جامعة الشارقة
UNIVERSITY OF SHARJAH

Dental Management of Medically Compromised Patients

1. Cardiovascular Disease (CVD)

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٢٠ عام من المعرفة
YEARS OF KNOWLEDGE

Introduction to CVD

- Most common medical condition that dental professionals confront

- Cardiovascular disease (CVD) is a spectrum of diseases that range from:
  - Hypertension
  - Infective (Bacterial) endocarditis
  - Congenital heart disease,
  - Coronary Artery Disease (e.g. Myocardial infarction)

- Factors contributing to the increase in Cardiovascular diseases include:
  - aging population
  - increasing survival rates

- An increase in risk factors such as:
  - obesity
  - diabetes

HISTORY TAKING

- A thorough medical history is necessary for all patients
- Includes:
  - A) PAST MEDICAL/SURGICAL HISTORY
  - B) DRUG HISTORY
  - C) SOCIAL HISTORY
  - D) FAMILY HISTORY

American Society of Anesthesiologists (**ASA**)

- **ASA** physical **status classification** is a system for assessing the fitness of pts before surgery either under L.A or GA

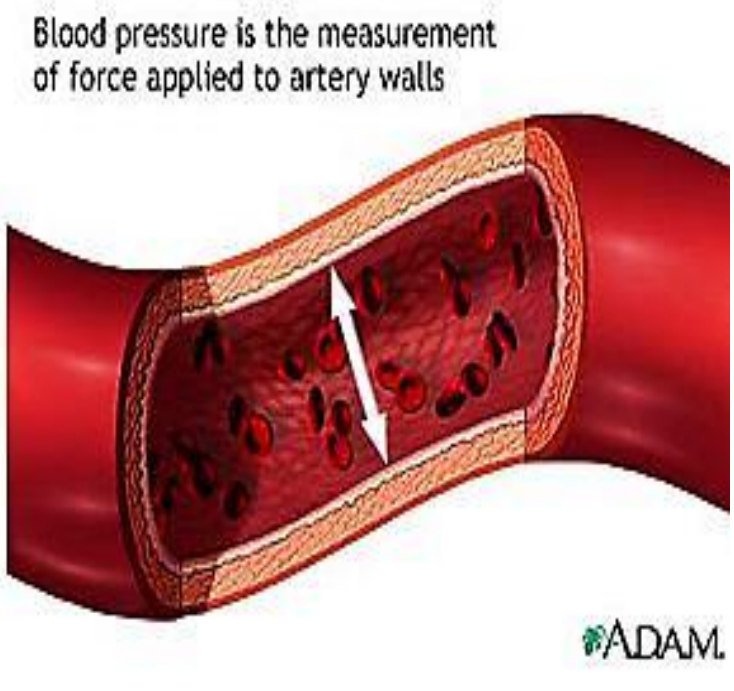
ASA Class	Description
I	Healthy Pt
II	Pt has mild systemic disease that does not limit their activities (e.g., controlled hypertension or controlled diabetes without systemic sequelae)
III	Pt has moderate or severe systemic disease, which does limit their activities (e.g., stable angina or diabetes with systemic sequelae)
IV	The pt has severe systemic disease that is a constant potential threat to life (e.g., severe congestive heart failure, end-stage renal failure)
V	The pt is morbid and is at substantial risk of death within 24 hours
VI	A declared brain-dead person whose organs are being removed for donor purposes
E	Emergency status: In addition to indicating underlying ASA status (1-5), any pt undergoing an emergency procedure is indicated by the suffix "E"

1.1: Hypertension

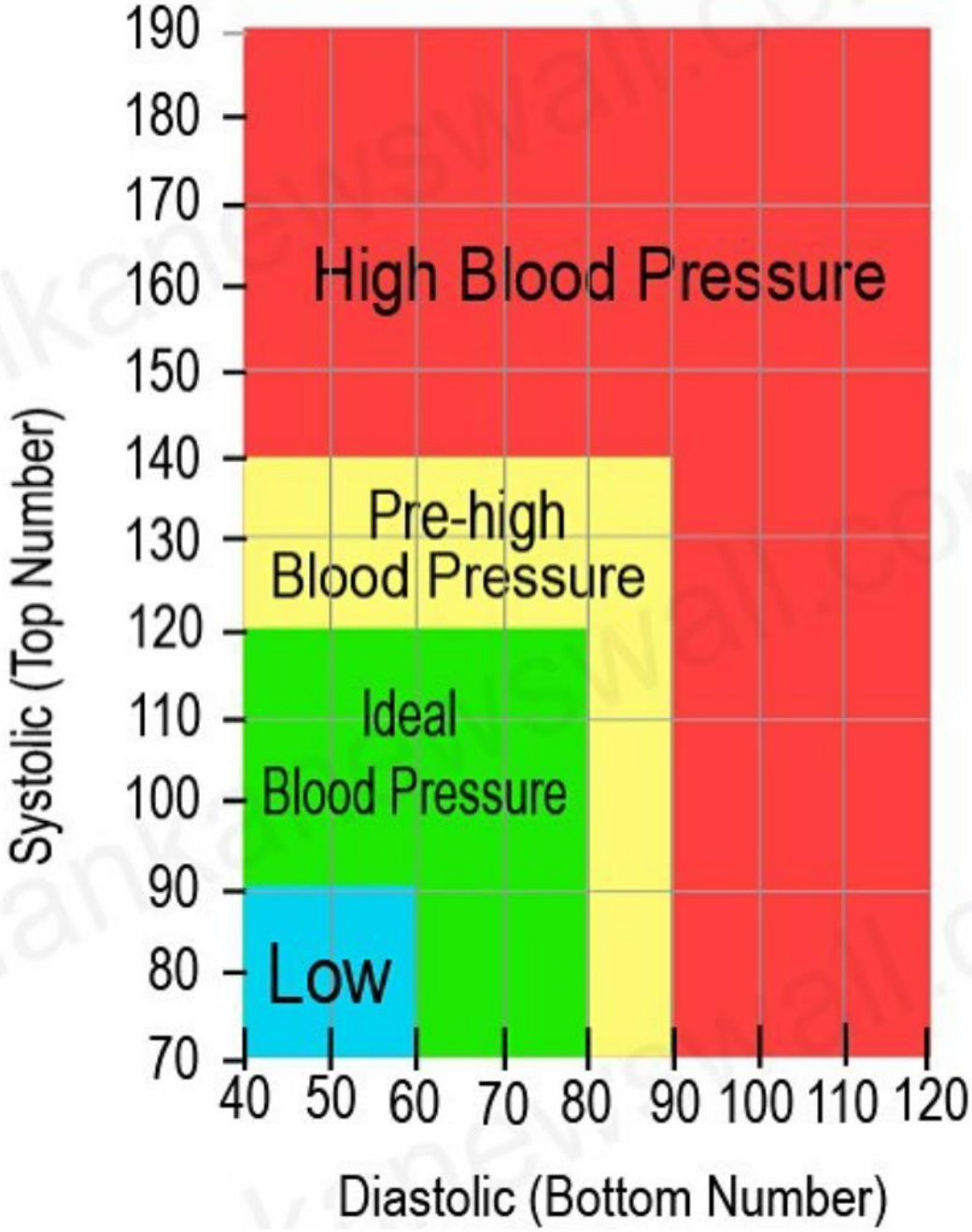
- Normal blood pressure:
  - Infancy --- 70/45 mm Hg
  - Early childhood --- 80/45 mm Hg
  - Adult --- 120/80 mm Hg

Hypertension

- Definition: abnormal elevation of the arterial blood pressure
- Known as Silent Killer of mankind
- Defined as:
  - having systolic blood pressure (SBP) >/= 140mm of Hg or
  - diastolic blood pressure (DBP) >/= 90mm of Hg

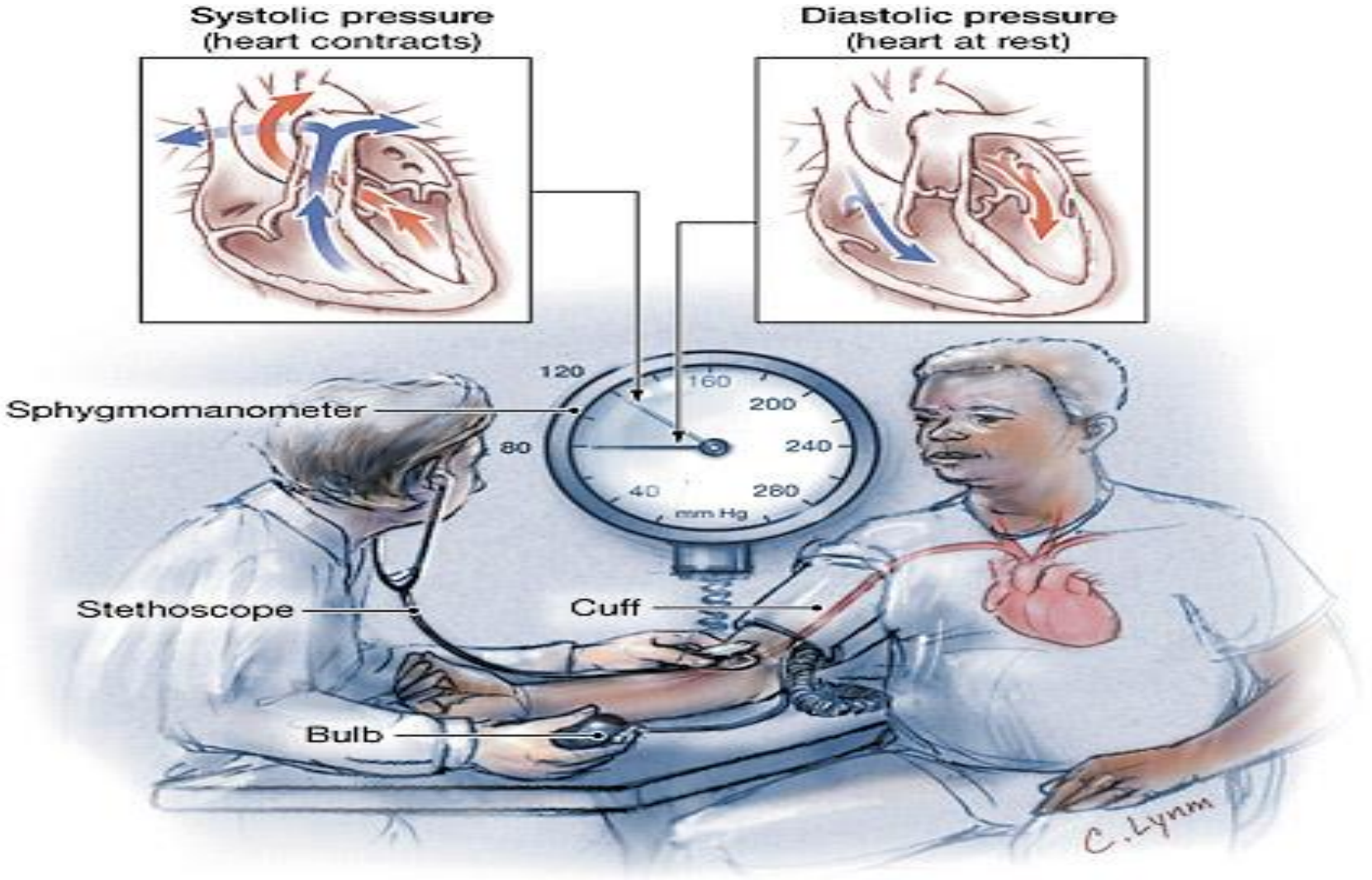


- Prehypertension - 120-139 / 80-89 mm Hg
- Stage 1 hypertension - 140-159 / 90-99 mm Hg
- Stage 2 hypertension - 160 / 100 mm Hg or higher


190
180
170
160
150
140
130
120
110
100
90
80
70
High Blood Pressure
Pre-high
Blood Pressure
Ideal
Blood Pressure
Low
Systolic (Top Number)
40 50 60 70 80 90 100 110 120
Diastolic (Bottom Number)

Dental Management

- Measure and record BP at initial visit



- Blood pressure reading should be taken on all new Pts & for recall pts on at least an annual basis
- Hypertensive pts should have BP assessed at each visit in which significant dental procedures are accomplished
- Dentists should thoroughly review the health history & be familiar with all significant past and current medical problems as well as current medications

Before initiating dental care:

- Assess presence of hypertension
- Every visit for pts with BP >140-90 mm Hg.
- Every visit for pts with established coronary artery disease, diabetes mellitus or chronic renal disease with BP >135-85 mm Hg.

- **Determine dental treatment modifications**

Dental Management

1. Pts with controlled hypertension
   (***Asymptomatic BP < 140/80 mm Hg)***
   - Can safely be treated in dental setting: good candidates for all dental procedures as long as stress is minimized
   - Risk assessment is essential if complex or surgical procedures are anticipated
   - Establishment of good rapport
   - Short morning appointments

2. Pts with uncontrolled hypertension ***(Asymptomatic BP 160-179/100-109 mm Hg)***
   - Assessment on an individual basis with regard to type of dental procedure
   - Repeat BP determinations to confirm initial findings & advise Pt to see his physician
   - Consider periodic intraoperative BP monitoring
   - **Emergency** care may be accomplished as long as SBP is < 180 mmHg & DBP is < 110 mmHg
   - Terminate **appointment** if BP rises above 179/109

3. ***Presence of target organ disease or poorly controlled diabetes mellitus (***pts with SBP > 180mmHg and / or DBP > 110 mmHg)
   - Abort all dental procedures
   - Refer the Pt for immediate medical evaluation
   - Pts with markedly elevated BP & acute target organ damage such as encephalopathy, myocardial infarction & unstable angina require hospitalization
   - Pts with marked BP elevation without acute target organ damage managed by immediate combination oral antihypertensive therapy

ORAL MANIFESTATION OF HYPERTENSION

There are no recognized manifestations of hypertension but anti-hypertensive **drugs** can often cause side affects , such as:

- **Xerostomia**
- **Gingival overgrowth**
- **Salivary gland swelling or pain**
- **Lichenoid drug reactions**
- **Erythema multiforme**
- **Taste sense alteration**

- Most antihypertensive drugs have drug interactions with LA and analgesics:
  - (i) Interaction of LA with nonselective beta-blockers may increase LA toxicity
  - (ii) LA with Epinephrine can cause HTN when a patient is taking nonselective b-blockers (propranolol and nadolol)
  - (iii) Long-term use of NSAIDs may antagonize the antihypertensive effect of diuretics, beta-blockers, alpha blockers, vasodilators, ACE inhibitors

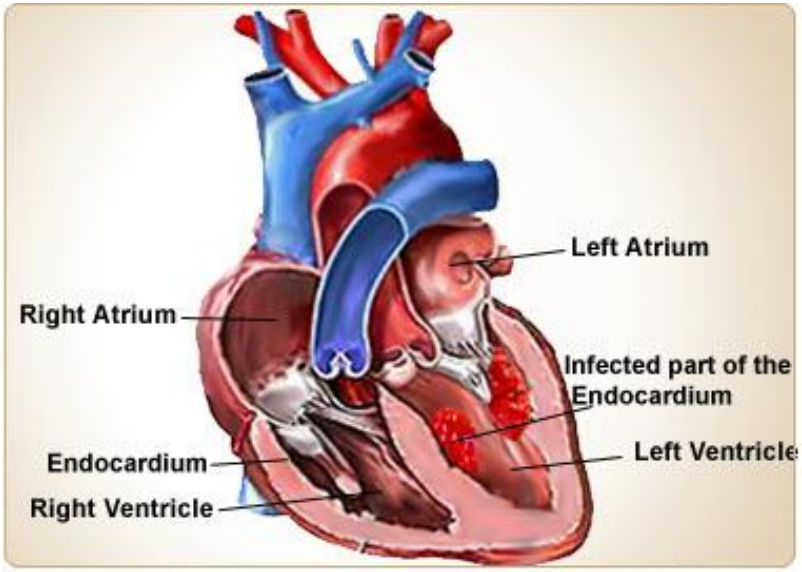
Local Anesthetics

- Epinephrine can be used **ONLY** in controlled HTN patients
- Options in uncontrolled HTN:
  - Mepivacaine (Scandonest) 3% (with NO vasoconstrictor)
  - Retraction cord containing epinephrine should be ***avoided***

1.2: Infective Endocarditis

Infective Endocarditis (IE)

- A serious microbial infection of the endothelial surface of the heart, includes heart valves, the mural endocardium, or a septal defect
- Intracardiac effects include severe valvular insufficiency, which leads to heart failure and valvular abscesses
- If left untreated, IE is generally fatal



- Invasive dental procedures can introduce bacteria into the bloodstream, where colonization & growths (vegetation) on the valves occur

- Causative organisms: **Staphylococcous Aureus, Viridans Streptococci -** which are oral flora and include *S. mitis*, *S. mutans*, *S. salivarius*, *S. sanguis*, and the *S. intermedius* group (*S. intermedius*, *S. anginosus*, and *S. constellatus*)

- The resulting complications are embolism of material from the vegetation, leaky valve, heart block and abscesses around the valve

Prophylaxis for Dental Procedures

- Prophylaxis is recommended for all dental procedures that involve manipulation of gingival tissue or the periapical region of the teeth, or perforation of the oral mucosa.

Infective endocarditis/valvular heart disease prophylaxis guidelines:

- prosthetic cardiac valves, including transcatheter-implanted prostheses and homografts;
- prosthetic material used for cardiac valve repair, such as annuloplasty rings and chords;
- a history of infective endocarditis;
- a cardiac transplant[a] with valve regurgitation due to a structurally abnormal valve;
- the following congenital heart diseases:
  - unrepaired cyanotic congenital heart disease, including palliative shunts and conduits
  - any repaired congenital heart defect with residual shunts or valvular regurgitation at the site of or adjacent to the site of a prosthetic patch or a prosthetic device

Prosthetic Joint Prophylaxis

- No association between dental procedures and the occurrence of prosthetic joint infections
- According to ADA, patients with a history of complications associated with joint replacement surgery who are undergoing dental procedures, prophylactic antibiotics should **only** be considered after Orthopedic consultation
  - In cases where antibiotics are deemed necessary, it is recommend the appropriate antibiotic regimen be prescribed by the Orthopedic

Prophylactic antibiotic protocol for EI

- Protocol for EI, recommended by American Heart Association (AHA)

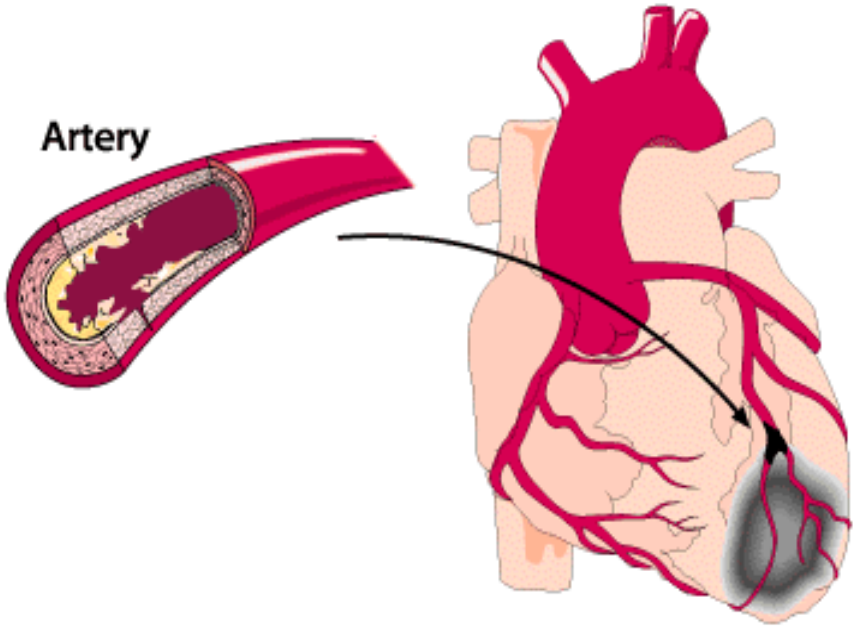
SITUATION		AGENT	SINGLE DOSE 30-60 min BEFORE PROCEDURE	
			ADULTS	CHILDREN
Standard general prophylaxis (oral)		Amoxicillin	2gr	50 mg/kg (maximum 2 gr)
Unable to take oral medication		Ampicillin Cefazolin or Ceftriaxone	2 gr im or iv 1gr im or iv	50 mg/kg im or iv 50 mg/kg im or iv
Allergic to penicillins	Oral	Cephalexin * Clindamycin Azithromycin or Clarithromycin	2gr 600 mg 500 mg	50 mg/kg 20 mg/kg 15 mg/kg
	Unable to take oral medication	Cefazolin or Ceftriaxone Clindamycin	1g im or iv 600 mg im or iv	50 mg/kg im or iv 20 mg/kg

Dental management

- Guidelines have been updated to state the following patients **no longer** need prophylactic antibiotics:
  - mitral valve prolapse
  - rheumatic heart disease
  - bicuspid valve disease
  - calcified aortic stenosis
  - congenital heart conditions such as ventricular septal defect, atrial septal defect & hypertrophic cardiomyopathy

- The guidelines do not recommend antibiotics for these dental procedures or events:
  - Routine anesthetic injections through non infected tissue
  - Dental X-rays
  - Placement of removable prosthodontic or ortho appliances
  - Adjustment of orthodontic appliances
  - Placement of orthodontic brackets
  - Shedding of baby teeth
  - Bleeding from trauma to the lips or inside of the mouth

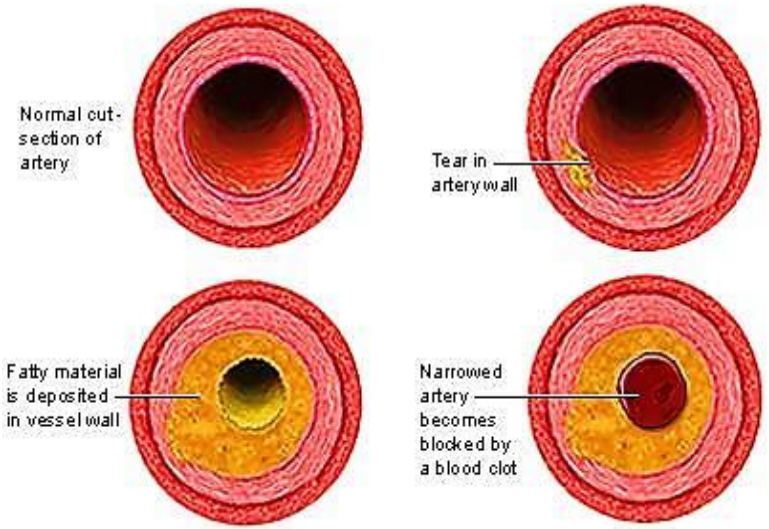
1.3: Coronary Artery Disease/ Myocardial infarction



- **Atherosclerosis** is the most common cause of Coronary Artery Disease

Dental Considerations

- Risk assessment for the dental management of pts with CAD involves three determinants:
  1. Severity of the disease
  2. Type and magnitude of the dental procedure
  3. Stability of the pt



Treatment Modifications for CAD

- A. Minimize stress during dental treatment
  - Relaxed office atmosphere
  - Explain procedures, decreases fear of unknown and surprises
    - Mild expected unpleasant experience is less stressful, i.e. injections, probing, etc., if anticipated and explained
  - Crucial is good local anesthesia: Allow sufficient time for maximum effort

- B: Adjunctive methods of relaxation to decrease stress and anxiety
  - Distraction techniques (Headphones)

- C. Pharmacologic anxiolytic methods
  - Nitrous Oxide/Oxygen or O2 alone at 4-6 L/minute
  - Diazepam
  - Others - Xanax, etc. by patient's previous experience and usage
  - Prophylactic dose of sublingual Nitroglycerin, as needed

Timing of Dental Appointment

- Six months after MI
- WHY?
  - Immediate post infarction:
    - Site of infarction weaker, may rupture
    - Cardiac arrhythmias
    - Time for collateral circulation
- Worsening symptoms : delay elective dental therapy until PROPERLY treated
  - WHY? 20% of unstable angina progress to acute MI within three months
- Patients with Angina
  - Wait 30 days after initial attack of angina
  - Early AM appointments
  - Correlate to medication (Aspirin, Clopidogrel)
- When in doubt, **consult cardiologist**

Myocardial infarction (MI)

- Myocardial infarction (i.e heart attack) is the irreversible necrosis of heart muscle secondary to prolonged lack of oxygen supply (ischemia)
- Signs:
  - Intense and unremitting chest pain for 30-60 mins
  - Substernal, and often radiates up to neck, shoulder, jaw and down left arm
  - Usually described as a substernal pressure sensation that also may be characterized as squeezing, aching, burning, or even sharp pain
  - Sometimes, symptom is epigastric discomfort, with a feeling of indigestion or of fullness/gas

MI is a MEDICAL EMERGENCY

Dental Management Considerations for Pts With Recent MI

- Avoid elective care
  - If treatment is necessary, consult with physician and limit treatment to pain relief, treatment of acute infection, or control of bleeding
- Consider including the following:
  - Prophylactic nitroglycerin
  - Placement of intravenous line
  - Sedation
  - Oxygen
  - Continuous electrocardiographic monitoring
  - Pulse oximeter
  - Frequent monitoring of blood pressure
  - Cautious use of epinephrine in local anesthetic, combined with above measures

General Precautions during Dental Procedures

- Dental clinic should have *advanced cardiac life support* or at least basic cardiac life support
- Use of *pulse oximeter* to determine the level oxygenation
- Automatic external *defibrillator*
- Determination of *vital signs* prior to dental care
- BP & pulse rate & rhythm should be recorded & any abnormal findings should be addressed
- *Premedication* with antianxiety drugs and inhalation nitrous oxide in anxious pts
- Elective procedures esp. those requiring GA should be *avoided* for *at least 4 wks after MI*
- Consult pt's physician prior to dental therapy

MI Management in dental chair

1. **<u>Terminate</u>** all dental treatment
2. Position pt in **semi-recline** position
3. Give **nitroglycerin (NTG)** (abt 0.4 mg) tablet or spray
4. Administer **oxygen**
5. Check **pulse & B.P**.

Discomfort relieved

6. Assume angina pectoris is present
7. Slowly taper oxygen over 5 mins
8. Modify t/t to prevent recurrence

Discomfort continues 3 mins

6. give 2nd NTG dose
7. monitor vital signs.

discomfort relieved

discomfort continues 3 mins after NTG

8. Give 3rd NTG dose
9. Monitor vitals
10. Call for medical assistance

Discomfort relieved

11. Refer pt for medical evaluation before further dental care

discomfort continues 3 mins after 3rd NTG dose

12. assume **MI is in progress**
13. Start **IV** drip of normal saline @ 30 ml/hr

14. If discomfort is severe, titrate **morphine sulphate** 2mg SC or IV every 3 mins until relief is obtained
15. Transport to emergency care
16. Administer **Basic Life Support** if necessary.

Anticoagulation Therapy & Dental Care

- Anticoagulant therapy is used both to treat & to prevent throboembolism.
- 2 major types : 1. antiplatlet medications
  2. antithrombin medications
- Daily aspirin typically continued lifelong
- May increase risk of oral bleeding following surgical procedures
- Associated conditions which predispose pt to uncontrolled hemostasis :
  - Uremia
  - Chronic Liver diseases
  - Chronic use of NSAIDS

3 different protocols used to treat pts with High INR

- **1st protocol** – warfarin not discontinued (minimizes thromboembolic events & increases risk of bleeding after surgery).
- **2nd protocol** – warfarin discontinued (drug should be discontinued 5 days prior to surgery, during this period pt is at risk of developing thromboembolic event but not bleeding).
- **3rd protocol** – warfarin discontinued & patient placed on alternative anticoagulant therapy (thromboembolic event minimized).

We always plan a treatment plan by comparing potential risk for excessive bleeding after procedures:

Stopping anticoagulation therapy / reducing INR

VS

Risk of pt experiencing a thromboembolic event if anticoagulation therapy is altered

MANAGING A BLEED

- Bleeding is managed by pressure applied to the extraction socket using a piece of gauze
- Use **local hemostatic** measures immediately after performing dental extraction
- Local hemostatic agents, suturing and tranexamic acid (Exacyl)

Extra Information

- The American College of Chest Physicians suggests:
- Pts should stop warfarin 5 days before any surgical intervention, and also that warfarin should be temporarily replaced with low molecular weight heparin as a bridge therapy
- American Heart Association, suggests reducing the INR to a range between 2.0 and 2.5, with strict INR monitoring.
- Teeth extraction is a procedure where bleeding can be encountered
- The difficulty of the extraction itself or complications related to the procedure may affect the risk of bleeding in at-risk pts

UDHS

- Dental treatment threshold for INR: **less than 3.5**
- Pts undergoing warfarin treatment should be carefully evaluated prior to dental procedure
- Perform the procedure as atraumatically as possible, use appropriate local measures and only discharge the patient once haemostasis has been achieved.
- Pts on warfarin treatment, requiring simple tooth extraction (involves gentle forceps manipulation of the tooth with minimal trauma to the tissue) can continue with their regular medication, providing that the INR is less than 3.5 and modification of warfarin treatment is therefore not necessary

Rebound Effect

- Rebound hypercoagulability after suddenly stopping warfarin treatment has been reported

- Risk of developing CVA

Good luck