Hilla University College / Dentistry Department / Oral Surgery

(4 th stage) / Dental Management of Medically Compromised Patients

Patient Evaluation and Risk Assessment

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- **MEDICAL HISTORY:**

- A medical history must be taken for every patient who is to receive dental treatment. Two basic techniques are used to obtain a medical history.

- **The first technique** consists of an interview of the patient (medical model), in which the interviewer questions the patient and then records a narrative of the patient's verbal responses on a blank sheet.

- **The second technique** is the use of a questionnaire that the patient fills out. **The latter approach is most used in dental practice and is very convenient and efficient**.

Hypertension:

Hypertension is an abnormal elevation in arterial pressure that can be fatal if sustained and untreated.

The blood pressure is the product of cardiac output and peripheral resistance and is dependent on the heart and vasculature, autonomic nervous system, endocrine system and kidneys.

In adults, a sustained systolic blood pressure of 140 mmHg or greater and/or a sustained diastolic blood pressure of 90 mmHg or greater is defined as hypertension.

- The **systolic pressure** is the force that the blood exerts on the artery walls as the heart contracts to pump the blood to the peripheral organs, while the **diastolic pressure** is residual pressure exerted on the arteries as the heart relaxes.

- The difference between diastolic and systolic pressures is called **pulse pressure**.

- **Mean arterial pressure** is roughly defined as the sum of the diastolic pressure plus one-third the pulse pressure.

Etiology:

1 . Primary/Essential/Idiopathic Hypertension:

Primary/essential hypertension is the most common type of hypertension and accounts for about **90% of all cases presenting with high blood pressure with no readily identifiable cause for their disease.**

This type of hypertension has and a genetic link and is often associated with cardiovascular risk factors, smoking, obesity, lipid problems, and diabetes.

Secondary Hypertension:

Secondary hypertension is always due to an underlying cause such as intrinsic renal diseases, renovascular disease, Pheochromocytoma, Cushing's syndrome, thyroid or parathyroid disease, heavy alcohol consumption, chronic corticosteroid therapy, chronic NSAIDS therapy, or long-term oral contraceptive use can lead to secondary hypertension.

The secondary hypertension patient experiences symptoms quite early on compared to the primary/essential hypertension patient and the symptoms **are more severe.**

Many patients with secondary hypertension may be cured after treatment of the underlying cause.

- **Classification of Hypertension Adults and Recommendations for Follow-Up A recent classification redefines "normal" blood pressure as:**

- **TABLE 3.1 Classification of Blood Pressure (BP) in Adults and Recommendations for Follow-Up**

BP Classification	Systolic BP (mm Hg)		Diastolic BP (mm Hg)	Recommended Follow-Up
Normal	<120	and	<80	Recheck in 2 years.
Prehypertension	120–139	or	80–89	Recheck in 1 year.
Stage 1 hypertension	140–159	or	90–99	Confirm within 2 months.
Stage 2 hypertension	≥160	or	≥100	Evaluate or refer to source of care within 1 month. For those with higher BP (e.g., >180/110 mm Hg), evaluate and treat immediately or within 1 week, depending on the clinical situation and complications.

- Some authors define hypertension as Mild when the systolic blood pressure is 140-159 mmHg and the diastolic is 90-99 mmHg, Moderate when the systolic is 160-179 mmHg and diastolic is 100-109 mmHg and Severe when the systolic pressure is ≥180 mmHg and the diastolic is ≥110 mmHg.

- Lifestyle risk factors modifying hypertension Lifestyle can play an important role in the severity and progression of hypertension; obesity, excessive alcohol intake, excessive dietary sodium, and physical inactivity are significant contributing factors.

- **Clinical features:**
- One third of the hypertensive patients are asymptomatic or only have trivial complications like epistaxis.
- **Symptoms include; headaches, visual disturbances, tinnitus, dizziness.**
- **Signs include; hypertension on testing, retinal changes, left ventricular hypertrophy, proteinuria and hematuria.**
- **Blood pressure is measured with the use of a sphygmomanometer. The diagnosis is based on an average of two or more properly measured, seated blood pressure readings on each of two or more office visits.**

- **Management:**
- **Hypertension is diagnosed by standardized serial blood pressure measurements.**
- **Investigations to identify a ‘secondary’ cause and assess end-organ damage (also called target organ damage) include: chest radiography (cardiomegaly is suggestive of hypertensive heart disease); ECG (may indicate ischemic heart diseases); serum urea and electrolytes (deranged in hypertensive renal disease and endocrine causes of secondary hypertension); urine testing (blood and protein suggests renal disease).**

- **Relaxation, weight loss, high-fiber diet, reduction in salt intake, restricting alcohol consumption, restricting caffeine intake, stopping smoking and taking more exercise and avoidance of acute emotions.**

- ❖ Antihypertensive therapy; the minimum dose should be used with minimum side effects.
- Note: About 20% of patients with untreated stage 1 hypertension have what is **called white coat hypertension**, which is defined as consistently elevated BP only in the presence of a health care worker but not elsewhere.

- Antihypertensive agents:

- • **Diuretics;** these include Thiazide diuretics like Chlorothiazide, Loop diuretics like Furosemide, Potassium-sparing diuretics like Amiloride, Aldosterone receptor blocker like Spironolactone, or a combination like Aldactazide.

- • **Angiotensin-converting enzyme (ACE) inhibitors**; like Captopril, Enalapril, ramipril).

- • **Angiotensin receptor blockers (ARBs);** like Candesartan and Losartan.

- • **Beta-adrenergic blockers**; these are either Cardioselective like Atenolol, or Nonselective like propranolol.

- **Calcium-channel blockers (CCBs);** like Amlodipine, Nifedipine, Verapamil.
- • **Alpha1-adrenergic blockers**; like Doxazosin, Prazosin.
- • **Combined alpha and beta blockers**; like Carvedilol.
- • **Central alpha2-agonists and centrally acting drugs (Sympatholytics**); like (Clonidine, methyldopa).
- • **Vasodilators**; like Hydralazine, and Minoxidil.

- **Malignant (accelerated) hypertension:**
- Accelerated hypertension **(systolic >200 mmHg, diastolic >130 mmHg)** typically affects young adults, especially those of African or Afro-Caribbean heritage and, like essential hypertension, often causes no symptoms until complications develop.
- It may present with headaches, visual impairment, nausea, vomiting, fits (seizures) or acute cardiac failure.
- **The chief complication is severe ischemic damage to the kidneys and renal failure, which can be fatal within 1 year of diagnosis.**
- Other causes of death are cardiac failure or cerebrovascular accidents.

- Life-threatening accelerated hypertension requires urgent hospital admission with the **aim to reduce the blood pressure slowly with oral antihypertensives**.
- Rarely, intravenous antihypertensives (sodium nitroprusside) are used but a sudden drop in blood pressure may result in a stroke (cerebral infarction), thus it should be avoided.
- Vigorous treatment, if started before renal damage is too far advanced, can greatly improve the life expectancy.
- **About 50% of such patients can now expect to live for at least 5 years.**

- **Dental management**

- ➢ The first task is to identify patients with hypertension, both diagnosed and undiagnosed. A medical history, including the diagnosis of hypertension, treatment, identification of antihypertensive drugs.

- ➢ Blood pressure measurements should be routinely performed for all new patients and at recall appointments, also for patients who are not compliant with treatment, who are poorly controlled, or who have comorbid conditions such as heart failure, previous MI, or stroke.

- ➢ **The main concerns when one is providing dental treatment for a patient with hypertension:**
- 1. During the course of treatment, the patient might experience an acute elevation in blood pressure that could lead to a serious outcome such as stroke or MI.

- This acute elevation in blood pressure could result from the release of endogenous catecholamines in response to stress and anxiety, from injection of exogenous catecholamines in the form of vasoconstrictors in the local anesthetic, or from absorption of a vasoconstrictor from the gingival retraction cord.

- 2. Potential drug interactions between the patient's antihypertensive medications and the drugs prescribed and oral adverse effects that might be caused by antihypertensive medications.

- Hypertension is regarded as a minor clinical predictor of increased perioperative cardiovascular risk.
- **≤120/80 Any treatment can be provided.**
- **≥120/80 but < 140/90 Any treatment can be provided but encourage the patient to seek medical consultation.**
- **≥ 140/90 but < 160/100 Any treatment can be provided but encourage the patient to seek medical consultation.**
- **≥ 160/100 but < 180/110 Any treatment; consider intraoperative monitoring of blood pressure for upper-level stage 2, treatment should be terminated if blood pressure rises above 179/109. The patient should be referred to physician promptly.**

- ≥ 180/110:

- Any elective treatment is deferred and the patient is referred to physician. Only emergency treatment is provided; the patient should be managed in consultation with the physician, and measures such as intraoperative blood pressure monitoring, electrocardiogram monitoring, establishment of an intravenous line, and sedation may be used.

- Once it has been determined that the hypertensive patient can be safely treated, the following should be considered:

- **✓ Stress/anxiety reduction.**
- **✓ Establishment of good rapport.**
- **✓ Short, morning appointments.**
- **✓ Consider premedication with sedative/anxiolytic like Diazepam 2-5 mg the night before surgery and/or 1 hour before surgery**

- ✓ Consider the use of nitrous oxide/oxygen (conscious sedation), ensure adequate oxygenation at all times, especially at the termination of administration. Hypoxia is to be avoided because of the resultant elevation in blood pressure that may occur.
- ✓ Slow position changes to prevent orthostatic hypotension.
- ✓ Consider periodic intraoperative blood pressure monitoring for patients with upper level stage 2 hypertension; terminate appointment if blood pressure rises above 179/109.
- ✓ Obtain excellent local anesthesia; adrenalin in modest amounts is acceptable. One or two cartridges of 2% lidocaine with 1:100.000 adrenalin are of little clinical significance in most patients with hypertension.
- Use of more than this amount may well be tolerated but with increasing risk for adverse hemodynamic changes.
- Intravascular injections should be avoided through the use of aspirating syringes.

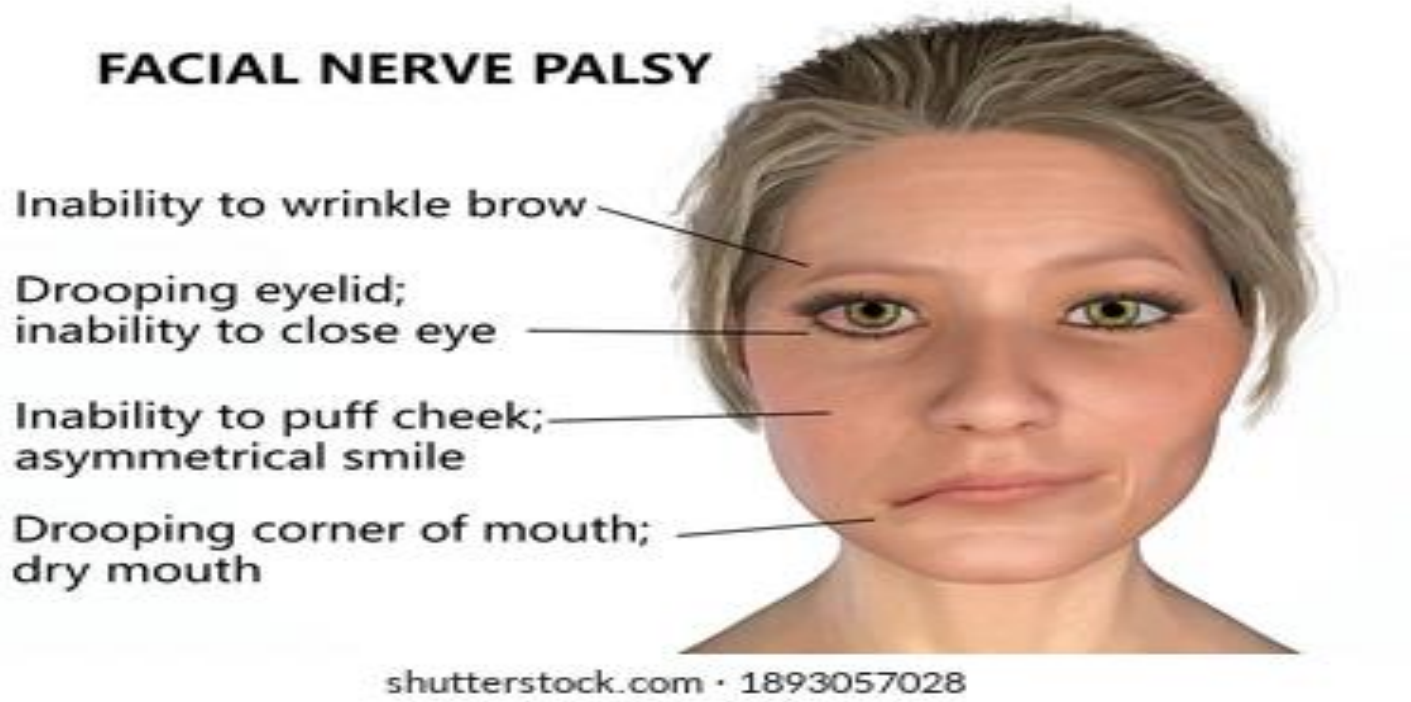
- ✓ Avoid the use of adrenalin-impregnated gingival retraction cord because these cords contain highly concentrated adrenalin, which can be quickly absorbed through the gingival sulcular tissues, resulting in tachycardia and elevated blood pressure.

- ✓ Noradrenalin and levonordefrin should be avoided in patients with hypertension because of their comparative excessive alpha1 stimulation.

- ✓ The use of adrenalin is generally not advised in patients with uncontrolled or severe hypertension, and indeed. However, if urgent treatment becomes necessary, a decision must be made about the use of adrenalin, which will be dictated by the situation.

- ✓ The other concern is for the adverse interactions between vasoconstrictors and the nonselective beta-blocking agents (such as propranolol) or peripheral adrenergic antagonists (such as Reserpine and Guanethidine). Available reports and clinical experience suggest that adrenalin in small doses of one to two cartridges containing 1:100.000 adrenalin can be used safely in most patients.
- **Oral Manifestations:**
- **No oral complications have been associated with hypertension itself.**
- **➢ Patients with malignant hypertension have been reported to occasionally develop facial palsy.**
- **➢ Patients with severe hypertension have been reported to bleed excessively after surgical procedures or trauma.**




FACIAL NERVE PALSY
Inability to wrinkle brow
Drooping eyelid;
inability to close eye
Inability to puff cheek;
asymmetrical smile
Drooping corner of mouth;
dry mouth
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- **➢ Patients who take antihypertensive drugs, especially diuretics, may report dry mouth.**

- **➢ Lichenoid reactions have been reported with thiazides, methyldopa, propranolol, and labetalol.**

- **➢ ACE inhibitors may cause neutropenia, resulting in delayed healing or gingival bleeding, non-allergic angioedema and burning mouth.**
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- **➢ All calcium channel blockers may cause gingival hyperplasia**














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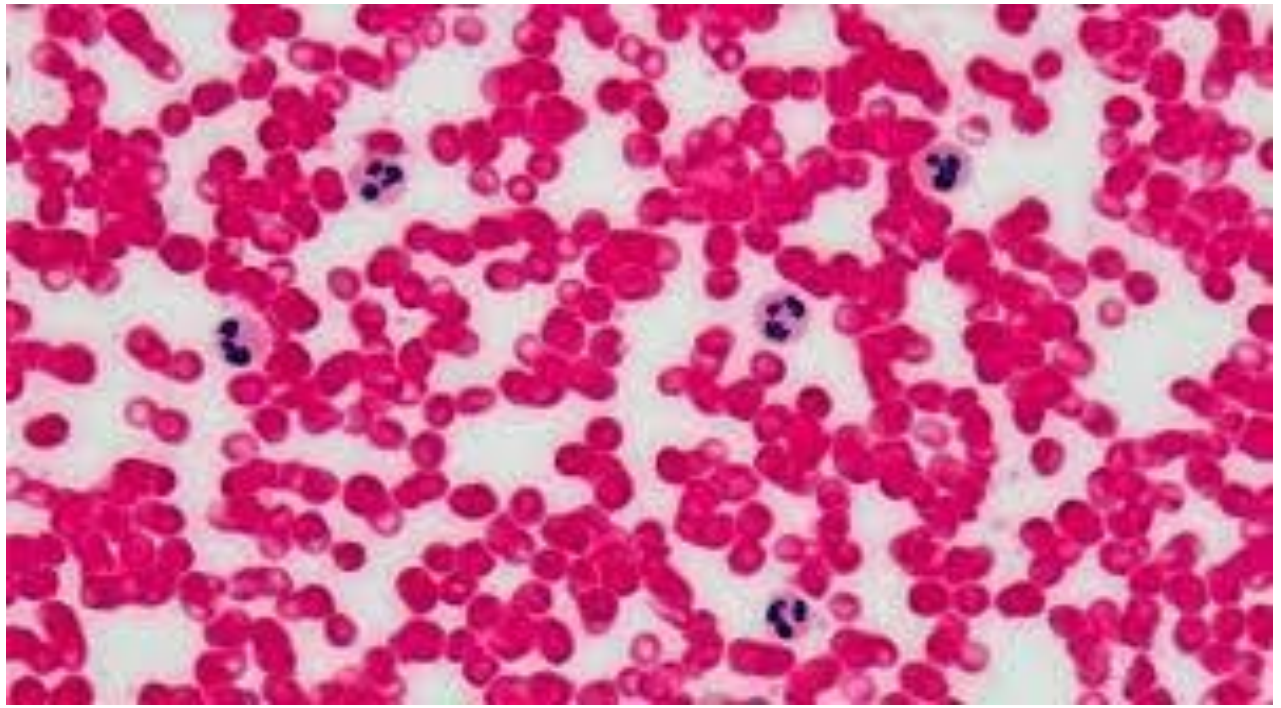


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A
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- **Ischemic Heart diseases**

- **Ischemic Heart Disease (IHD):** also called **Coronary Artery Disease (CAD)** is the most common and important cardiac disease and it is the most common cause of death.

- IHD is cause by **Atheroma (Atherosclerosis, also called Arteriosclerosis**), it is characterized by the accumulation of cholesterol and lipids in the intima of arterial walls, and can lead to thromboses, which sometimes break off and move within the vessels to lodge in and occlude small vessels **(embolism).**

- **Atheroma can thus lead to IHD with angina, myocardial infarction, cerebrovascular disease and stroke.**
- It also affects other arteries and can cause, for example, ischemic pain in the calves whilst walking – intermittent claudication – seen especially in young smokers. Atheroma results from a combination of genetic and lifestyle factors**.**
- **Irreversible (fixed) risk factors** include increasing age, male gender and family history of atheroma.
- ✞ **Potentially reversible risk factors** for atheroma include:
- • **Cigarette smoking. Persons who smoke 20 or more cigarettes daily have a two or threefold increase in coronary artery diseases.**
- • **Blood lipids.**
- • **Hypertension.**
- • **Diabetes mellitus. There is a two-eightfold higher rate of cardiovascular events.**
- • **Obesity and lack of exercise.**

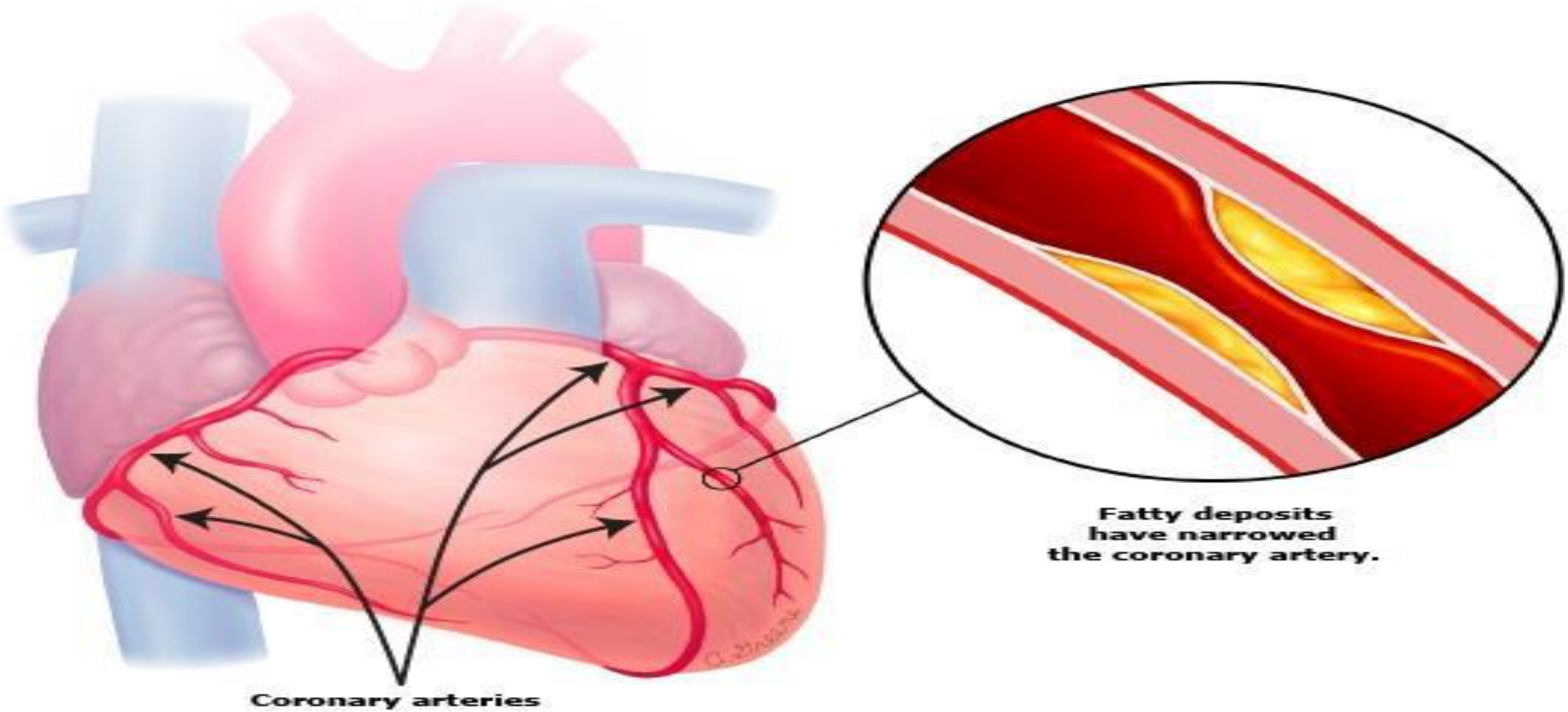


Fig. 3 Atherosclerosis

- **Angina pectoris**

- Episodes of chest pain caused by myocardial ischemia, it affects 1% of the adult population and its prevalence increases with age. **The usual underlying causes are atherosclerotic plaques that rupture.**

- Arterial spasm alone may, rarely, be responsible. The mortality rate in angina is about 4% per year, the prognosis depending on the degree of coronary artery narrowing.

- **The most common precipitating causes of angina pain** are physical exertion (particularly in cold weather); emotion (especially anger or anxiety); and stress caused by fear or pain, leading to adrenal release of catecholamines (epinephrine and norepinephrine) and consequent tachycardia, vasoconstriction and raised blood pressure

- **Clinical features of angina**

- • Chest pain described as a pressure sensation, fullness or squeezing in the mid-portion of the thorax, the pain lasts for less than 10-15 minutes about 2-5 minutes in most cases, relieved by rest or glyceryl trinitrate.

- • Radiation of chest pain into the jaw/teeth, shoulder, arm, and/or back.

- • Occasionally associated dyspnea or shortness of breath, epigastric discomfort or sweating.

- **Types of angina**
- ➢ **Stable angina:** induced by effort, stress or sometimes eating, it is relieved by rest or Nitroglycerin.
- ➢ **Unstable angina**: (crescendo) angina of increasing frequency or severity, occurs on minimal exertion or at rest, the pain is not readily relieved by Nitroglycerin, there is increased risk of MI.
- ➢ **Decubitus angina**: precipitated by lying down.
- ➢ **Variant or Prinzmetal's angina**: caused by coronary artery spasm.
- **The term acute coronary syndromes (ACS) are a term used in unstable angina and evolving MI which share a common underlying pathology; plaque rupture, thrombosis and inflammation.**

- **Management**
- ❖ Identify and correct risk factors; stop smoking, encourage exercise and weight loss, control hypertension and diabetes.
- ❖ Antiplatelet drugs like spirin 75-325 mg/24 h and\or clopidogrel.







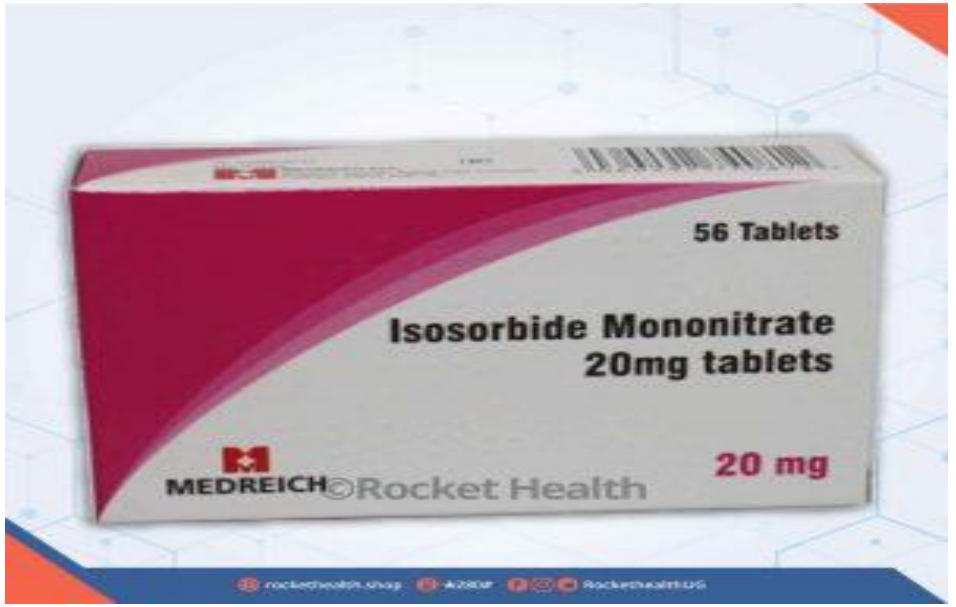
- ❖ β blockers; atenolol 50-100 mg/24h, unless contraindicated (asthma, COPD, bradycardia, coronary artery spasm).
-



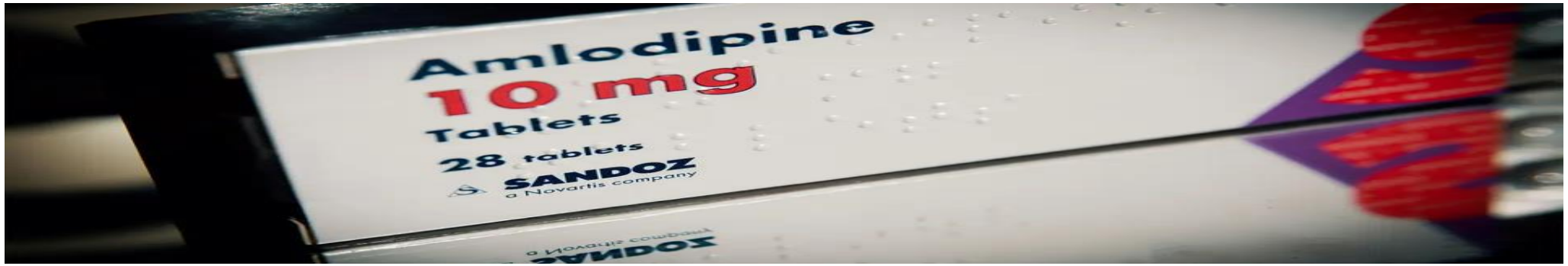


- Nitrates; for symptoms give glyceryl trinitrate (GTN) spray or sublingual tablets 0.3 mg to reduce the peripheral vascular resistance and reduce oxygen demands. Also long acting nitrates isosorbide mononitrate 20-40 mg twice daily or slow-release nitrate.

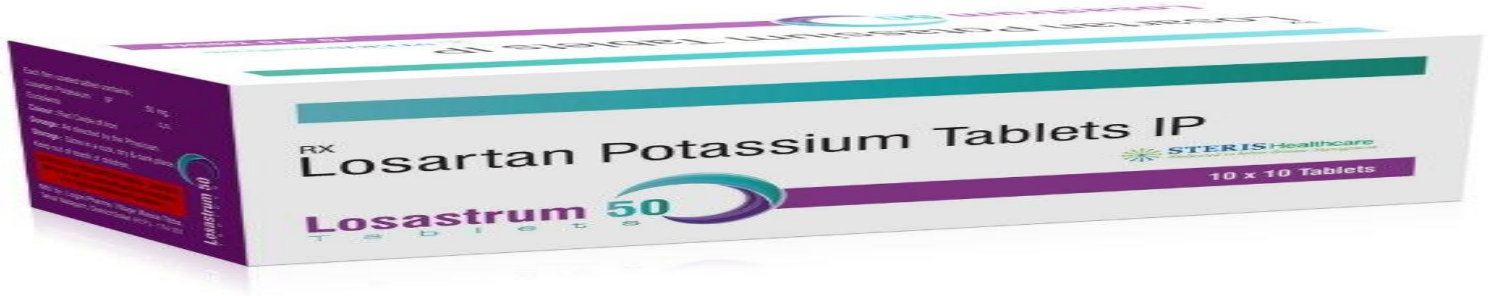




- Calcium antagonists; amlodipine, diltiazem, especially when β-blockers are contraindicated.



- ❖ Potassium channel activator; nicorandil.



- ❖ Percutaneous transluminal coronary angioplasty (PTCA); aims to open up the coronary blood flow by inserting a balloon- tipped catheter through the groin up into the area of arterial blockage.
- ❖ Coronary artery bypass grafts (CABG) are vascular grafts made to bridge the obstructions in the coronary blood vessels.

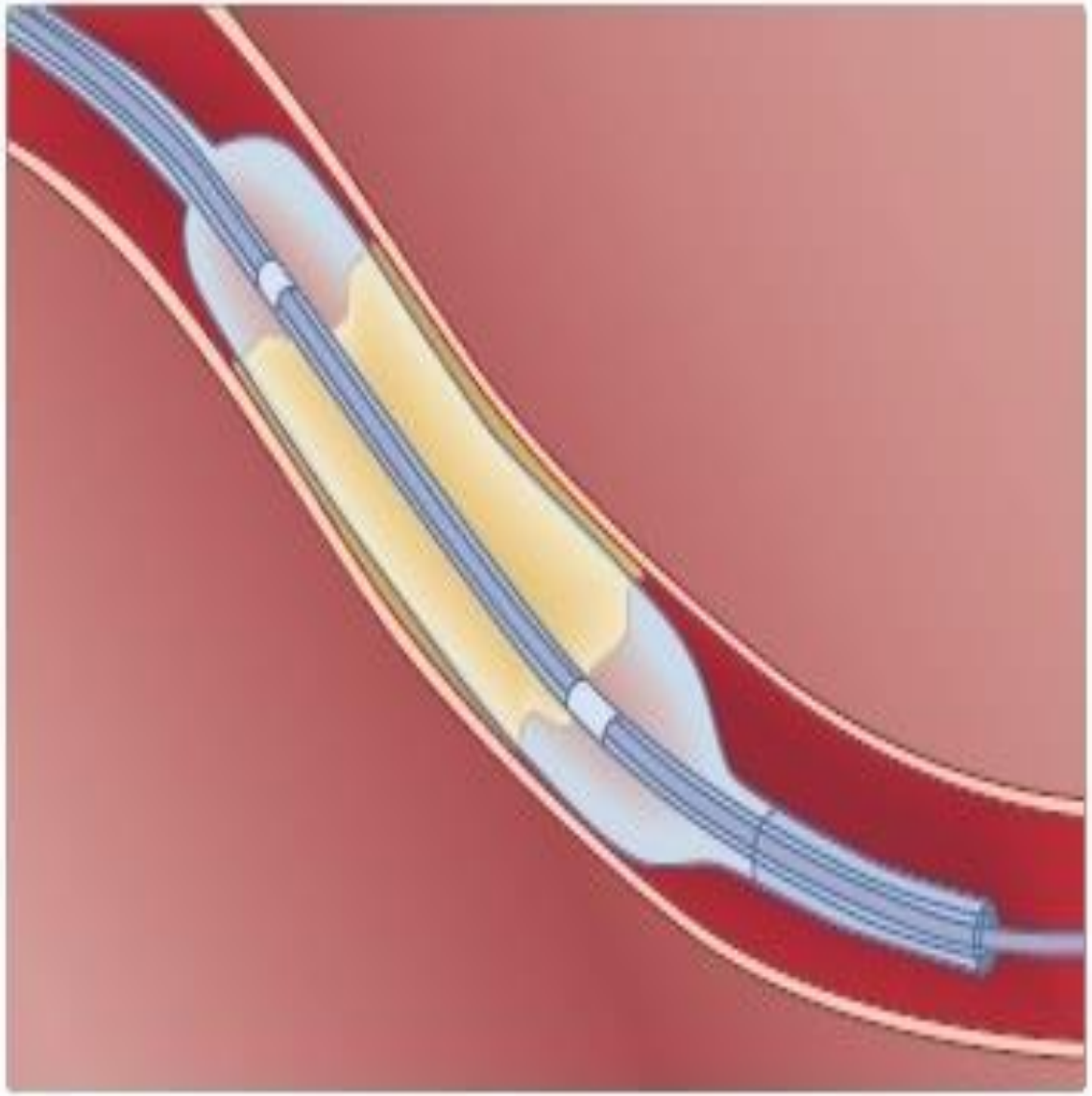
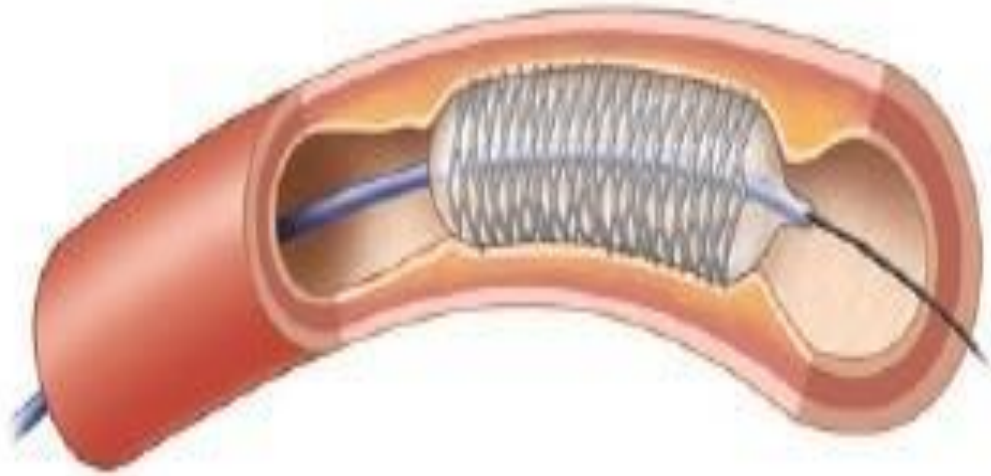


FIG .5 Balloon angioplastv catheter.



Expandable metallic stent. The stent is left in place after deflation and withdrawal of the balloon catheter.

- **Myocardial Infarction (MI)**
- **Myocardial infarction results from the complete occlusion (blockage) of one or more coronary arteries.** It arises when atherosclerotic plaques rupture causing platelet activation, adhesion and aggregation with subsequent thrombus formation within the coronary circulation.

- Angina may progress to MI but fewer than 50% of patients with MI have any preceding symptoms.

- **Complications:** of MI include weakened heart muscle, resulting in acute congestive heart failure, post-infarction angina, infarct extension, cardiogenic shock, pericarditis, and arrhythmias.

- Causes of death in patients who have had an acute MI include ventricular fibrillation, cardiac standstill, congestive heart failure, embolism, and rupture of the heart wall or septum.

- **Clinical features of myocardial infarction**
- **Chest pain described as a pressure sensation, fullness or squeezing in the mid-portion of the thorax. 10-20% of individuals have silent (painless) MI.**
- **Radiation of chest pain into the jaw/teeth, shoulder, arm, and/or back.**
- **Associated dyspnea or shortness of breath.**
- **Associated epigastric discomfort with or without nausea and vomiting.**
- **Associated diaphoresis or sweating.**
- **Syncope or near-syncope without other cause.**
- **Impairment of cognitive function without other cause.**
- **50% of the patients die within the first hour of MI and a further 10-20% within the next few days.**

- **Management**
- • Alert **emergency services** (if in community) or cardiac arrest team (if in hospital).
- • **Aspirin** (300 mg); to be chewed. **Clopidogrel.**
- • **Rest** and reassure.
- • **Pain relief:** opioid analgesia (diamorphine) is usually necessary.
- • **Oxygen** administration.
- • Early **thrombolytic therapy** (Streptokinase, Urokinase, Alteplase or Reteplase), the greatest benefit is realized when patients receive thrombolytic drugs within the first 3 hours after infarction; however, modest benefit is possible even up to 12 hours after the event. The early use of thrombolytic drugs may decrease the extent of necrosis and myocardial damage and dramatically improve outcome and prognosis.

- **Primary percutaneous intervention** to dissolve the coronary thrombus provided the patient is not at risk of a life-threatening hemorrhage.

- • **Insulin** infusion to prevent stress hyperglycemia.

- • General **pharmacologic measures** for patients with acute MI include the use of nitrates, beta blockers, calcium channel blockers, ACE inhibitors, and lipid-lowering agents. Antiplatelet drugs are significant in decreasing morbidity and mortality.

- • **Sedatives and anxiolytic** medications also may be used.

- • Prompt **treatment of complications**, particularly cardiac arrhythmias. During the first several weeks after an infarction, the conduction system of the heart may be unstable, and patients are prone to serious arrhythmias and re-infarction.

- **Dental management**
- ✪ Identification of patients with a history of ischemic heart diseases, and if the patient is not under medical control, we have to refer him to physician for an evaluation and control.

- ➢ The potential problem related to the dental procedure is that the stress and anxiety during the dental procedure, and excessive amount of vasoconstrictor in local anesthesia may precipitate the attack of angina pectoris, MI, arrhythmia, or sudden death.

- In general, recent MI and unstable angina are classified as clinical predictors of **major risk** for perioperative complications like serious arrhythmias and re-infarction. Stable (mild) angina and past history of MI are identified as clinical predictors of **intermediate risk** for perioperative complications.

- **Patients with stable angina or past history of MI (more than 6 months) [Intermediate risk]**
- **o Short Morning appointment with comfortable chair position is recommended.**

- **➢ Pretreatment vital signs should be recorded including pulse rate and blood pressure as a base line record.**

- **➢ Nitroglycerin sublingual tablets should be readily available and in some cases prophylactic preoperative nitroglycerin is advisable especially when the patient has angina more than once a week.**

- ○ Stress-reduction measures which include:
- **✓ Good communication**
- **✓ Oral sedation (e.g., Diazepam 2-5 mg on the night before and 1 hour before the appointment)**
- **✓ Intraoperative Nitrous oxide and oxygen but hypoxia should be avoided.**
- **✓ Excellent local anesthesia**

- **Limited use of vasoconstrictor (maximum 0.036 mg adrenalin, 0.20 mg levonordefrine), not more than two cartridges containing 1: 100.000 adrenalin or 1:20.000 levonordefrine.**
- **Avoidance of adrenalin-impregnated retraction cord**
- **➢ Antibiotic prophylaxis not recommended for history of coronary artery bypass graft (CABG).**
- **➢ Avoidance of anticholinergics (e.g., scopolamine, and atropine)**
- **➢ Adequate postoperative pain control.**

- For patients with coronary artery stents, elective dental care should be deferred for 6 months; emergency dental care should be in a hospital setting.

- If a patient experiences chest pain in the dental surgery, dental treatment must be stopped, the patient should be **given nitroglycerine sublingually and oxygen**, and be kept sitting upright. Vital signs should be monitored.

- The pain should be relieved in 2–3 min; the patient should then rest and be accompanied home. If chest pain persists after three doses of nitroglycerin given every 5 min, that lasts more than 15–20 min, or that is associated with nausea, vomiting, syncope or hypertension is highly suggestive of MI, oxygen should be continued, and 300 mg of aspirin should be chewed.

- **Patients with unstable angina or recent MI (less than 6 months) [Major risk]**
- **o Avoid elective care, only emergency treatment should be provided, consult with physician and limit treatment to pain relief, treatment of acute infection, or control of bleeding.**
- **➢ Prophylactic nitroglycerin sublingually is advisable.**
- **➢ Placement of intravenous line.**
- **➢ Sedation and oxygen.**
- **➢ Frequent monitoring of blood pressure and vital signs, using a pulse oximeter and continuous electrocardiographic monitoring**

- ⭘ Cautious use of adrenalin in local anesthetic, local anesthesia without adrenalin can be used or not more than two cartridges containing 1: 100.000 adrenalin or 1:20.000 levonordefrine using aspirating syringes.

- ➢ In general, conscious sedation and general anesthesia should be deferred for at least 3 months in patients with recent-onset angina, unstable angina or recent development of bundle branch block and, in any case, it should be given in hospital.

- ➢ Adrenalin-impregnated retraction cords are avoided.

- ➢ If the patient experiences pain during treatment, the management is the same as above.

- **The use of antiplatelet and anticoagulation drugs**
- Patients who take **aspirin or another platelet aggregation antagonist** such as clopidogrel can expect some increase in bleeding.
- This effect generally is not clinically significant, and bleeding may be controlled through local measures.
- Discontinuation of these agents before dental treatment generally is unnecessary.

- Patients who take **warfarin** for anticoagulation must have a current international normalized ratio (INR) determined before any invasive procedure and they are managed after consultation with physician.





- The Local hemostatic measures that are used to control bleeding include the use of hemostatic agents in the sockets (gelfoam, surgicel), suturing and gauze pressure packs.





