

ORIGINAL RESEARCH**Evaluation of Common Factors of Periodontitis and Cardiovascular Disease in Patients with the Acute Coronary Syndrome****Dr. Prashant Kr Singh¹, Dr. Jasjit Kaur Sahota², Dr. Tania Mahajan³, Dr. Shikha Parihar⁴**¹Reader, Department of Periodontics, Institute of Dental Sciences Jammu, J&K, India²Professor and Head, Department of Periodontics, Institute of Dental Sciences Jammu, J&K, India³B.D.S. Tania Dental Clinic Talab Tillo, Jammu⁴PG student, Department of Periodontics, Bhojia Dental College and Hospital, Baddi, H.P., India

Received: 12-04-2023

Revised: 02-05-2023

Accepted: 15-05-2023

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ABSTRACT:**Background:** Periodontitis is a disease of multifactorial etiology, causing inflammatory destruction of supporting structures of dentition and eventually leading to its loss. To evaluate common factors of periodontitis and cardiovascular disease in subjects with acute coronary syndrome.**Materials & methods:** A total of 100 subjects were enrolled. The age of patients was between 30 to 70 years. Complete examination was done. Statistically significant differences in all tests performed were considered those for which the probability $p < 0.05$.**Results:** Periodontal pocket (PD) depth measurements in interdental spaces were chosen to assess the severity of periodontitis. 3 men (3.75%) and 2 women (10%). 22 male subjects (27.5%) showed the depth value of periodontal pockets in the interdental spaces was between 4 and 5 mm.**Conclusion:** Subjects having myocardial infarction have worse periodontal status than healthy individuals.**Keywords:** Periodontitis, oral health, cardiovascular disease.**Introduction**

Cardiovascular disease comprises a variety of heart and vascular conditions including ischemia, atherosclerosis, peripheral artery disease, infective endocarditis, and acute myocardial infarction.¹ Evidence suggests that an association between inflammatory markers such as interleukins, C-reactive proteins, protease activated receptors, and matrix metalloproteinase-9 for atherogenesis and acute ischemic events.² It has been hypothesized that coronary artery disease (CAD) may be triggered by systemic mechanisms, in addition to local inflammatory factors, and chronic periodontal infection is one of the possibilities to be considered.^{3,4} Cardiovascular disease occurs as a result of a complex set of genetic and environmental factors.⁵ The genetic factors include age, hypertension, diabetes, marked obesity, lipid metabolism, fibrinogen levels and platelet P1 polymorphism.⁶ The environmental risk factors include diet, physical inactivity, stress, cigarette smoking, socioeconomic status, chronic infections, use of non-steroid anti-inflammatory drugs and possible endothelial cell injury.^{7,8} Cardiovascular mortality rates account for about 30% of all deaths, despite efforts aiming at controlling the conventional risk factors. The identification of factors leading to an increased risk of coronary heart disease is still far from complete. It has been estimated that, to a significant percentage of patients with the disease, no one of the established risk factors aforementioned, does apply.⁹ Periodontitis is an inflammatory disease of the gums, which affects all the dental supporting tissues. It has been mentioned that severe generalized periodontal disease is present in 8% to 13% of the world's adult population.¹⁰ The prevalence is lower in children and young adults with an estimated rate 2% to 5% between the ages of 11 and 25 being affected. Periodontitis is a progressive inflammation, leading to the destruction of the supporting tissue and alveolar bone loss.¹¹ This process is the result of the bacteria - produced toxins and the inflammatory reaction of the gum tissues.¹²

Myocardial infarction is a form of ischemic heart disease (IHD), which in addition to myocardial infarction, includes ischemia, stable angina, unstable angina, and sudden cardiac death. The essence of ischemic heart disease is the disproportion between the myocardium's need for oxygen and energy and its ability to supply them. Cardiovascular disease is characterized by intravascular, fat-rich deposits that can induce thrombi, contributing to cardiac death.¹³ The mechanism of myocardial infarction involves complete occlusion of the coronary artery lumen, leading to myocardial necrosis due to ischemia. Myocardial infarction usually occurs in the background of atherosclerosis of the coronary arteries in coronary artery disease. Hence, this study was done to evaluate common factors of periodontitis and cardiovascular disease in subjects with acute coronary syndrome.

Materials & methods

A total of 100 subjects were enrolled. The age of patients was between 30 to 70 years. Complete examination was done. Periodontal examination was done. Periodontal pocket depth was measured. Subjects with myocardial infarction were evaluated. Student-t test was done. The results were analysed using SPSS software. Statistically significant differences in all tests performed were considered those for which the probability $p < 0.05$.

Results

Periodontal pocket (PD) depth measurements in interdental spaces were chosen to assess the severity of periodontitis. 3 men (3.75%) and 2 women (10%). 22 male subjects (27.5%) showed the depth value of periodontal pockets in the interdental spaces was between 4 and 5 mm. There were 5 (6.25%) male subjects with healthy or mild periodontitis. Moderate periodontitis was seen in 10 females (50%) and 25 males (31.25%). Severe periodontitis was diagnosed in 7 females (35%) and 50 males (62.5%).

Table 1: Characteristics of the study population concerning periodontal pocket (PD) depth at interproximal sites

PD (mm)	Male n	%	Female n	%
<3 mm	3	3.75	2	10
4-5 mm	22	27.5	11	55
>6 mm	55	68.75	7	35

Table 2: Division of periodontitis according to Page and Eke classification in the study population after myocardial infarction.

	Male n	%	Female n	%
None or mild inflammation	5	6.25	3	15
Moderate inflammation	25	31.25	10	50
Severe inflammation	50	62.5	7	35
p- value	0.05			

Discussion

The greatest global non-communicable disease (NCD) burden arises due to cardiovascular disease (CVD), responsible for 17.9 million deaths (a third of total mortality), and 45% of NCD- induced mortality.¹⁴ In Europe, CVD is responsible for 3.9 million deaths (45% of deaths), and whilst CVD mortality rates are reducing, the absolute numbers have increased in the last 25 years, due to an increasingly ageing population.¹⁵ Ischaemic heart disease, stroke, hypertension (leading to heart failure), rheumatic heart disease, cardiomyopathy and atrial fibrillation cause over 95% of CVD-related deaths.¹⁶ Hence, this study was done to evaluate common factors of periodontitis and cardiovascular disease in subjects with acute coronary syndrome.

In the present study, periodontal pocket (PD) depth measurements in interdental spaces were chosen to assess the severity of periodontitis. 3 men (3.75%) and 2 women (10%). 22 male subjects (27.5%)

showed the depth value of periodontal pockets in the interdental spaces was between 4 and 5 mm. A study by Dembowska E et al, a total of 160 patients (35 female and 125 male) were enrolled in the study. Considering the age range, the largest group of patients (118 patients) was between 55 and 65 years, which accounted for 73.8% of the total study population. There were 35 patients (21.9%) in the age group of 45 to 54 years, while the youngest age group of 35 to 44 years had as many as seven patients. Medical history and physical examination, including periodontal status, were performed. API, PD, CAL, and CPITN were evaluated. Common risk factors for periodontitis and acute coronary syndrome were assessed. The study assessed risk factors such as hypertension, diabetes, dyslipidemia, general health, smoking, height, weight, and hip circumference. In light of the above-described etiopathogenesis of atherosclerotic disease and its association with periodontal disease, it is important to emphasize preventing and treating periodontitis, especially in patients in the so-called high-risk group for cardiovascular disease. Dentists' introduction of an appropriate prophylactic and therapeutic plan may constitute both primary and secondary prevention of cardiovascular diseases.¹⁷

In the present study, there were 5 (6.25%) male subjects with healthy or mild periodontitis. Moderate periodontitis was seen in 10 females (50%) and 25 males (31.25%). Severe periodontitis was diagnosed in 7 females (35%) and 50 males (62.5%). Another study by Ramesh A et al, a total of 30 patients, ages ranging from 30 –80. Periodontitis was recognized in 11 patients of the acute coronary syndrome group and 10 patients in the healthy group. Fisher's exact test yielded a p value of 0.4539 with an odds ratio of 0.727(95% confidence interval 0.151 to 3.493). No significant association was found between periodontal disease and acute coronary syndrome. Periodontitis may contribute to cardiovascular disease and stroke in susceptible subjects. Properly powered longitudinal case control and intervention trials are needed to identify how periodontitis and periodontal interventions may have an impact on cardiovascular diseases.¹⁸ Cardiovascular diseases rank among the leading causes of death and thereby have an important clinical and epidemiological role.¹⁹ Results from studies relating periodontal disease to cardiovascular disease have been mixed. A study carried out by Emingil et al. suggests that the presence of periodontal disease may induce a systemic inflammatory response, resulting in elevated serum levels of inflammatory makers, such as tumor necrosis factor, interleukin and C-reactive protein that contribute to plaque instability and atherosclerotic events.²⁰ Age is an important factor associated with both periodontitis and cardiovascular diseases. Available studies suggest that periodontitis prevalence in older subjects is high.²¹ In the study done by Persson et al. approximately 50% of subjects older than 60 years of age had periodontitis. In addition, approximately 55% had either a diagnosis of atherosclerosis, or a history of stroke, or ACS.²² In this study, mean age of the patients with ACS was greater than that of the control group. It is known that the age factor also accounts for increased cardiovascular risk, and this finding may have reduced both the significance and magnitude of the results.²³

Conclusion

Subjects having myocardial infarction have worse periodontal status than healthy individuals.

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