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# Panoramic Radiograph as Detective of Cardiovascular Risk

*Balwant Rai, S.C. Anand and Simmi Kharb*

Government Dental College, Pt. Bhagwat Dayal Sharma,
Post Graduate Institute of Medical Science, Rohtak, Haryana, India

**Abstract:** Evidence for a potential link between periodontal disease and coronary heart disease (CHD) has accumulated in recent years. C-reactive proteins (CRP) potential marker of cardiovascular risk and associated with periodontal disease. CRP levels were analyzed in 48 patient of periodontitis [(mild, n=25), (moderate, n=17), (severely, n=16) periodontitis panoramic radiographically] and 22 health controls (radiographically). The CRP levels were raised with severity of disease as compared to controls ($p<0.01$). These findings implicate role of CRP in periodontitis suggesting that routine screening for periodontal disease with respect to CRP and panoramic radiograph should be done that could alert clinicians to patients at increased risk of heart disease.

**Keywords:** Panoramic radiograph · CRP · cardiovascular risk

## INTRODUCTION

Periodontal disease, a common chronic oral inflammatory disease, is characterized by destruction of soft tissue and bone. Starts early in life, however, since disease progression is usually slow, clinical symptoms or hospitalization on are rare before 40 years of age. Epidemiological associations between periodontitis and cardiovascular disease have been reported [1, 2]. Periodontitis and atherosclerosis have complex aetiologies, genetic and gender predispositions and may share pathogenic mechanisms as well as common risk factors. It is becoming increasingly clear that infections and chronic inflammatory conditions such as periodontitis may influence the atherosclerotic process. The crucial casual relation might be established by prospective treatment studies, which elucidate the connection between treatment of poor health and systemic inflammatory marker [3, 4]. The aim of this study was to determine whether patients with severe periodontitis have higher plasma concentrations of established markers of atherosclerosis such as c-reactive protein (CRP).

## MATERIALS AND METHODS

Forty eight subjects (M:F, 25:23 range 30-65 years) having loss of clinical attachment had been referred to Department of Periodontology were selected for study due to their severe periodontitis and were undergoing treatment for this condition. On radiographic examination included an evaluation of alveolar bone loss score from a panoramic radiograph of all existing teeth. Probing attachment levels were measured at four sites: mid buccal, midlingual, mesio interproximal point and distal inter proximal point. The median probing attachment loss at 24 sites (four sites on each of six index teeth) and median alveolar bone scores among all teeth were used as two measures of the presence and severity of periodontal disease. For these analyses, a missing tooth was assigned a value higher than the maximum recorded measurements so that edentulous patients or patient with missing index teeth could be included. Periodontal disease was classified as no or mild; moderate and severe. Individuals with no or mild periodontal disease had 15 or more teeth, a median bone loss score <50% and median attachment loss of 1<1 mm. Individuals with moderate periodontal disease had 15 or more teeth, a median bone score of 50-75%, or a median attachment loss of 2-5 mm. These with severe periodontal disease had less than 15 teeth or median bone loss score >75% or median attachment loss of ≥6 mm [5]. Patient were excluded from the study if they had alcoholic or chronic smoker. The control (healthy), non-periodontal cases comprised 22 subjects (M:F, 12:10, range 20-62 years), none of whom exhibited radiographical bone loss. In none of the participants was cardiovascular disease or any other ongoing general disease, or infections diagnosed.

In all these cases, plasma was obtained after centrifugation at 1500 g for 10 min and stored at -4°C until

**Corresponding Author:** Dr. Balwant Rai S/o Sh. Ramsawroop, Village - Bhangu, Distt. Sirsa, Post Office - Sahuwala I., India

Table 1: (Mean±SD) of C-reactive protein plasma levels (mg $L^{-1}$) in mild, moderate, severely periodontitis and healthy controls

| Subjects | C-reactive plasma level |
|---|---|
| Mild (n=15) periodontitis | 2.32±1.73 |
| Moderate periodontitis (n=17) | 2.95±1.72 |
| Severely periodontitis (n=16) | 4.05±1.83 |
| Normal health (n=22) | 1.72±1.82 |

p<0.01 at all levels

analysis of C-reactive protein. All the statistical analysis was performed using SPSS software package (Version 7.0).

## RESULTS

The c-reactive protein level were increase significantly ($p<0.01$) in periodontitis patients in comparison to healthy normal. The CRP level was higher in severely as compared to moderate and mild periodontitis (Table 1, $p<0.01$).

## DISCUSSION AND CONCLUSION

The association between periodontal disease has been reviewed extensively [6]. Inflammation associated with periodontal disease may play a central role in pathogenesis of CVD. As with other chronic infections, chronic periodontal disease is associated with systemic changes in blood and blood forming organs, which may result in activation of markers of inflammation and acute phase proteins such as c-reactive protein [7]. The higher plasma levels of CRP were observed in the present study in case of severe periodontitis patients in comparison to healthy control (Table 1, $p<0.01$). It has been well documented that CRP is a valuable market in assessment of cardiovascular risk. Periodontal disease is often a chronic bacterial infection which involves inflammatory process as that also affect cardiovascular system. Similar pathology is evident in both diseases and it is reasonable to expect some form of interaction between their pathogenic process. The panoramic radiograph is routine radiograph in dental profession. Hence this correlation between the panoramic radiographs and CRP is valuable for detection of cardiovascular risk.

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