EVALUATION OF RELATIONSHIP BETWEEN RHEUMATOID ARTHRITIS AND PERIODONTAL DISEASE

Bibin Thomas George¹, Presanthila Janam², Parvathy V³, Deepa M.S⁴, Sheila George⁵

¹Professor, Department of Periodontics, Darshan Dental College, Udaipur, Rajasthan.
²Professor, Department of Periodontics, Government Dental College, Trivandrum.
³Reader, Department of Conservative Dentistry and Endodontics, Noor Islam College of Dental Science, Neyatinkara, Trivandrum.
⁴Reader, Department of Oral Medicine and Radiology, ACDSR, Kollam.
⁵Professor, Department of Conservative Dentistry and Endodontics, Noor Islam College of Dental Science, Neyatinkara, Trivandrum.

ABSTRACT

Background: Periodontal disease and rheumatoid arthritis are both chronic inflammatory diseases which affect the connective tissue including bone. The present study was carried out to find the relationship between rheumatoid arthritis and periodontal disease. Materials and Methods: This study was conducted in rheumatology and surgical outpatient department, Medical college, Thiruvananthapuram, Kerala. Fifty fulfilling and fifty not fulfilling ACR criteria patients aging 30-50 with no other diseases or under any other medication were matched for sex, age, oral hygiene status with AR patients were included and divided into two groups in this study. Periodontal status of two group patients was assessed by measuring the probing pocket depth, gingival recession, periodontal attachment loss, plaque index, calculus index and gingival index and blood sample was collected and subjected for estimation of erythrocyte sedimentation rate, C-reactive protein and rheumatoid factor. The observations was analyses by t-test for statistical significance. Results: In RA group have significant p value (P<0.05) missing tooth (4.48±4.16), Probing pocket depth (2.46±0.66), Gingival recession (0.76±0.57), Clinical attachment level (3.15±1.11), Gingival index (1.81±0.48), oral hygiene index (3.96 ±1.01) and radiographic bone loss (0.96±0.23) compared to Non-RA group. Increased erythrocyte sedimentation rate (57.58±21.20), c-reactive protein (28.80±16.27) and rheumatoid factor levels (384.00±22.14) in RA group patients. Conclusion: The results of this study provide evidence of a significant relationship between rheumatoid arthritis and periodontal disease. This may be due to similar pathophysiology nature of the diseases. There is requirement of detailed clinical and immunological studies in a large population to confirm the present study conclusions.

Keywords: Arthritis, Periodontal diseases, Rheumatoid, C-reactive protein, Erythrocyte sedimentation rate

INTRODUCTION

The prevalence of periodontal disease has increased in rheumatoid arthritis (RA) patients compared to non rheumatoid arthritis population. Because of the both diseases shared pathological mechanisms like increased T-cells, IL-17, increased B-cell function, RANK over expression [1], HLA-DRB1-04 [2], smoking [3] and infection with the Epstein-Barr virus and cytomegalovirus are risk factors for both conditions[4]. It seems some studies observed increase cytokinase level in both diseases [5].
There is an increased periodontal parameters in periodontal diseases patients but it more increased patients have RA with periodontitis [6]. Studies suggest that a higher prevalence of periodontal bone loss in RA [7]. One pilot study noted that individuals with severe RA are more likely to have advanced periodontitis and vice versa [8]. Animal studies also proved relationship between RA and periodontitis[9]. A study was conducted on 1412 patients reported that 62.5% progressive destruction in RA patients [10]. Patients on steroid, anti-rheumatoid drugs and NSAIDS therapy decrease gingival inflammation. The extend of destruction periodontal tissues in periodontal disease and cartilage and bone destruction in rheumatoid arthritis have open up a new avenue for research in this field. Hence the individuals of developing rheumatoid arthritis may also be risk developing periodontal disease. The purpose and objectives of this study is to access the relationship between rheumatoid arthritis and periodontal disease.

MATERIALS AND METHODS

This study was conducted in rheumatology and surgical outpatient department, Medical college, Thiruvananathapuram, Kerala.

Inclusion criteria
Patients fulfilling the current ACR criteria, willing to participate are included in the case group. Patients that are not fulfilling ACR criteria, willing to participate are included in the control group.

Exclusion criteria
Hypertension, pregnancy, lactation, smoking, using of antibiotics, recent periodontal treatment are included in exclusion criteria.

The subjects selection ratio of 1:1. A total number of 100 patients were selected for the study. 50 patients fulfill the ACR criteria were included in the group-I and other 50 were included in group-II. All the patient demographic data was collected by questionnaire. The selected patient were subjected to careful oral examination under proper illumination with the patient made to sit erect on the chair and using mouth mirror and Williams graduated probe[11]. Full mouth data (excluding third molars) of periodontal status was assessed by measuring Probing pocket depth [12], Gingival recession [13], clinical attachment level [14], gingival index [15], oral hygiene [16], radiographic bone loss [17].

Blood sample collection
Blood sample collected by vein puncture and centrifuged at 2000 RPM for 10 min. only unhaemolysed, non-lipemic and non turbid serum was separated and stored at 2-8°C for 48 h and used for estimation of C-reactive protein [18] and rheumatoid factor [19]. Some part of collected blood used for estimation of erythrocyte sedimentation rate [20].

Statistical analysis
The data was analysed using statistical package SPSS (Version1.1). The significant was measured by using student-t-test [21].

RESULTS

In this study observations increase the all periodontal parameters in rheumatoid arthritis patients compared with other group. Probing Pocket Depth in arthritis (2.46±0.66) other group (1.98±0.39), Gingival Recession (0.79±0.76) other group (0.22±0.19), Clinical Attachment Loss in arthritis (3.15±1.11) other group (2.07±0.39), Gingival Index in rheumatoid arthritis (1.81±0.48), other group (1.57±0.29) (Table-1). Significant difference was observed compared Missing Tooth in rheumatoid arthritis patients (4.48±1.84) with non rheumatoid arthritis (1.84±2.10), Oral hygiene (3.96±1.01) non rheumatoid arthritis (3.24±0.60), Radiographic Bone Loss Index (1.98±0.33), non rheumatoid arthritis (0.96 ±0.23) and Rheumatoid Factor group-I (384.00±22.14) (Table-2). Increased erythrocyte sedimentation rate in group-I (57.58±21.20) compared with group-II (11.70±1.64) (Figure 1), C-reactive protein group-I (28.80±16.27), group-II (0.94±0.34) (Figure 2).
Tables 1: Comparison of mean periodontal parameters between RA and Non-RA patients

<table>
<thead>
<tr>
<th>Periodontal Parameter</th>
<th>Group-I (Rheumatoid arthritis) (MEAN±S.D)</th>
<th>Group-II (Non-Rheumatoid arthritis) (MEAN±S.D)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probing Pocket Depth</td>
<td>2.46±0.66</td>
<td>1.98±0.39</td>
<td>0.001</td>
</tr>
<tr>
<td>Gingival Recession</td>
<td>0.79±0.76</td>
<td>0.22±0.19</td>
<td>0.001</td>
</tr>
<tr>
<td>Clinical Attachment Loss</td>
<td>3.15±1.11</td>
<td>2.07±0.39</td>
<td>0.001</td>
</tr>
<tr>
<td>Gingival Index</td>
<td>1.81±0.48</td>
<td>1.57±0.29</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Tables 2: Comparison of mean periodontal parameters and Rheumatoid Factor levels between RA and Non-RA patients

<table>
<thead>
<tr>
<th>Periodontal Parameter</th>
<th>Group-I (Rheumatoid arthritis) (MEAN±S.D)</th>
<th>Group-II (Non-Rheumatoid arthritis) (MEAN±S.D)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing Tooth</td>
<td>4.48±4.16</td>
<td>1.84±2.10</td>
<td>0.001</td>
</tr>
<tr>
<td>Oral Hygiene Index</td>
<td>3.96±1.01</td>
<td>3.24±0.60</td>
<td>0.003</td>
</tr>
<tr>
<td>Radiographic Bone Loss Index</td>
<td>1.98±0.33</td>
<td>0.96±0.23</td>
<td>0.001</td>
</tr>
<tr>
<td>Rheumatoid Factor</td>
<td>384.00±22.14</td>
<td>0.00±0.00</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Figure 1: Comparison of mean erythrocyte sedimentation rate between RA and Non-RA patients

![Figure 1](image1.png)

Figure 2: Comparison of mean c-reactive protein and between RA and Non-RA patients

![Figure 2](image2.png)
DISCUSSION

There are several inflammatory diseases that cause destruction of bone and its supporting connective tissue. The most prevalent of the disease that can cause destruction are rheumatoid arthritis and periodontal disease. This disease is a result of an imbalance between host inflammatory process and specific pathogenic bacteria residing in the gingival crevice. This observation and previous studies observations led to the hypothesis that there are susceptibility factors or risk factors that modulate patient susceptibility or resistance to destructive periodontitis. Studies have correlated periodontal disease to various systemic conditions including heredity, preterm low birth weight, coronary heart diseases, myocardial infection, stroke, atherosclerosis, diabetes, HIV infection, emotional stress, malnutrition, obesity, alcohol abuse, aging, pulmonary disease and rheumatoid arthritis. In some studies showed rheumatoid arthritis play major key role periodontal disease. Patients have both disease suffer with dys-regulation of inflammatory response. Increased all periodontal observations in rheumatoid arthritis patients due to various mechanisms. Many patients with rheumatoid arthritis become more or less disabled as a results of functional hand impairment leads to increase oral hygiene index. Rheumatoid arthritis patients increase inflammatory reactions in gingival can cause increase the gingival index. Tooth mortality has been found to be correlated to an increased clinical attachment loss and alveolar bone loss in individual with periodontal disease. Normally periodontal diseases status was generally assessed by determining the clinical attachment loss and radiographic bone loss. Clinical attachment loss was used as a reliable method to assess the severity of periodontal disease but this value increase in rheumatoid arthritis patients. Patients have periodontal disease and rheumatoid arthritis showed increased erythrocyte sedimentation arte, C-reactive protein and rheumatoid arthritis factor levels its due to development of inflammatory process. Thus based on the data from the study a relationship exists between periodontal disease and rheumatoid arthritis. This study clear that individuals suffering from advanced rheumatoid arthritis are more likely to experience more significant periodontal problems compared to their non-rheumatoid arthritis counterpart. The possibility of destruction in rheumatoid arthritis individuals may be due to general and common underlying dys-regulation of host inflammatory response present in both conditions. Microbiologically, chronic lipopolysaccharide secreted from periodontal pathogens in the biofilm could serve as a source of super-antigens which can cause initiation and persistence of rheumatoid arthritis. There is a serious and force consider the importance of periodontal care based on the individual needs. Management strategies are similar as these disease share common pathological process. Which the realization that an imbalance between proinflammatory and anti-inflammatory cytokines exists in the pathogenesis of rheumatoid arthritis and periodontitis. Newer studies and clinical trials are focusing on the inhibition of proinflammatory cytokines and destructive proteases. The study observations supported the hypothesis there is relationship between periodontitis and rheumatoid arthritis. But this observed only in small population. This study has to conduct large number population to know the molecular mechanism, causes and various targets to develop new drugs.

REFERENCES


