RELATIONSHIP BETWEEN PERIODONTAL DISEASES AND CORONARY ARTERY DISEASES (CAD) IN PATIENTS ATTENDING SHAHID MOSTAFA KHOMEINI HOSPITAL IN ILAM, IRAN; 2015

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ABSTRACT

Introduction: In the last two decades, studies have shown that periodontal disease affects a wide range of human organs. These diseases affect body organs through various mechanisms. This study was performed in order to analyze the association between periodontal disease and coronary artery diseases among patients attending SH.M.KH hospital in Ilam during 2015.**Materials and Method:** In the present case-control study, the case group consisted of ninety patients with coronary artery disease and the control group consisted of ninety individuals without CAD who had referred to SH.M.KH hospital was examined. Periodontal examinations were performed for groups and their clinical parameters (PPD), BOP‹Gingival color) were determined and recorded in each person separately in the Dental Clinic.**Results:** There were 93 male and 87 female participants in this study. 23 people from the case group and 14 people from the control group had abnormal gingiva color and this difference was not statistically significant (p=0.97). In terms of pocket probing depth, 29 people from the case group and 11 from the control group had a probing depth of over 5mm, a difference which was statistically significant (p=0.001). In the terms of the bleeding on probing (BOP) index, there was no statistically significant difference as 48 people from the case group and 42 people from the control group had BOP. The control groups were chosen from the patients who had referred to the heart clinic and their heart's health was verified by a cardiologist. These patients were referred to a dental clinic for periodontal examinations in terms of gingiva color, pocket probing depths (PPD) and bleeding on probing (BOP).**Conclusion:** Based on the results of this study and the higher probe depth in the case group it can be concluded that periodontal disease can be considered a risk factor for ischemic heart disease.

Key words: Coronary artery disease, periodontal disease, BOP, PPD, gingiva color.

INTRODUCTION

Ischemic heart disease (IHD) is caused by an imbalance between the supply and demand of oxygen in the myocardium where not enough oxygen is available. Atherosclerosis is the most common cause of myocardial ischemia and prevents sufficient blood flow to the myocardium [1]. Major risk factors for atherosclerosis include: smoking, high blood pressure, diabetes mellitus, high LDL and low HDL [1, 2]. There are many possible mechanisms which could explain the association between periodontal disease and coronary artery disease. This association could be due because of common risk factors between them however it could also be because of the systemic effects of periodontal disease. Periodontal infection can affect the pathogenesis of cardiovascular diseases through bacteria's poly liposaccharides and inflammatory cytokines. Periodontal pathogens alone can cause an increase in platelet coagulation and lead to thromboembolism. In one study, periodontal pathogens were discovered in an atheromatous plaque which confirms their etiologic role in cardiovascular diseases [3]. An increase in blood viscosity increases the chance of clot formation which can exasperate ischemic heart disease and lead to strokes. Fibrinogen is probably the most important factor in clot formation. Fibrinogen is the precursor of fibrin and if fibrinogen increases it causes the blood to become more viscous. High plasma fibrinogen level is a known risk factor for cardiovascular disease and peripheral vascular disease [3]. Systemic infections are recognized as a factor in the increase of clot formation and viscosity. The level of fibrinogen and the number of white blood cells also increases with periodontal disease [3]. Grossi SG et al in their study, show that specific oral infections play an important role in atherosclerosis [4]. Recently evidence has been found that high levels of inflammatory and hemostatic factors can accelerate vascular inflammation and thrombosis [5]. Therefore any factor which causes the increased level of the factors mentioned in systemic blood flow is considered as a risk factor for coronary artery disease. Syrganen et al concluded from their study that patients with poor oral hygiene and heavy calculus and debris faced twice the risk of coronary heart disease [6]. Periodontal disease makes the patient more susceptible to bacteremia caused by

gram negative pathogens associated with periodontitis, also it is estimated that around 8 percent of all infectious endocarditis are related to periodontal and dental disease who have a history of previous dental procedures. By being aware of this fact the American Heart Association has emphasized on maintaining an optimal level of oral hygiene and reducing possible proliferation sources of bacteria (seeding) in order to prevent infectious endocarditis [7]. In 1996 Beck et al analyzed 921 men without coronary artery disease in a prospective study for 18 years, and during this period the periodontal status and possibility of coronary artery disease was examined. The results showed that the chance of cardiovascular diseases in people suffering from periodontitis is 2.8 times greater [7]. The purpose of this study is to analyze the relationship between periodontal diseases and coronary artery disease in patients attending the Heart clinic at Shahid Mostafa Khomeini hospital in Ilam city. The presence of such a relationship matters as it highlights the importance of treating and following up on periodontal problems in order to reduce the risk of cardiovascular disease and the mortality rate of these illnesses, especially strokes.

METHODS AND MATERIAL

This study was performed to analyze the relationship between periodontal disease and coronary artery disease; it was an analytical case-control study. The populations being studied were patients referring to the heart clinic at Shahid Mostafa Khomeini hospital in Ilam city. The case group were chosen from the patients referring to heart clinic of the hospital because of angina pains or myocardial infarctions and had been diagnosed with coronary artery disease. The diagnosis was done by a cardiologist using EKG, the fitness test and echocardiography. The control groups were chosen from the patients who referred to the heart clinic and their cardiovascular health was verified by a cardiologist after displaying normal results on the fitness test, EKG and echocardiography. The criterion for being chosen to take part in the study was age, 35-55 and not being pregnant. Patients who were edentulous, had ac compromised immune system, had systemic illnesses which

affected the periodontal tissues such as diabetes, used contraceptive drugs, used post-menopausal hormones, had osteoporosis and were smokers were excluded from the study. The chosen patients were referred to a dental clinic to be examined for gingiva color, pocket probing depth and bleeding on probing. A questionnaire for each patient was filled out using interviews, clinical and dental examinations and the information on their hospital files. This questionnaire consisted of demographic data and two other separate sections: the first was questions relating to the history of heart disease and information relating to cardiovascular disease such electrocardiography, echocardiography, angiography, lipid profile, use of heart medication, troponin and heart factor reports. The second section was related to periodontal analysis containing indexes such as gingival color, BOP and PPD. Examinations were performed on Rumford teeth meaning the upper left 1, 4, 6 teeth, lower left 1, 6 teeth, upper right 1, 6 teeth, lower 1, 4, 6 teeth.

The analyzed variables of this study

Gingiva color

A bluish-red color (final stages of gingival inflammation) and red (initial stage of inflammation) were considered as abnormal gingiva color and pink to dark pink were considered as normal gingiva color in this study.

Bleeding on probing

This index was examined by horizontally moving the probe inside the pocket/sulcus and observing whether or not bleeding occurs after thirty seconds in 4 areas of the tooth (Mesiobuccal, buccal, distobuccal and lingual).

Probe pocket depth

The vertical distance from the neck of the tooth to the bottom of the pocket this is measured in millimeters. In this study people with less 5mm probing depth were considered normal and over 5mm as otherwise. Age and gender were considered as other variables. The data from this study were analyzed using the SPSS software version 19. A written consent was acquired from all the participants in both groups and sterilization principles were abided during examinations.

RESULTS

97 male and 87 female participants were present in this study. There were 101 people in the 35-45 age group and 79 people in the 45-55 age group. The average body mass index for the case group was 27 and in the control group it was 25.7 (Table 1). People suffering from diabetes and smokers were excluded from the study. From the people present in this study 47 (23.1%) had a history of high blood pressure and 133 people (73.9%) had not history of high bloody pressure. In the preset study 23 people from the case group and 14 people from the control group had abnormal gingiva color. This difference was not statistically meaningful. The PPD index showed 29 people from the case group and 11 people from the control group had over 5 mm probing depth (Table 2). Also 48 people from the case and 42 people from the control group had bleeding on probing.

Table 1: Comparison of mean age, weight, height, BMI and PPD of the case and control groups.

Variable	Mean	Number	Persons
Age	46.19	**90**	Case
	42.12	**90**	Control
Weight	75.04	**90**	Case
	75.04	**90**	Control
Height	1.66	**90**	Case
	1.7	**90**	Control
BMI	27	**90**	Case
	25.7	**90**	Control
PPD	3.7	**90**	Case
	2.6	**90**	Control

Table 2: Frequency based on gingiva color, BOP and PPD in case and control groups.

Groups	Gingiva color			PPD			BOP		
	Normal	Abnormal		Under 5mm	Over 5mm		Bleeding present	No bleeding present	
Case	67	23	P:0.097	61	29	P:0.001	48	42	P=0.371
Control	76	14		79	11		42	48	
Total	143	37	OR=1.8	140	40	OR=3.4	90	90	OR=1.3

DISCUSSION

Periodontitis is a localized inflammatory disease caused by bacteria which effect bone and connective tissue of the teeth [8]. Initial epidemiologic evidence shows association between periodontitis and cardiovascular disease [9]. In the past two decades studies have attributed the majority of the association between periodontal disease and coronary artery disease to the role that periodontal diseases play in starting or advancing of atherosclerosis. Atherosclerosis is the most common cause of myocardial ischemia and prevents sufficient blood supply to it. Periodontal diseases cause atherosclerosis through certain mechanisms. Firstly, the level of fibrinogen increases with periodontal disease and fibrinogen is the precursor for fibrin which increases clot formation. Also people with poor oral hygiene have a considerably higher amount of factor 8. Even routine daily actions such as chewing and brushing teeth place the individual at a risk of bacteremia and considering the regulatory function of bacterial LPS in the attachment of monocytes to the endothelium, this matter can be explained [1]. In the present study, the bluish-red color of the gingiva is considered as periodontal disease. The number of people in the ill group with abnormal gingiva color was higher but this difference was not statistically significant. However different conditions can affect gingiva color. Various pigments such as melanin and carotene and even high age can affect the color change of gingiva. When analyzing periodontal indexes it was determined that in the PPD index there was no statistically meaningful difference between people suffering from CAD and normal people (p=0/001). The obtained results correlated with the results of Rigy et al study in 1392, Akbari et al study in 1386 and Destefano et al study in 1993 [10, 11]. The current study showed that BOP was higher in people with CAD than healthy people however this difference was not statistically significant. The obtained results correlated with the results of Akbari et al study in 1392 but did not correlate with Taleghani et al study in 1386 and Destefano et al study in 1993 which was carried out on 9760 people [10, 11]. Considering other studies such as Destefano's study where the sample size was much larger, it can be claimed that if the sample size in the present study was higher the difference in this index could become statistically significant.

CONCLUSION

In the current study the odds ratio for the periodontal indexes was calculated. This ratio for pocket probe depth was 3.4 and for gingiva color it was 1.8 which shows that probing depth and to a lesser extent gingiva color can be risk factors for ischemic heart disease. According to the study at hand the PPD index has a statistically significant relationship with coronary artery disease and the obtained results show that periodontal disease can be a risk factor for ischemic heart disease.

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