

Assessment of oral hygiene status and inflammatory components in CVS patients

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ABSTRACT

Background: The purpose of the study is to carry out assessment of oral hygiene status and inflammatory components in CVS patients. Due to cardiovascular diseases patients usually develop irritating factors regarding mainly to the periodontal area which would disrupt the oral hygiene status. **Aim:** To assess the oral hygiene status viz. dental status, gingival and periodontal status and mucosal changes and inflammatory components viz. cytokines in cardiovascular patients. **Reason:** This assessment is carried out to determine if the periodontal disease contributes to increasing the risk factors of coronary diseases in the cardiovascular system.

Introduction

Periodontal diseases is a common infection which involves the periodontium. The periodontium are the tissues surrounding the tooth. Cardiovascular diseases on the other hand is a condition that involves the narrowing of blocked blood vessels that can lead to a series of conditions such as cardiac arrest, angina or stroke due to age, hypertension, diabetics, obesity, serum lipid concentration and abnormal habits. Periodontal diseases have been associated with cardiovascular diseases.¹

Based on researches, for the past three decades, increasing cardiovascular diseases has been sought out due to the impact of oral hygiene.² Cardiovascular diseases is the leading cause of death throughout the nations of the world and the main factor is atherosclerosis which causes the hardening of arteries.^{3,7} Both the diseases have high incidences and is important to be curb as it has a huge impact on the health of the public.⁴

There are some reasons why periodontal diseases are associated with cardiovascular diseases such as smoking and diabetes besides intrinsic or extrinsic stimulus which causes and individual to have and inflammatory response. The presence of periodontal infections may lead to bacteria growth that can harm the cardiovascular system due to arteriosclerotic plaques.⁵

The objective of the study is to assess the oral hygiene status viz. dental status, gingival and periodontal status and mucosal changes and inflammatory components viz. cytokines in cardiovascular patients.

Materials and Methods

A group of 50 patients are taken for the study at a dental hospital in Malaysia. The data of the patients were collected upon finding out the cardiac status of the patient and the main medication prescribed to the patient. Before treatment, the saliva of the patients are collected and sent to the lab for the assessment of the salivary pH and flow rate. An assessment was carried out on the patient's hard and soft tissue.

Results

Out of the 50 samples collected, it was found that the mean salivary pH is 7.93 and the mean for the salivary flow rate is 2.09 mL/min. The lesions that can be seen in the hard tissues are gingivitis, periodontitis as well as lesions on the periapical and carious lesions. In the soft tissues the lesions are mostly seen through inflammation, bleeding of gums and subgingival calculus.

Discussion

Although the relationship between periodontal diseases and cardiovascular disease has been investigated for more than 2 decades. It is important for all health professionals to assess oral inflammation as a risk factor for cardiovascular disease and to activate the dental team as part of the patient care plan.⁸ Because chronic systemic inflammation plays an important role in the pathogenesis of atherosclerosis, and because periodontitis has been shown to contribute to the overall level of systemic inflammation, there have been increasing calls for early interventions that would eliminate oral inflammation and reduce the overall systemic inflammatory burden.⁹ This interprofessional approach will have the twofold benefit of establishing more comprehensive individual risk reduction strategies and improving overall public health outcomes.¹⁰ A limited clinical inspection is performed to identify possible signs of oral or systemic disease, malformation, or injury, and the potential need for referral for diagnosis and treatment.¹¹

The study has proposed that these associations are independent of age, sex, race, education, poverty index, marital status and body mass index, cardiac diseases and medications prescribed. The hard tissue and soft tissue lesions are noted as well as the salivary flow rate and salivary pH.¹²

Out of the data collected from the 50 patients, there were 20 patients who had myocardial infarctions, there were 5 patients each with a history of angioplasty, bypass surgery, stroke and hypercholesterolemia. There were 4 patients

with a past medical history of angina pectoris and 6 patients who atherosclerosis. Out of this 50 patient, the mean of the salivary pH is the highest in stroke patients and the lowest in patients with angioplasty. On the other hand, the patient with the highest salivary flow rate are observed in patients with hypercholesterolemia and the lowest salivary flow rate in patients with a past medical history of angioplasty.^{13,20,21}

The lesions that can be found in the hard tissues are mostly periodontal pocket, mild gingivitis, periapical lesion while on the soft tissues although lesions are absent in patients with atherosclerosis and stroke. In patients where soft tissue lesions are present, there are mainly composed of inflammation, subgingival calculus, gingival bleeding.

In periodontitis, bacteremia or endotoxemia may trigger a systemic inflammatory response that, in turn, may cause endothelial dysfunction and thus increase blood pressure and accelerate atherosclerosis.¹⁹ Endothelial dysfunction through the periodontal infection-inflammation pathway might be the link between periodontitis and hypertension. High consumption of potassium, possibly reducing the risk of hypertension, might decrease periodontitis severity and partially explain the association between periodontitis and hypertension.^{17,22}

Oral reactions to prescribed drugs, including altered taste, impaired salivary function and gingival hyperplasia may be seen in cardiac patients.²³ While abnormal growth of the periodontal tissue is mainly associated with plaque related inflammation, drugs such as nifedipine and amlodipine, have been implicated in causing gingival overgrowth, which may be brought to dental attention because of pain, bleeding or appearance.²⁴ The anti-dysrhythmic agents disopyramide and propafenone and the anti-hypertensive drugs indoramin and methyldopa may cause a dry mouth. [15] ACE inhibitors and amiodarone sometimes give rise to altered taste, typically described as 'metallic'. If an offending drug can be identified, it may be possible (in consultation with the prescriber) to discontinue it or give an alternative.^{25,26}

Conclusion

The oral hygiene status of individuals with cardiovascular diseases and associated periodontal risk factors are seen higher in patients whom have recently undergone treatment or surgery and started their medication.^{14,16} These patients complains of having bleeding gums during the first 6 months of consuming their prescribed medication. This research concludes that there is an interrelation between cardiovascular diseases and the oral hygiene status in a patient.

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Table

Cardiac status	Gender		Salivary pH		Salivary Flow Rate		Hard Tissue	Soft Tissue
	Male	Female	Mean	SD	Mean	SD		
Myocardial infarction	13	7	7.27	0.404	1.89	0.686	Cariou lesion, periapical lesion, Severe gingivitis, missing tooth	Subgingival calculus, gingival bleeding, inflammation
Angioplasty	5	0	7.2	0.367	1.1	0.583	Edentulousness, carious lesion, mild gingivitis	Inflammation, gingival bleeding
Hypercholesterolemia	2	3	7.32	2.492	2.4	0.995	Periodontal pocket, mild gingivitis, periapical lesion	Inflammation, subgingival calculus, gingival bleeding.
Bypass surgery	4	1	7.6	0.339	1.5	0.702	Periapical lesion, carious lesion	Subgingival calculus, gingival bleeding
Angina pectoris	3	1	7.4	0.665	2.08	0.499	Periodontitis, mild gingivitis, severe gingivitis	Inflammation, gingival bleeding
Artherosclerosis	3	3	7.6	0.070	1.83	0.632	Cariou lesion, periapical lesion, missing teeth	nil
Stroke	5	0	8.1	0.396	1.4	0.738	Periodontal pocket, periodontitis, loss of attachment	nil