



ORIGINAL RESEARCH PAPER

Periodontology

CARDIOVASCULAR MANAGEMENT IN PERIODONTAL PATIENTS

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Dr. Sania

Senior Lecturer, dept Of Periodontology, institute Of Dental Sciences, jammu

ABSTRACT

It has been proposed for several decades that infections may be responsible for the accelerated development of atherosclerosis. The initiation of the atherosclerotic plaque is ascribed to focal accumulation of lipids. This explains the importance of plasma lipids in the development of atherosclerosis. Recent reports point towards a possible association between periodontal disease and increased risk for cardiovascular disease. Thus, periodontitis and cardiovascular disease may share common risk factors, and association between periodontitis and coronary heart disease may be due to the elevated levels of plasma lipids.

INTRODUCTION

Periodontitis primarily represents an anaerobic gram negative oral infection that leads to gingival inflammation, destruction of periodontal tissues, loss of alveolar bone, and eventual exfoliation of teeth in severe cases^[1]. Lipopolysaccharides and other microbial substances gain access to the gingival tissues, initiate and perpetuate inflammation, resulting in production of high levels of proinflammatory cytokines, which lead to the destruction of the periodontal ligament and alveolar bone^[2].

There have been several proinflammatory cytokines implicated in the immunopathology of periodontitis; however, some of the most convincing evidences for destruction of periodontium involves Interleukin 1beta (IL-1b) and tumour necrosis factor alpha (TNF-a). These cytokines are significantly elevated in diseased periodontal ligament sites demonstrating inflammation and during periods of active tissue destruction. Periodontitis has been shown to be associated with increased levels of proatherogenic plasma lipoproteins^[3].

Hyperlipidemia is a condition where there is an elevation of the serum levels of total cholesterol (TC) and triglycerides (TG) due to the lipid metabolism alteration, with an increase in the liver lipogenesis and lipolysis in the adipocytes^[4]. Proatherogenic role of chronic infection in periodontal disease has not yet been conclusively established but periodontal pathogens as for example, Tannerella forsythens, Porphyromonas gingivalis and Prevotella intermedia, have been identified in atherosclerotic plaques as well as in coronary and aortic endothelium^[5,6].

Nevertheless, treatment of poor oral health (periodontal disease) has been shown to improve the systemic and haemostatic situation of coronary heart disease patients^[7]. Thus heart disease patients become an important target group where oral health can have a profound effect on their general health.

Treatment objectives

- 1) Important goal of treatment to manage patients with cardiovascular diseases is to deal with all the identified risk factors involved.
- 2) Pre-medication should be considered to alleviate anxiety and effective analgesia is important to reduce stress.
- 3) Early and short morning appointments are advised for all such patients.
- 4) All the patients are allowed to attain a comfortable position in a dental chair.
- 5) Every effort should be made to keep procedure time down to a minimum, and treatment should be terminated early if the patient becomes overly anxious.
- 6) Current medications which the patients are taking and allergies to any drugs and also any potential drug interactions and side effects are noted.⁸

Dental management of hypertensive patients. Prior to any treatment, a consultation with the physician regarding the current medical status, medication, and patient management during periodontal therapy is required. Dentist must inform the physician regarding the estimated degree of stress, length of procedures,

and complexity of the individualized treatment plan. A detailed family history of heart disease, history of hypertension, drug history, any complications should be evaluated. Before starting dental treatment, dentist has to assess the presence of hypertension and accordingly the treatment changes needed. Patients with hypertension are at increased risk of developing adverse effects in a dental office. With every new patient at the dental office, a new recording of blood pressure should be recorded. In patients with chronic systemic diseases, BP measurement will be carried out during more complicated dental interventions as oral surgical procedures, restorative treatment complicated with longer sessions, placing dental implants, and periodontal surgery. Routine measurement of BP may reduce the risk of cardiovascular events and acute complications during dental treatment, especially when conscious sedation or general anesthesia is required. Whenever a dentist meets a patient with hypertensive crisis, the dental procedure should be postponed and the patient should be sent for consultation.⁹

Dental management of angina pectoris patients: In day to day life majority of the population suffers from coronary heart disease which most likely a dentist can meet. Treatment sequence should start with taking complete medical history followed by short morning appointments, premedication with anxiolytics or prophylactic nitroglycerin, nitrous oxide-oxygen sedation, and slow delivery of an anesthetic with epinephrine (1:1,00,000) coupled with aspiration. Angina pain is often felt in the mandible, with secondary radiation to the neck and throat. Therefore, the patient may initially suspect the pain to be of dental origin. The dental environment increases the likelihood of an angina attack because of fear, anxiety, and pain. A patient who has an angina episode in the dental chair should receive the following emergency dental treatment: Dental procedure is discontinued and Patient is allowed to attain a comfortable position. Patient is reassured and restrictive garments are loosened. Patient is encouraged to have his own NTG spray 1 or 2 metered sprays depending on his usual requirement (up to 3 doses of NTG spray can be given in 15 min). If angina signs and symptoms do not resolve with this treatment within 2–3 min, administer another dose of nitroglycerin, monitor the patient's vital signs, call his or her physician, and be ready to accompany the patient to emergency department. Oxygen is administered 4–6 lit/min. Dental procedure may be restarted if it is the usual type of experience for the patient. If no improvement within 15min – Myocardial Infarction (MI) is suspected, patient is sent to the hospital.¹⁰

Dental management of myocardial infarction (MI) patients. A careful medical history with short appointments along with anxiety reduction should be carried out. Supplemental Oxygen via a nasal cannula will help meeting the extra oxygen requirements of the Myocardium: 4 lit/min. Caution should be taken if more than 3 ml of 2% Lignocaine Hydrochloride with 1:80,000 adrenaline solution is required. Drug interactions with potential adverse reactions need to be taken into account after treatment (e.g. interaction between NSAIDs, Penicillin, Tetracycline, Metronidazole, and anticoagulants) because prophylactic antibiotic may need to be considered to prevent infection. In patients with pacemakers, electrocautery and the use of cavitron

should be avoided. Within 6 months, if any urgent invasive treatment is required such as Extractions/RCT, with 6 months of infarction, the treatment should be delivered in a hospital setting where facilities exist should there be another attack of MI. After 6 months, myocardial infarction patients can usually be treated using techniques similar to the stable angina patient.^[9]

Dental management of infective endocarditis patients

Management of patients with infective endocarditis will involve Health questioning which will cover history for all potential categories of risk. If any doubt exists, the patient's physician should be consulted. Oral hygiene should be practiced with methods that improve gingival health yet minimize bacteremia. In patients with significant gingival inflammation, oral hygiene is initially limited to gentle procedures. Oral irrigators are generally not recommended because their use may induce bacteremia. Susceptible patients should be encouraged to maintain the highest level of oral hygiene once soft tissue inflammation is controlled. Severe periodontal disease and areas of periodontal suppuration or dental focus of infection require elimination. Pretreatment chlorhexidine mouthrinses are recommended before all procedures, including periodontal probing, because they significantly reduce the presence of bacteria on mucosal surfaces. Dental extraction should be avoided in healthy mouths whenever possible. Endodontic therapy is the treatment of choice. Also, single extractions are preferable to multiple extractions. All dental treatment procedures require antibiotic prophylaxis. When possible, at least 7 days are kept between appointments (preferably 10–14 days). If this is not possible, an alternative antibiotic regimen is selected for appointments within a 7-day time period. Regular recall appointments, with an emphasis on oral hygiene reinforcement and maintenance of oral health, are extremely important for patients With infective endocar-ditis.^[11]

TABLE 1

List of Cardiac Conditions Requiring Antibiotic Prophylaxis

Prosthetic cardiac valve
Previous infective endocarditis
Congenital heart disease (CHD)*
<ul style="list-style-type: none"> ◦ Unrepaired cyanotic CHD, including palliative shunts and conduits ◦ Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention during the first 6 months after the procedure ◦ Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibits endothelialization)
Cardiac transplantation recipients who develop cardiac valvulopathy

*Congenital heart diseases not mentioned do not need antibiotic prophylaxis.

Regimens for a dental procedure.

SITUATION	AGENT	REGIMEN: SINGLE DOSE 30-60 MINUTES BEFORE PROCEDURE	
		Adults	Children
Oral	Amoxicillin	2 grams	50 milligrams per kilogram
Unable to Take Oral Medication	Ampicillin OR Cefazolin or ceftriaxone	2 g IM* or IV†	50 mg/kg IM or IV
		1 g IM or IV	50 mg/kg IM or IV
Allergic to Penicillins or Ampicillin Oral	Cephalexin§	2 g	50 mg/kg
	OR Clindamycin	600 mg	20 mg/kg
	OR Azithromycin or clarithromycin	500 mg	15 mg/kg
Allergic to Penicillins or Ampicillin and Unable to Take Oral Medication	Cefazolin or ceftriaxone§	1 g IM or IV	50 mg/kg IM or IV
	OR Clindamycin	600 mg IM or IV	20 mg/kg IM or IV

* IM: Intramuscular.
 † IV: Intravenous.
 ‡ Or other first- or second-generation oral cephalosporin in equivalent adult or pediatric dosage.
 § Cephalosporins should not be used in a person with a history of anaphylaxis, angioedema or urticaria with penicillins or ampicillin.

9. Dental management of dysrhythmia patients During any dental treatment,if arrhythmia occurs continous monitoring using ECG and pulse oxymetric devices should be recorded Patients with cardiomyopathies, heart failure, and valvular problems could face arrhythmias so a careful evaluation by physician and required

medication should be implemented before extensive dental procedures. If a patient with known heart disease develops arrhythmia during treatment, the treatment should be discontinued, supplemental oxygen considered, and the patient status closely monitored. If the patient recovers quickly, continuation of treatment may be considered if the patient wishes. If a patient with heart disease collapses in the chair, cardiac arrest should be suspected and emergency medical services activated immediately and cardiopulmonary resuscitation initiated without delay. These patients are advised to take their medication regularly. Beta-blockers are the preferred drug of choice.^[12]

10. Dental treatment of patients on anticoagulant therapy

Patients on anticoagulant therapy should be delicately handled in a dental setup. This may involve use of local hemostatic measures to control bleeding in anticoagulated patients. These include atraumatic surgical technique, adequate wound closure, pressure application, and topical clotting agents. Oral rinsing with tranexamic acid can also be used. The indication for anticoagulation should be known since many indications allow brief discontinuation of anticoagulant treatment without a substantial increase in the risk of thrombotic events. On the other hand, anticoagulant treatment should in general not be discontinued in patients with mechanical valve prostheses. Close collaboration with the patient's physician is recommended in these matters. In patients receiving long-term anticoagulant therapy and who are stably anticoagulated on warfarin, an international normalized ratio (INR) check 72 h prior to surgery is recommended. This allows sufficient time for dose modification if necessary to ensure a safe INR (2–4) on the day of dental surgery (including subgingival scaling). There is no need to check the INR for non-invasive dental procedures.^[12]

Heart Transplantation

Active and potential sources of infection (periodontal and dental) should be eliminated and necessary .Dental care should be accomplished before transplant.Patients who receive a heart transplant on an emergency basis and who have existing and identified dental infection, should receive antibiotics before and after the transplant, until dental treatment is rendered. After heart transplantation, recipients may be maintained on life long immunosuppressive drugs to blunt the host rejection. These drugs may include cyclosporine, corticosteroides, antilymphocyte globulin (ALG), Azathioprine, or combinations.

Periodontists and dental care workers should remain alert for signs and symptoms of unusual systemic fungal infections such as Cryptococcus and mucormycosis. These infections may lead to severe disseminated disease in immunosuppressed patients and must be detected early on for appropriate antimicrobial. Prophylactic antibiotics are recommended for all dental procedures likely to cause bacteremia in transplant patients taking immunosuppressive drugs, and physician consultation is appropriate. For these reasons, mouth wash for one minute with antiseptic at periodontal surgical site may reduce the incidence of possible bacteremia.^[13]

Conclusion Patients with family history of cardiovascular diseases or suspicion of heart disease could be frequently encountered in dental practice and as a dentist it is necessary to treat them. Medical and dental coordination with understanding of the potential hazards during dental treatment, with a proper knowledge of drugs and the potential adverse effects of drugs commonly used in periodontal practice is required . Successful management of such patients on a Dental Chair is thus based on knowing the patient, understanding the disease process, and judicious use of pharmacologic agents designed to produce a state of relaxation, decrease anxiety, and control the factors which may induce or contribute to the initiation of these cardiovascular diseases.

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