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Textbook of

Oral Medicine, Oral Diagnosis and Oral Radiology

Editors
Ravikiran Ongole
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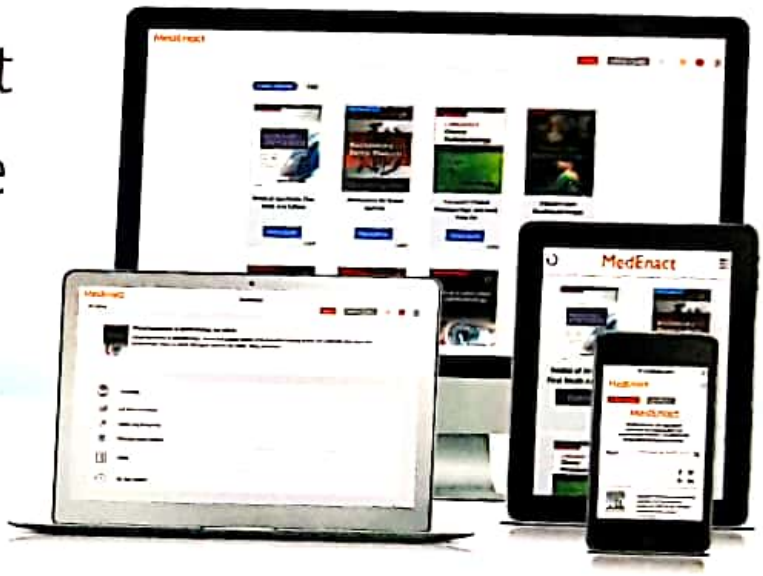

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OUTLINE

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CARDIOVASCULAR DISORDERS

Cardiovascular disease is quite common; although it is more frequent and severe in later life, it can also affect young individuals. It is one of the leading causes of death in the world. A thorough knowledge about cardiovascular diseases is necessary because of its implications in dentistry and also the initial measures taken by the dentists in case of certain emergency conditions can be lifesaving.

Cardiovascular History Taking

Clinicians must assess the status of cardiovascular system (CVS) within the context of the patient's overall health. These associated conditions can heighten cardiovascular risk during dental care. Consequently, an initial medical history should be obtained from all patients and it must be reviewed with the patient at each appointment to identify serious cardiac conditions. The clinicians should also note history of cerebrovascular disease, renal dysfunction, chronic pulmonary disease, diabetes mellitus, anaemia, dyslipidaemia, peripheral vascular disease, orthostatic intolerance and anaemia. Furthermore, an accurate record of current medication taken by the patient and use of tobacco products, alcohol and over-the-counter and recreational drugs should be documented.

SYMPTOMS SUGGESTIVE OF CARDIOVASCULAR DISEASE

Chest Pain

It is the common presentation of cardiac diseases, though can be a manifestation of disease of the lungs, musculoskeletal system or gastrointestinal (GI) system. Pain is usually felt behind the sternum and radiates across the chest and down the arms; it may also radiate to the back or to the mandible.

Breathlessness or Dyspnoea

It is a major symptom of many cardiac disorders, particularly left heart failure. Dyspnoea may vary in severity from an uncomfortable awareness of breathing to a frightening sensation of fighting for breath.

There are three forms of dyspnoea:

- Orthopnoea: Lying flat causes a steep rise in left atrial pressure in patients suffering from heart failure resulting in pulmonary congestion and severe dyspnoea. A semirecumbent position helps such patients.
- Paroxysmal nocturnal dyspnoea: Frank pulmonary oedema on lying flat awakens the patient from sleep with distressing dyspnoea. Symptoms are corrected by standing upright.
- Exertional dyspnoea: Exercise causes a sharp increase in left atrial pressure resulting in dyspnoea.

Fatigue. Exertional fatigue is an important symptom of heart failure and is more severe towards the end of the day.

Palpitation. Awareness of the heartbeat is common during exertion or heightened emotions. However, it may be indicative of an abnormal cardiac rhythm.

Dizziness and syncope. Cardiovascular disorders produce dizziness and syncope by transient hypotension resulting in abrupt cerebral hypoperfusion. Recovery is usually rapid.

Lower limb pain or discomfort. A tight or cramping pain in lower limb muscles on exercise may be present.

Oedema of legs. Bilateral swelling of the legs due to oedema is a common feature of chronic heart failure. The history should also determine the patient's functional capacity.

Functional capacity

- Functional capacity refers to an individual's capacity to perform a spectrum of common daily tasks.
- The functional capacity can be expressed in terms of metabolic equivalent (MET) values. It can be classified as follows:
  - 1 MET or more
    - Do light work around the house.
    - Walk a block on level ground at 3.2–4.8 km/h.
  - 4 MET or more
    - Climb a flight of stairs or walk up a hill.
    - Walk on level ground at 6.4 km/h.
    - Run a short distance.
    - Do heavy work around the houses (scrubbing floors, lifting or moving heavy furniture).
  - 10 MET or more
    - Participate in strenuous sports (swimming, singles tennis, football, basketball or skiing).

The functional capacity can be graded as follows:
- Excellent (if >10 MET)
- Good (7–10 MET)
- Moderate (4–7 MET)
- Poor (<4 MET)

Patients are at an increased cardiac risk when unable to meet a 4-MET demand during normal daily activity.

Physical Examination

The general appearance of the patient can provide valuable information related to his/her physical and emotional state. Pallor, cyanosis, peripheral oedema, dyspnoea, tremors, Cheyne–Stokes respiration, obesity and anxiety are clues that suggest the presence of cardiovascular disease.

Cyanosis. It is defined as the blue colour of the skin and mucous membranes due to the presence of excessive amount of deoxygenated haemoglobin in these tissues. It is seen in heart failure, cyanotic congenital cardiac disease and chronic cardiac disorders.

Finger clubbing. It is the obliteration of the angle between nail base and adjacent skin of the finger. Clubbing is characterized by the thickening of the nail bed secondary to hypervascularity and opening of the anastomotic channels in the nail bed. It is seen in congenital cardiac disease and infective endocarditis (IE).

Distended neck veins. Systemic fluid retention and inability of heart to pump blood into the lungs may be seen as distention of the veins in the neck.

Swelling of legs due to peripheral oedema. Bilateral swelling of both the legs may be due to chronic heart failure. Oedema is detectable by fingertip pressure over the tibial bone for about 30 seconds; a pit due to physical displacement of excessive tissue fluid is observed.

Blood pressure. Determination of the blood pressure provides a useful clue that will confirm or rule out significant cardiovascular disease. It should be recorded on all new patients at the time of initial appointment and at all subsequent appointments on all patients with a history of hypertension, cardiovascular disease, diabetes mellitus, thyroid disorders, adrenal disease, renal dysfunction and significant use of tobacco, alcohol or coffee. The auscultatory method of measurement of BP is recommended. In patients older than 50 years, elevated systolic pressure may predict the potential for cardiovascular morbidity and mortality.

Pulse rate and rhythm. The pulse pressure closely correlates with systolic pressure and is a reliable cofactor that will provide us with information on cardiovascular disease. Rate less than 60 or more than 100 in adults and if associated with symptoms such as sweating, weakness, dyspnoea and chest pain should be considered as a risk factor in association with noncardiac procedures. Further abnormalities in the normal rhythm of the pulse should provoke a search for any underlying cardiac diseases.

COMMON CARDIOVASCULAR DISORDERS AND THEIR DENTAL CONSIDERATIONS

Hypertension

Hypertension is a disorder characterized by an abnormal elevation of arterial pressure, which, if sustained and untreated, is associated with a significant increase in morbidity and mortality. The systolic or diastolic pressure or both are elevated in hypertension.

It may be asymptomatic for long periods but ultimately leads to damage with resultant symptoms in several organs including kidney, heart, brain and eyes.

It is generally accepted that a sustained systolic blood pressure of 140 mm Hg or more and a sustained diastolic blood pressure of 90 mm Hg or more is abnormal.

Aetiology

Majority of the patients suffering from hypertension have no cause for their disease. These patients are diagnosed to have primary, idiopathic or essential hypertension. Essential hypertension is seen in elderly, obese and individuals who are tensed and fearful. Genetic factors also play a role. However, a few patients have underlying systemic diseases that produce hypertension, which is known as a secondary hypertension.

Systemic Diseases Causing Secondary Hypertension

- Renal disease (renal parenchymal disease, renal artery stenosis)
- Adrenal abnormalities (primary aldosteronism, Cushing syndrome, pheochromocytoma)
- Coarctation of aorta
- Hyperthyroidism
- Pregnancy (eclampsia)
- Central nervous system (CNS) disorders (head injury, infection, haemorrhage and brain tumours)
- Autonomic hyperactivity
- Sleep apnoea
- Drug-induced (cyclooxygenase [COX-1 and COX-2] inhibitors, sympathomimetics, steroid hormones, cyclosporine and tacrolimus)

Lifestyle risk factors increasing the chances of a person becoming hypertensive are the following:
- Obesity
- High dietary salt intake
- Excess alcohol
- Smoking
- Physical inactivity
- Stress/anxiety

Signs and Symptoms

A patient suffering from hypertension is usually asymptomatic for quite a few years. The early symptoms include

occipital headache, vision changes, ringing ears, dizziness, weakness and nose bleeding. Odontalgia due to hyperaemia or congestion of dental pulp has also been reported.

Untreated hypertension reduces the life span by 10–20 years. Even mild hypertension that has not been treated for 7–10 years increases the risk of complications. Sustained hypertension results in arterial damage (atherosclerosis) and the onset of these vascular changes in the kidney, CVS, cerebrovascular system and eyes can cause complications such as renal failure, coronary insufficiency, myocardial infarction (MI), congestive cardiac failure, cerebrovascular accident (stroke) and blindness in patients. Malignant hypertension develops in 1% of hypertensives. The chief complication is severe ischaemic damage to the kidney and renal failure. In the absence of treatment, it can be fatal within 1 year of diagnosis.

Blood pressure is measured by the use of a sphygmomanometer, an instrument that indirectly records the diastolic and systolic pressure.

Food, exercise, alcohol and smoking should be avoided for 30 minutes before measurement of BP and also the patient should be at rest for at least 5 minutes.

Faulty BP readings involve using improper-size cuffs or applying the cuffs too loosely or too tightly.

Classification of Blood Pressure

Classification	Systolic BP (mm Hg)	Diastolic BP (mm Hg)
Normal	<120	<80
Prehypertension	120–139	80–90
Stage 1 hypertension	140–159	90–99
Stage 2 hypertension	>160	>100

Malignant hypertension. It is a highly elevated blood pressure associated with organ damage (eyes, brain, lungs and kidneys are affected). The systolic and diastolic blood pressures are usually more than 240 and 120 mm Hg, respectively.

White coat hypertension. It is a phenomenon in which patients exhibit elevated blood pressure in a clinical setting but not when recorded by themselves at home or when ambulatory. White coat hypertension is believed to be secondary to anxiety that some individuals may experience during their visit to a hospital.

General Management

- Acute emotions should be avoided.
- In patients with secondary hypertension, manage the primary cause.
- The patient should practice the following for a lifetime:
  - Weight loss—maintaining ideal body weight lowers systolic BP reading by 5–20 points
  - Reduction in salt intake less than 2.4 g/day
  - Restricting alcohol and caffeine
  - Stopping smoking
  - Exercise (lowers BP by 5–9 mm Hg)
  - Intake of fruits, vegetables and low-fat dairy products

Specific Management

Antihypertensive therapy

- Direct-acting vasodilators: Nitroglycerin and minoxidil directly relax the vascular smooth muscle. Methyldopa and clonidine act in the CNS to decrease sympathetic nervous system output.
- Angiotensin II receptor blockers: Losartan and telmisartan prevent angiotensin II from binding on smooth muscle sites in arteries, promoting vasodilatation.
- Diuretics: Frusemide and hydrochlorothiazide reduce blood volume and decrease vascular resistance.
- Beta-blockers: Propranolol and sotalol reduce heart rate and force of contraction. Selective beta-blockers are preferred. Nonselective beta-blockers are contraindicated in patients suffering from asthma, because their beta-agonist action is blocked.
- Angiotensin-converting enzyme (ACE) inhibitors: Captopril and ramipril retard the renin–angiotensin system, leading to vasodilatation.
- Calcium channel blockers: Amlodipine and nifedipine decrease the calcium influx in smooth and cardiac muscles, reduce the total peripheral resistance and decrease the force of contraction.
- Alpha-blocking agents: Prazosin and terazosin prevent norepinephrine from binding to receptors in arterioles, leading to vasodilatation.

Therapeutic Goals and Pharmacological Strategies for Hypertension

Therapeutic Goal	Pharmacological Strategies
Reduce volume overload	Diuretics
Block beta-1 adrenergic receptors	Beta-1 adrenergic receptor antagonists
	ACE inhibitors
Dilate blood vessels	Angiotensin II receptor antagonists
Reduce sympathetic outflow from the central nervous system	Calcium channel blocking agents
	Alpha-1 adrenergic receptor antagonists
	Alpha-2 adrenergic receptor antagonists

Oral Side Effects of Antihypertensive Medicines

Drugs	Side Effects
Diuretics	Dry mouth, lichenoid reactions
Beta-blockers	Dry mouth, lichenoid reactions, taste change
ACE inhibitors	Loss of taste, dry mouth, ulcerations, angio-oedema
Calcium channel blockers	Gingival enlargement, dry mouth, altered taste
Alpha-blockers	Dry mouth