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Original Research

Dental Management of Cardiovascular Compromised Patient: A Review

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ABSTRACT:
Patient with various cardiovascular diseases are regularly encountered in dental practice and it is essential to treat them. Cardiac patients may collapse in the dental clinic due to variety of cardiac emergencies or drug interactions. Hence, patients with cardiac disease may pose a significant risk in dental clinics. Safe and effective dental management of such patients requires close medical and dental coordination, an understanding of the potential hazards during dental treatment, knowledge of drugs used in treatment of cardiovascular diseases. The present study consists of a literature review dental management of patients suffering from various cardiovascular diseases.

Keywords: Dentistry, Cardiovascular disease, Dental management

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INTRODUCTION

Cardiovascular diseases (CVD) comprise of a group of diseases of the heart and vascular system affecting majority of individuals worldwide. Ischemic heart disease, Hypertension, Dysrhythmias, and Infective Endocarditis are some of the cardiovascular conditions most commonly seen among the population.[1]

Along with the associated morbidity, such disorders are important because many patients are associated with treatment. So, patient with cardiovascular disease constitute risk cases in dental practice. The dental management of these medically compromised patients can be problematic in terms of oral complications, dental therapy, and emergency care.[2] The present study consists of a literature review dental management of patients suffering from various cardiovascular diseases.

TREATMENT OBJECTIVE[3]

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.

CARDIOVASCULAR DISEASES AND THEIR DENTAL MANAGEMENT

Hypertension

Hypertension is probably, one of the most common and significant medical condition encountered in dental practice. Hypertension is high blood pressure. Hypertension is defined as values >140 mmHg systolic pressure and/or >90 mmHg diastolic pressure.[4]

Undetected and insufficiently treated hypertension is a problem in dental environment. Elevated blood pressure increases a patient risk of experiencing cardiovascular condition such as angina, myocardial infarction and cerebrovascular accident while undergoing dental treatment.[5]

Dental management[6-9]

1. A well-controlled hypertensive patients does not pose a risk in clinical practice.

2. The patient is to be instructed to take his or her medication as usual on the day of dental treatment. Prior to such treatment, the patient blood pressure should be recorded.
3. It is preferable for the visits to be brief and in the morning. The prescription of anxiolytic agents may prove necessary in particularly anxious patients (5-10 mg of diazepam the night before and 1-2 hours before the appointment) before dental treatment, or alternatively sedation with nitrous oxide may be considered.
4. In the case of emergency dental visits, treatment should be conservative, with the use of analgesics and antibiotics. NSAIDs should not be prescribed for longer than this five-day period.
5. Patients with cardiovascular disease are at a greater risk of massive endogenous adrenalin release secondary to deficient local anesthesia than of reaction to the small amount of vasoconstrictor used in local anesthetics. Nevertheless, vasoconstrictor use should be limited, taking care not to exceed 0.04 mg of adrenaline.

MYOCARDIAL INFARCTION

Myocardial infarction is characterized by acute, sudden onset and intense pain, of an oppressive nature, located in the retrosternal or precordial region, and can irradiate to the arms, neck, back, jaw, palate or tongue. The duration is over half an hour, and the pain does not subside with rest. The condition is accompanied by intense perspiration, nausea, vomiting, dyspnea and imminent death sensation, though it can also manifest as sudden loss of consciousness, mental confusion or weakness. The triggering stimuli are emotional stress, intense physical exercise or the existence of concomitant disease or surgery. So-called silent infarctions in turn are characterized by an absence of pain, and are more common in elderly individuals, in women and in diabetic patients.[10,11]

DENTAL MANAGEMENT

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 use 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.[1]

HEART FAILURE

Heart failure (HF) is defined as the incapacity of the heart to function properly, pumping insufficient blood towards the tissues and leading to fluid accumulation within the lungs, liver and peripheral tissues**.**[12]

DENTAL MANAGEMENT

Dental treatment should be limited to emergency care, preferably in a hospital setting, in patients with heart failure. Placing a patient with poorly compensated heart failure in supine position can cause shortness of breath and can precipitate pulmonary edema, thus complicating dental treatment procedures.[13]

It is advisable to avoid vasoconstrictors in patients receiving digitalis as it can precipitate cardiac arrhythmias. Since aspirin can lead to sodium and fluid retention, it is prudent to avoid it in patients with heart failure. Medications used by patients with heart failure can be associated with certain side effects of dental significance like xerostomia, lichenoid reaction, and orthostatic hypotension.[14]

Dental treatment is to be limited to patients who are in stable condition. The patient should be placed in the semi-supine position in a chair, with control of body movements (which should be slow), in order to avoid orthostatic hypotension. In the event of an emergency and after contacting the emergency service, the patient should be placed seated with the legs lowered, and receiving nasal oxygen at a rate of 4-6 liters/minute. Sublingual nitroglycerin tablets are indicated (0.4-0.8 mg), and the dose may be repeated every 5 or 10 minutes if blood pressure is maintained.[12]

INFECTIVE ENDOCARDITIS

Endocarditis is a life-threatening disease, although it is relatively uncommon. Endocarditis usually develops in individuals with underlying structural cardiac defects who develop bacteremia with organisms likely to cause endocarditis. Some surgical and dental procedures and instrumentations involving mucosal surfaces or contaminated tissue cause transient bacteremia that rarely persists for more than 15 minutes. Blood-borne bacteria may lodge on damaged or abnormal heart valves or on the endocardium or the endothelium near anatomic defects, resulting in bacterial endocarditis or endarteritis

DENTAL MANAGEMENT

Antimicrobial prophylaxis is recommended for procedures associated with significant bleeding from hard or soft tissues, periodontal surgery, scaling, and professional teeth cleaning. In such an event, data from experimental animal models suggest that antimicrobial prophylaxis administered within 2 h

following the procedure will provide effective prophylaxis

Table no 1: Antibiotic regimens for a dental procedure

Route	**Drug**	**Regimen:** Single dose 30 to 60 min before procedure	
		For adult	**For children**
Oral	Amoxicillin	**2g**	50 mg/kg
Unable to take oral medication	Ampicillin or Cefazolin or ceftriaxone	2 g IM or IV 1 g IM or IV	50 mg/kg IM or IV
Allergic to penicillins or ampicillin — Oral	Cephalexin* or Clindamycin or Azithromycin or clarithromycin	2g 600 mg 500 mg	50 mg/kg 20 mg/kg 15 mg/kg
Allergic to penicillins or ampicillin and unable to take oral medication	Cefazolin or ceftriaxone* or Clindamycin	1 g IM or IV 600 mg IM or IV	50 mg/kg IM/IV 20 mg/kg IM/IV
* Cephalosporins should not be used in a person with a history of anaphylaxis, angioedema or urticaria with penicillins or ampicillin.			

CARDIAC ARRHYTHMIAS

A cardiac arrhythmia simply defined is a variation from the normal heart rate and/or rhythm that is not physiologically justified.[16]

DENTAL MANAGEMENT

Patients with dysrhythmias may be managed with electronic devices that emit electrical signals (cardiac pacemaker and implantable cardioverterdefibrillators). These devices have been shown to be sensitive to electromagnetic signals produced by dental instruments like electrosurgical unit, electric pulp tester, electronic apex locator, etc.. Though the newer models (bipolar devices with electromagnetic shielding) are generally not affected by the small electromagnetic fields generated by dental equipment, caution should be observed when operating ultrasonic scalers, ultrasonic cleaning systems, select composite curing lights in the vicinity of individuals who have pacemakers or implantable cardioverter-defibrillators.[17]

ANGINA PECTORIS

Angina pectoris is an acute coronary syndrome associated with transient ischemia to the myocardium. Hypoxia (and at times anoxia) results from diseases and conditions which lead to atherosclerosis and obstruction of coronary arteries by fatty deposits that limits and/or impairs coronary blood flow. Precipitating factors that increase cardiac oxygen demand in the presence of decreased perfusion of the myocardium include physical exertion, emotional stress, cold, recent meal. Unstable angina pectoris may occur spontaneously at rest.[18]

DENTAL MANAGEMENT

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.[1]

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.1

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 3 min – Myocardial Infarction (MI) is suspected, patient is sent to the hospital.[19]

CONCLUSION

Cardiovascular diseases (CVD) comprise of a group of diseases of the heart and vascular system affecting majority of individuals worldwide. Dental surgeons may be the first line of defence in the detection and referral of a patient suspected of having cardiovascular disease, an uncontrolled disease status, or oral adverse drug reactions, and they have a key role to play in oral and systemic disease prevention and treatment, in partnership with the patient and his physician.

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