The relationship between Periodontal Disease Severity and Systemic Diseases: Retrospective study

Elias Boutros[1,*], Ahmad Al nashar[2], Seba Al Haji[3], Reem Ganem[4]

[1,3,4]Dept. of Periodontology, [2]Dept. of oral surgery, Faculty of Dentistry, Al-Andalus University for Medical Sciences, Syrian Arab Republic

***Corresponding Author:**
Email: dr.elias.boutros.2016@gmail.com

Abstract

Objective: To investigate the correlation between the periodontal disease severity and coexistence of systemic disease(s) amongst referred patients with periodontal disease to the department of periodontology, Al Andalus University for medical science.

Methods: A total of 147 patients' questionnaire between September 2013 and Mars 2015 were reviewed. Data recorded were patient age, sex, periodontal disease severity, systemic diseases (diabetes, hypertension, cardiovascular disease)

Results: 48.6% of patients presented with moderate periodontal disease (M 46.6%/ F 51.7%). 51.4% of patients examined presented with severe periodontal disease (M 53.4%/F 48.3%). 8.8% of patients had diabetes (10.5% with severe periodontal disease, 6.9% with moderate periodontal disease). 8.1% of patients hypertension (11.8% with severe periodontal disease, 4.2% with moderate periodontal disease). 5.4% of patients had cardiovascular disease CAV disease (6.6% with severe periodontal disease, 4.2 with moderate periodontal disease).

Conclusion: Periodontal disease was associated with systemic diseases but there were no significant differences between severity of periodontal disease and co-existence systematic disease.

Introduction

Periodontitis, one of the most common diseases of humans, is an infectious condition that can result in the inflammatory destruction of periodontal ligament and alveolar bone. In light of the extensive microbial plaques associated with periodontal infections, the chronic nature of these diseases, the exuberant local and systemic host response to microbial assault, it is reasonable to hypothesize that these infections may influence overall health[1]. It has been long known that diabetes mellitus, both type 1 and type 2, are risk factors for periodontal disease[2]. A systematic review of the effects of periodontal disease on diabetes was recently published(3) which summarizes evidence for the two-way relationship between periodontal disease and diabetes. periodontal infection may induce a chronic state of insulin resistance, contributing to the cycle of hyperglycemia and formation of advanced glycation end products(AGEs), thus amplifying the pathways of degradation and destruction of connective tissue[4]. Two surveys showed that diabetic individuals are twice as likely to have severe attachment loss compared with individuals without diabetes[5,6]. Several studies have shown that acute bacterial infections can provoke insulin resistance in non-diabetic individuals that may last for up to 3 months after resolution of the infection. Insulin resistance in such infections characterized by hyperglycemia and hyperinsulinemia[7,8]. Recent studies have shown that effective control of periodontal infection in patients with diabetes may reduce the level of advanced glycation end products in the serum[9,10]. Inflammatory PDD increase the risk of cardiovascular disease (CVD)[11,12]. Inflammation in the vessel wall plays an essential role in the development of atherosclerosis[13,14]. The relationship between CVD and PDD can be dependent on the risk factors both diseases have in common[15-17], but there may be a more direct relationship resulting from the systemic effects of PDD[11]. Periodontal infections may cause vascular events via LPS and inflammatory cytokines, contributing to the pathogenesis of CVD[18]. Periodontal pathogens themselves shown to increase platelet aggregation and thromboembolic events[19]. The pathogens associated with PDD were identified on atheroma, which supports the etiological role of these pathogens in CVD.(20) In a seven year prospective study, Mattila et al[21] observed dental infections to be significant risk factors for CVD and also for further coronary events. Subjects with the severe probing depths and bone loss at baseline had higher risk for developing CVD than those with minimal periodontal diseases or gingivitis[11,12,22]. Drugs used for the treatment of hypertension can cause xerostomia, which potentially causes extensive tooth decay, mouth sores, and oral infections[23]. The Puerto Rican Elderly Dental Health Study suggests that periodontitis may contribute to poor blood pressure control among adults[24]. The aim of this study is to investigate the correlation between the periodontal disease severity and coexistence of systemic disease(s) amongst referred patients with periodontal disease to the department of periodontology, Al Andalus University for medical science.

Patients and Methods

A retrospective study was made of 147 patients with a periodontal disease who referred for periodontal consultation to the department of Oral Surgery, Al-Andalus University for Medical Science between

September 2013 and Mars 2015. The parameters evaluated included patient age and sex, periodontal disease severity,systemic diseases (diabetes,hypertension, cardiovascular disease).Study participants examined by two dental clinicians to verify periodontitis case status defined as the presence of at least 2 interproximal sites with clinical attachment loss (CAL) ≥4 mm, or at least two interproximal sites with probing depth (PD) ≥5 mm[25]. Based on the proportion of root length supported by bone of up to a third, half and less than half, a diagnosis of early, moderate or severe periodontal disease was made through radiographic evaluation. They were also classified as diabetic based on a self-reported physician's diagnosis of diabetes, Hypertension was classified according to the American Heart Association as follows: SBP ≥ 139 and DBP ≥ 89 mmHg; or non-hypertension systolic blood pressure (SBP) <139 mmHg and diastolic blood pressure (DBP) <89 mmHg without the use of an antihypertensive.

Statistical testing

The data were analyzed by the Statistical Package for the Social Sciences version 11.0 (SPSS Inc., Chicago, Ill). Descriptive statistical analyses of the independent variables (age, sex, diabetic status, periodontitis, hypertension, CVD) were performed. The chi-square (X2) test was used as a basic statistical test for comparison of sample proportions of moderate and severe periodontal disease. Statistical significance was inferred at $P<0.05$.

Results

A total of 147 patients' questionnaire between September 2013 and Mars 2015 were reviewed the mean age of our patients was 54.13±8.24years (M/54.70±8.169, F/53.28±8.340) (Table 1). 48.6% of patients presented with moderate periodontal disease (M 46.6%/ F 51.7% with no statically differences P>0.05), 51.4% of patients examined presented with severe periodontal disease (M 53.4%/F 48.3% with no statically differences P>0.05). 8.8% of patients had diabetes (10.5% with severe periodontal disease, 6.9% with moderate periodontal disease). There no statically differences regarding periodontal disease severity and diabetes P>0.05. 8.1% of patients had hypertension (11.8% with severe periodontal disease, 4.2% with moderate periodontal disease). There no statically differences regarding periodontal disease severity and hypertension P>0.05., 5.4% of patients had CAV disease (6.6% with severe periodontal disease, 4.2 with moderate periodontal disease). There no statically differences regarding periodontal disease severity and CAV disease P>0.05.

Table 1:Comparison of variables in patients with moderate and severe periodontal disease

Variable	Levels of periodontal disease	
	Moderate (n = 72)	Severe (n = 76)
Mean age	54	54.25
Diabetes	6.9%	10.5%
Hypertension	4.2%	11.8%
Cardiovascular disease	4.2%	6.6 %

Discussion

In our study, the mean age of those with moderate periodontal disease was nearly similar to that presenting with severe periodontal disease. Therefore can compared for other parameters. 48.6% of patients presented with moderate periodontal disease and 51.4% of patients examined presented with severe periodontal disease. A recently published meta-analysis demonstrated that periodontal treatment improved endothelial function, reduced atherosclerotic vascular disease ASVD biomarkers and led to a less atherogenic lipid profile, especially in patients already suffering from ASVD and/or diabetes[26]. Previous studies showed that the extent of the inflammatory burden caused by periodontal disease could influence systemic diseases with a similar inflammatory pathology[27,28]. 8.8% of patients in our study had diabetes (10.5% with severe periodontal disease, 6.9% with moderate periodontal disease). While 5% of patients in Soory study had diabetes with moderate periodontal disease and 8% with severe periodontal disease[29]. Borgnakke et al[3] in their systematic review about the effect of periodontal disease on diabetes concluded that periodontal disease adversely affects glycaemic control and diabetes complications or promotes development of type 2 diabetes. In metaanalysis study of 15 observational studies ZengXT et al(30) concluded that periodontal disease was associated with carotid atherosclerosis. However, 8.1% of patients in our study had hypertension (11.8% with severe periodontal disease, 4.2% with moderate periodontal disease comparable with 40% with moderate periodontal disease and 10% with severe periodontal disease) in Soory study[29]. 5.4% of patients had CAV disease (6.6% with severe periodontal disease, 4.2 with moderate periodontal disease). Bahekar et al[31] in their metaanalysis, found a significant association between periodontal disease and cardiovascular disease after controlling for major co-contributors of cardiovascular disease.

Conclusion

Periodontal disease was associated with systemic diseases but there were no significant differences between severity of periodontal disease and co-existence systematic disease.

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