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ORIGINAL ARTICLE

Evaluation of Correlation between Periodontitis and Rheumatoid Arthritis In An Indian Population

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ABSTRACT

Background and Objective: Considering the hypothesis that generated a link between joint diseases and periodontitis many centuries back, and the renewed interest lately in association between periodontitis and specifically rheumatoid arthritis, this study was undertaken in an Indian population. A correlation was done between the degree of periodontal disease in subjects with rheumatoid arthritis (RA) and non rheumatoid arthritis (NRA). **Materials and Methods:** The study comprised of 202 subjects, who were divided into rheumatoid arthritis and non rheumatoid arthritis groups of 101 subjects each. The periodontal status was evaluated through an inclusion criteria by evaluating the probing pocket depth (PPD), clinical attachment loss (CAL), bleeding scores and plaque scores. The degree of periodontal disease was compared to the severity of rheumatoid arthritis. **Results:** There was no statistically significant prevalence and severity of periodontal disease in the RA and NRA groups. **Interpretation and Conclusion:** Thus, as per this study, RA is not a risk indicator for periodontal disease, as both these diseases were not associated significantly in the Indian population.

Keywords: Rheumatoid arthritis, periodontitis, Indian population, correlation

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INTRODUCTION

Periodontitis is one of the most common chronic disorders in humans, which is characterized by chronic inflammation and is associated with the destruction of both the connective tissue and the alveolar bone. Most patients of periodontitis respond to bacterial invaders by mobilizing their defensive cells and releasing cytokines like interleukin-1B, tumour necrosis factor-a, and interleukin-6, which ultimately causes tissue destruction by stimulating the production of collagenolytic enzymes like matrix metalloproteinases.

Rheumatoid arthritis is an autoimmune disease that affects several organs and it is also associated with the destruction of joint

connective tissues and bones.[1] Both periodontitis and RA represent an imbalance between pro-inflammatory and cytokines anti-inflammatory cytokines, which are deemed responsible for tissue damage.[2]

Recently, there has been growing evidence suggesting an association between periodontitis and rheumatoid arthritis, as both these conditions are associated with the destruction of bones[1]. Possibly, a bidirectional relationship between RA and periodontitis may involve RA, thus affecting the pathogenesis of periodontitis and vice-versa [2]. Still, there is possibility of a common genetic trait predisposing to both these conditions.

The literature regarding a relationship between periodontal disease and RA is controversial. Most of the studies have been carried out on non-Indian populations and are diverse in their results and conclusions [2]. Hence, the purpose of this study was to evaluate the association between periodontitis and RA in an Indian population.

MATERIAL AND METHODS

This is an observational and an analytical study, which was approved by the Ethical Committee on Human Trials. A written and informed consent was obtained from all volunteers.

The study comprised of 202 subjects, who were divided into rheumatoid arthritis and non rheumatoid arthritis groups of 101 subjects each. The periodontal status was evaluated in both these groups to determine the extent of their periodontal disease, and to correlate these findings with various indicators of rheumatoid arthritis. The indicators of RA included the number of swollen joints, the number of tender joints, pain index, RA factor and CRP titers.

The Rheumatoid arthritis group (The RA group): The patients in the RA group were diagnosed according to the Revised Criteria for the classification of Rheumatoid Arthritis of the American College of Rheumatology [3]. Chronic RA patients attending a rheumatology clinic under a standard drug regimen, with duration between 1 to 25 years were selected for the study. The eligibility for participation in the study was determined by the patient's physician, in order to ensure that the patient did not have any other condition that would modify the periodontal disease manifestations. Patients having at least 8 teeth in each jaw were included. Smokers were not specifically excluded.

The Non-rheumatoid arthritis group (The NRA group): Subjects whose age, sex and smoking status matched to the RA group, were included in the NRA group from the general population. [Table/Fig1].

Study group	RA	NRA
Age (Years)	25-61	25-61
Sex	M/F = 29/72 (1:2.4)	M/F = 35/66 (1:1.8)

[**Table/Fig 1]: Demographic details of patient population in the study**

The periodontal status was assessed in both the RA and the NRA groups by using the following criteria:

Probing pocket depth (PPD), Clinical attachment loss (CAL 1to3), Bleeding scores and Plaque scores by using the Turesky Gilmore Index, and bone loss on periapical radiographs was assessed by using the Hugoson's and Jordon's Index [4] [Table/Fig 1-4].

[Table/Fig 2]: PPD of 7mm in a RA patient

[Table/Fig 3]: Periapical bone loss score P_2 in same patient

[Table/Fig 4]: PPD of 8mm in a NRA patient

[Table/Fig 5]: Periapical bone loss score P_3 in NRA patient

The results obtained from both the groups were subjected to statistical analysis. Missing teeth, plaque, and bleeding percentages were analyzed by using paired t tests. The difference in the radiographical bone loss scores was analyzed by the application of the Fisher's exact test. P_0 and P1 were grouped as P_{01} and P_2 plus P_3 were grouped as P_{02}. PPD and CAL in both the groups were subjected to the Chi square test.

RESULTS AND OBSERVATION

As the age and sex matched subjects were selected in both the study groups, the age range was 25 to 61 years, with a mean age of 43 years. The male to female ratio (M: F) in the RA and NRA groups was (1:2.4) and (1:1.8) respectively.

There was no statistically significant difference in the mean number of teeth present, plaque scores and the gingival bleeding indices scores between the RA and the NRA groups (p=0.8, p=0.35 and p=0.27 respectively) [Table/Fig 6].

Mean scores	RA group	NRA group
Teeth present	27.4(+4.6)	27.5(+3.4)
Plaque score	1.56(+0.57)	1.49(+0.54)
Gingival bleeding score	0.74(+0.69)	0.85(+0.67)

[Table/Fig 6]: Mean values of teeth present, plaque & gingival bleeding scores

The mean PPD was higher in the RA group as compared to that in the NRA group; however, it was not statistically significant (p=0.601). Similarly, though the mean CAL in the RA group was higher than that of the NRA group, it was statistically insignificant [Table/Fig 7].

Mean scores	RA group	NRA group
Mean PPD	2.73(±0.87)	2.62(±0.75)
Mean CAL	3.05(±1.02)	2.84(±0.89)

[Table/Fig 7]: Mean values of periodontal pocket depth and clinical attachment loss

The difference in the radiographical scores between both the groups after the application of Fisher's exact test was not statistically significant (p=0.484) [Table/Fig 8].

Mean radiographic bone loss	RA group	NRA group
P01	38	41
P02	6	3

[Table/Fig 8]: Number of subjects with radiographic periodontal bone loss

DISCUSSION

The published studies vary widely with respect to the design, setting and the methods which are used to ascertain an association between rheumatoid arthritis and periodontitis. However, the strength and temporality of the association are uncertain. Well designed epidemiological studies are thus needed to be carried out, especially in the Indian population.

The average number of teeth present in both the study groups was not statistically significant. This observation is similar to the results obtained by other studies by Sjostrom et al and Mercado et al [5],[6].

The observation that the plaque scores were not significant in the RA and the NRA groups is consistent with the observations of Sjostrom et al and Mercado et al. [5],[6] Thus, the general concept that RA patients tend to have more plaque deposits because of limited dexterity [7], was not validated.

In this study, the mean bleeding score was lower in the RA group, but this observation was not statistically significant. The lower gingival bleeding score in the RA group may be due to the effect of the NSAID therapy. This result is similar to that from the study performed by Sjostrom et al.[5]

There was no significant difference in the mean PPD scores between the two groups studied. This finding is in agreement to the results of few previous studies done by Waite I M et al.[8] However, this observation is in contrast to the study results of Mercado et al[6], which stated a significantly greater PPD in the RA group than in the NRA group.

The absence of significant radiographical bone loss scores in this study is in accordance with the results from the study by Sjostrom et al [5] and this finding is in contrast to the results of the study done by Mercado et al [6].

SUMMARY AND CONCLUSION:

In our study, the prevalence and severity of periodontal disease was not significantly different in the RA and the NRA groups. Thus, as per this study, RA is not a risk indicator for periodontal disease, as both these diseases were not associated significantly in the Indian population.

The development of new paradigms has allowed the application of most advanced drugs in the treatment of RA. What remains to be seen is, whether the pathogenic mechanisms of these diseases are similar, and if yes, then whether these also can be used in the treatment of periodontal disease as well.

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