Serum CRP rises within hours of an inflammatory stimulus and declines rapidly following its resolution owing to its relatively short half-life **[3]**. Unlike the erythrocyte sedimentation rate, CRP responds rapidly to changes in disease activity and closely tracks the response to surgical treatment **[4]**. CRP was among the earliest acute-phase reactants shown to occur in oral disease **[5]**. Chairside quantitative CRP testing has demonstrated significant reductions following treatment of acute dental abscesses **[6]**. In systemic illness, CRP-based indices such as the CRP-to-prealbumin ratio correlate with the severity of organ dysfunction **[7]**. Elevated CRP has also been associated with adverse outcomes, including increased mortality risk, in critically ill patients, underscoring its prognostic value **[8]**. In the maxillofacial region, CRP correlates with the severity of odontogenic fascial space infections and may outperform the total leukocyte count for monitoring the clinical course **[9]**. CRP, alongside markers such as prealbumin, has accordingly been used as a monitoring tool in patients with fascial space infections of odontogenic origin **[10]**. Therefore, it is of interest to evaluate the pre-operative and post-operative CRP concentrations, together with associated clinical parameters and to assess CRP as a prognostic marker in patients undergoing surgical management of odontogenic infections.

Materials and Methods:
Study design and participants:
This prospective cohort study was conducted in the Department of Oral and Maxillofacial Surgery, Buddha Institute of Dental Sciences and Hospital, Patna, over a period of approximately two years, after institutional ethical clearance was obtained (174/BIDSH). Fifty patients diagnosed with odontogenic infections, aged 18-60 years, medically fit (ASA I-III) and willing to participate, were recruited. Patients with severe systemic illness (ASA IV-VI), hepatic disease or immunocompromised conditions and those unable to comply with postoperative instructions or to attend follow-up visits, were excluded.

Clinical and radiographic evaluation:
Clinical examination was performed according to departmental protocols and demographic data, medical history and clinical findings were recorded. Pain, fever, facial swelling and neck swelling were assessed before treatment and during follow-up. Radiographic evaluation included panoramic radiography, with additional intraoral radiographs where required establishing the diagnosis and identifying the source of infection.

CRP estimation:
For CRP estimation, 5 mL of venous blood was collected before treatment and centrifuged at 3000 rpm for 10 minutes to obtain serum. CRP was measured using a latex slide agglutination test kit by mixing patient serum with reagent and control solutions and observing agglutination; the maximum serum dilution showing agglutination was recorded and multiplied by 0.6 to obtain the CRP concentration, with values below 10 mg/L considered normal. A second blood sample was collected on the seventh postoperative day and CRP estimation was repeated using the same methodology.

Treatment:
All patients received treatment appropriate to the severity and nature of the infection, including extraction of the offending tooth, incision and drainage of abscesses through intraoral or extraoral approaches and placement of drains when necessary, under standard aseptic protocols. Antibiotics, anti-inflammatory

medications and supportive therapy were prescribed according to departmental protocols.

Statistical analysis:

Statistical analysis was performed using IBM SPSS Statistics version 20. Continuous variables were expressed as mean ± standard deviation and categorical variables as frequencies and percentages. As normality testing revealed a non-normal distribution of some variables, non-parametric tests were used: the Wilcoxon signed-rank test compared CRP values before and after treatment and the chi-square test evaluated changes in categorical clinical parameters. Statistical significance was set at $p \leq 0.05$.

Results:

The study included 50 patients, comprising 25 males (50%) and 25 females (50%), with a mean age of 34.86 ± 11.63 years. Pericoronitis and space infections were the most common diagnoses, each accounting for 32% of cases, followed by periodontal abscess (16%), cellulitis (14%) and periapical abscess (6%). Right-sided involvement was observed in 54% of patients and left-sided in 46% **(Table 1)**. A significant reduction in serum CRP was observed following treatment. The mean preoperative CRP concentration was 19.33 ± 17.04 mg/L, which decreased to 1.45 ± 0.92 mg/L on the seventh postoperative day, a highly significant reduction on the Wilcoxon signed-rank test ($Z = 6.093$, $p < 0.001$) **(Table 2)**. Clinical parameters also improved substantially. Fever was present in 14% of patients preoperatively and decreased to 4% postoperatively, although this reduction was not statistically significant ($\chi^2 = 3.053$, $p = 0.081$). Swelling improved markedly, from 82% before intervention to 6% at follow-up, a highly significant reduction ($\chi^2 = 58.604$, $p < 0.001$) **(Table 3)**. Similarly, pain decreased from 72% before intervention to 8% at follow-up ($\chi^2 = 42.667$, $p < 0.001$) **(Table 4)**. Overall, both biochemical and clinical findings indicated substantial resolution of infection following treatment.

Table 1: Descriptive statistics of the study participants and distribution of infection type and side

Variable	N	%
Type of infection		
Cellulitis	7	14
Periapical abscess	3	6
Pericoronitis	16	32
Periodontal abscess	8	16
Space infection	16	32
Side		
Left	23	46
Right	27	54

Table 2: Comparison of C-reactive protein levels [mean (SD)] at different time intervals (Wilcoxon signed-rank test)

CRP levels	N	Mean (mg/L)	Std. deviation	Z value	P value
Pre-operative	50	19.33	17.04	6.093	<0.001**
Post-operative	50	1.45	0.92	–	–

$p < 0.05$ – significant; $p < 0.001$ – highly significant**.*

Table 3: Comparison of swelling at different time intervals (chi-square test)

Group	Absent, n (%)	Present, n (%)	Total, n (%)
Pre-operative	9 (18.0)	41 (82.0)	50 (100)
Post-operative	47 (94.0)	3 (6.0)	50 (100)

*$\chi^2 = 58.604$; $p < 0.001$**.*

Table 4: Comparison of pain at different time intervals (chi-square test)

Group	Absent, n (%)	Present, n (%)	Total, n (%)
Pre-operative	14 (28.0)	36 (72.0)	50 (100)
Post-operative	46 (92.0)	4 (8.0)	50 (100)

*$\chi^2 = 42.667$; $p < 0.001$**.*

Discussion:

CRP is a sensitive acute-phase reactant that reflects the intensity of inflammatory processes and is widely used for monitoring infection and treatment response. In the present prospective cohort of 50 patients, the mean CRP decreased from 19.33 mg/L preoperatively to 1.45 mg/L postoperatively, accompanied by significant reductions in swelling and pain, indicating substantial resolution of inflammation and supporting the role of CRP as a reliable biomarker of therapeutic response in odontogenic infections. Because CRP falls rapidly as inflammation resolves owing to its short half-life, persistent postoperative elevation may indicate unresolved infection, inadequate drainage or the development of complications requiring further intervention. These findings are concordant with previous studies. Paraskevas *et al.* **[11]** reported that serum CRP served as a useful monitoring tool for odontogenic infections, with serial CRP reflecting treatment efficacy, mirroring the significant biochemical and clinical improvement observed here. In the context of periodontal inflammation, López *et al.* **[12]**, in a systematic review and meta-analysis, found elevated CRP concentrations in patients with periodontitis and modest reductions following periodontal therapy. In contrast, Heim *et al.* **[13]** observed no significant difference in CRP levels among adolescents with periodontitis, a discrepancy plausibly attributable to differences in age group and to the chronic nature of periodontal disease compared with acute odontogenic infection. The prognostic value of CRP in odontogenic infection is further supported by Rosca *et al.* **[14]**, who reported that elevated CRP was associated with greater disease severity and longer hospitalization in patients with odontogenic abscesses. More recently, Hammad *et al.* **[15]** found that elevated CRP, combined with the neutrophil-to-lymphocyte ratio, effectively identified severe odontogenic infections, reinforcing the value of CRP as a practical and cost-effective marker of disease severity. Taken together, these observations indicate that CRP assessment can serve as a valuable adjunct to clinical evaluation, assisting clinicians in determining disease severity, evaluating treatment response and identifying patients who require closer follow-up. Several limitations should be acknowledged. The study was conducted at a single centre with a modest sample of 50 patients, limiting generalizability. CRP was measured using a semi-quantitative latex slide agglutination method rather than a high-sensitivity quantitative assay and only a single postoperative time point (day 7) was assessed, so the full kinetics of CRP resolution were not captured. Additional inflammatory markers and longer follow-up were not evaluated. Future multicentre studies incorporating quantitative CRP assays, serial measurements and complementary biomarkers would further

define the prognostic utility of CRP in the management of odontogenic infections.

Conclusion:
Serum CRP levels decreased significantly following treatment of odontogenic infections and this reduction paralleled significant improvements in pain and swelling, confirming the usefulness of CRP as a prognostic biomarker of inflammation resolution. CRP provides an objective, reliable and readily available indicator of treatment response that may complement clinical assessment in the management of odontogenic infections. Incorporating routine CRP monitoring may therefore facilitate early identification of treatment success or failure and support better clinical decision-making and patient outcomes.

References:
[1] https://www.ncbi.nlm.nih.gov/books/NBK589648/
[2] Zhou H-H *et al. Front. Immunol*. 2024 **15**:1425168. [PMID: 38947332]
[3] Wang B *et al. Oral Dis*. 2024 **30**:1695. [PMID: 37094078]
[4] Harrison M. *Aust Prescr*. 2015 **38**:93. [PMID: 26648629]
[5] Elfezary MT *et al. BDJ Open*. 2025 **11**:51. [PMID: 40410141]
[6] Ren YF & Malmstom HS. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2007 **104**:49. [PMID: 17482849]
[7] Żerdziński K *et al. J Clin Med*. 2026 **15**:826. [PMID: 41598762]
[8] Wang H *et al. Lipids Health Dis*. 2025 **24**:299. [PMID: 41024001]
[9] Pani G *et al. J Maxillofac Oral Surg*. 2025 **24**:489. [PMID: 40182462]
[10] Jadhav D *et al. Natl J Maxillofac Surg*. 2023 **14**:406. [PMID: 38273903]
[11] Paraskevas S *et al. J Clin Periodontol*. 2008 **35**:277. [PMID: 18294231]
[12] López R *et al. J Periodontol*. 2011 **82**:543. [PMID: 21043803]
[13] Heim N *et al. J Craniomaxillofac Surg*. 2018 **46**:2220. [PMID: 30416035]
[14] Rosca O *et al. Medicina (Kaunas)*. 2022 **59**:20. [PMID: 36676644]
[15] Hammad Y *et al. Oral Surg Oral Med Oral Pathol Oral Radiol*. 2022 **133**:639. [PMID: 34975007]

Caveat Emptor is applicable among the literate community where required and possible. The publisher, its journal, editors and the internal/external reviewers take adequate steps to check, evaluate, correct, edit, revise and improve content where possible and required.