Dental Management of Patients with Cardiovascular Diseases

BY

Dr . Mohamed Seif

Senior Consultant Cardiologist , UHS

Lecture Outlines

- Overview of management of medical emergencies in the dental clinic.
- Dental management of patients with common cardiovascular diseases.
- Principals of Cardio-Pulmonary Resuscitation (CPR).

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Management of Medical Emergencies

Incidence

- A survey done in the 90's showed that, over a 10 year period, 90% of dentists have encountered at least one medical emergencies.

Types

TYPE OF EMERGENCY	NUMBER	PERCENT
Altered Consciousness	17,782	59
Cardiovascular	4,280	14
Allergy	2,887	9.5
Respiratory	2,718	9
Seizures	1,595	5
Diabetes-Related	999	3

Management of Medical Emergencies

1. Recognition
2. Prevention
3. Preparation
4. Basic life support (BLS)
5. Cardiopulmonary resuscitation (CPR)
6. Specific medical emergencies

Prevention

- IS THE BEST TREATMENT

Know your patient

Never treat a STANGER

Prevention

- 90% of life-threatening situations can be prevented
- 10% will occur in spite of all preventive efforts (sudden unexpected death)

Prevention

- Medical History
- Physical Evaluation
- Vital Signs
- Dialogue History
- Determination of Medical Risk
- Stress Reduction

Prevention

MEDICAL HISTORY

- Review
- Update
- Medication
- Medical consultation

Prevention

PHYSICAL EVALUATION

- Length of time since last evaluation
- Vital signs
- Visual inspection of patients
- Referral to physician

Prevention

VITAL SIGNS

- Blood pressure
- Pulse rate
- Respiratory rate
- Temperature
- Height
- Weight

Prevention

DETERMINATION OF MEDICAL RISK.

- Ability of patient to safely tolerate dental treatment.
- Does patient represent increased medical risk?
- Can patient be managed in the dental office?

Determination Of Medical Risk

American Society of Anesthesiology

Physical Status Classification System

ASA I

- A patient without systemic disease
- A normal healthy patient

- Can tolerate stress involved In dental treatment
- No added risk of serious Complications
- Treatment modification Usually not necessary

ASA II

A patient with mild systemic disease

Example:

-Well-controlled diabetic

-Well-controlled asthma

-ASA I with anxiety

- Represent minimal risk during dental treatment
- Routine dental treatment

  With minor modifications

  -Short early appointments

  -Antibiotic prophylaxis

  -Sedation

ASA III

A patient with severe systemic disease that limits activity but is not incapacitating

Example:

- a stable angina
- 6 mos. Post - MI
- 6 mos. Post - CVA
- COPD

- Elective Dental Treatment is not Contraindicated
- Treatment Modification is Required
  - Reduce Stress
  - Sedation
  - Short Appointments

ASA IV

A patient with incapacitating systemic disease that is a constant threat to life

Example:

- Unstable angina
- M I within 6 months
- CVA within 6 months
- BP greater than 200/115
- Uncontrolled diabetic

- Elective dental care should be postponed
- Emergency dental care only
  - Rx only to control pain and infection
  - Other treatment in hospital
    - (I&D, extraction)

ASA V

A morbid patient not expected to survive

Example:

- End stage renal disease
- End stage hepatic disease
- Terminal cancer
- End stage infectious disease

Elective treatment definitely contraindicated

Emergency care only to relieve pain

Prevention

STRESS REDUCTION

- Premedication
- Sedation
- Pain control (intra and post-op)
- Early appointments
- Short appointments

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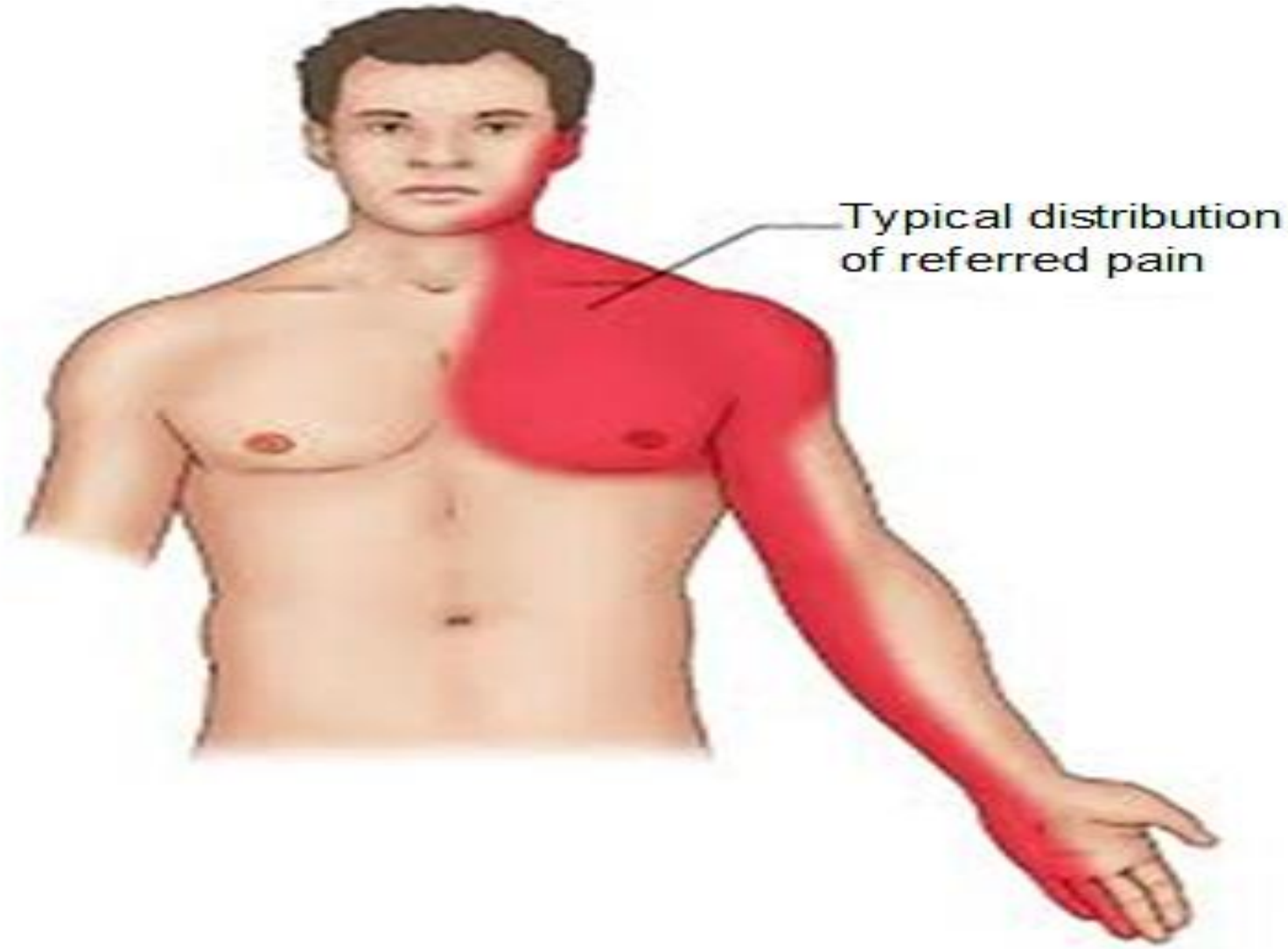
Common Cardiovascular problems

- Ischemic heart disease :
  - Stable Angina Pectoris.
  - Acute Myocardial Infarction
- Hypertensive Heart Disease
- Dysrhythmias
- Infective endocarditis
- Dental management of patients using Warfarin

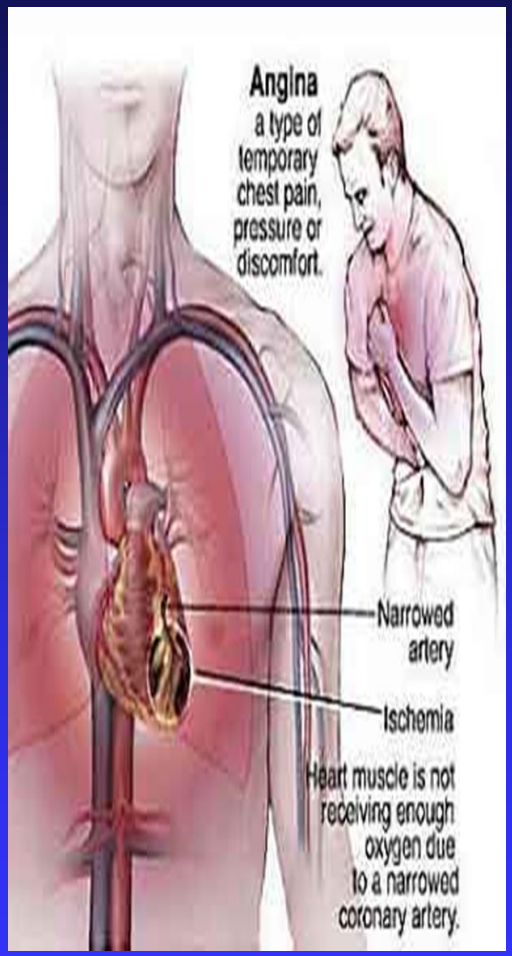
ANGINA PECTORIS



Angina: Reduction in blood flow to the heart muscles causes chest pain that may radiate to jaw, shoulder, back and left arm as illustrated.

ANGINA PECTORIS

- Angina is a symptom of ischemic heart disease produced by myocardial demand-supply mismatch
- Dental aspects:
  - Preoperative glyceryl tri-nitrate and oral sedation are advised .
  - Effective local anesthesia is essential.
  - Ready access to medical help, oxygen and nitroglycerine are essential.



Treatment of Angina Pectoris

NBC

Nitrates

Beta Blocker

Calcium Channel Blocker

Vien

Heart

Artery

Venodilator
-- preload

-- Cardiac work

Arteriodilator
-- afterload

+

Coronary dilatation

+

MYOCARDIAL INFARCTION (HEART ATTACK)

MYOCARDIAL INFARCTION

- MI is a condition caused by necrosis of a region of myocardium due to decrease in myocardial supply.
- It is characterized clinically by substernal pain which stimulates angina pectoris but is of more intense and is of longer duration.
- ***Signs and symptoms:***
  - Dyspnea
  - Orthopnea
  - Giddiness
  - Nausea
  - Vomiting
  - Light headedness

MANAGEMENT OF MYOCARDIAL INFARACTION

- PATIENT WITH RECENT ATTACK OF MI (WITHIN 6 MONTHS):
  - These patients are on antiplatelets and are on increased risk of another episode.
  - Delay of dental treatment for 6 months is advisable
- PATIENTS WITH EPISODE OF MI(LESS THAN 6 MONTHS):
  - Anxiety reduction protocol must be followed.
  - Dental treatment must be carried out with effective Local anesthesia, less anxiety and oxygen saturation.
  - Gingival retraction cords having Adrenaline must be avoided.

AN EPISODE OF MI ON DENTAL CHAIR :

- Terminate all dental treatment if he complaints of chest pain.
- Remove all foreign objects including cotton gauge
- Change the patient's position to patient's comfort. (mostly upright) .
- Administer 0.5 mg Glyceryl tri-nitrate (GTN) sublingually.
- Monitor vials.
- Postpone dental treatment if can be done.
- Position the patient in a semi reclined procedure if he is unconscious.
- If conscious, change position to sitting procedure.
- Repeat this after 5 minutes.

HYPERTENSION

HYPERTENSION

- Hypertension refers to blood pressure that is consistently above 140 /90 mm Hg.
- The blood pressure must be controlled before any dental treatment or opinion of a physician must be sought first.
- It is essential to avoid stress and anxiety since endogenous epinephrine released in response to pain and fear may induce dysrhythmias.

Hypertension

- ASA Risk Status I
  - <140 and < 90
  - Routine dental management
  - Recheck in 6 months
- ASA Risk Status II
  - 140-160 and 90 to 95
  - Recheck BP for next 3 appointments, if elevated get medical consultation
  - Routine dental care
  - Stress reducyion

Hypertension

- ASA Risk Status III
  - 160-200 and 95 to 115
  - Recheck BP in minutes
  - If elevated, medical consult before dental treatment
  - Stress reduction
- ASA Risk Status IV
  - >200/115
  - Recheck BP in 5 minutes
  - Immediate medical consultation
  - No routine treatment
  - Emergency treatment in hospital
  - Rx for pain and infection

HYPERTENSION

- Systemic corticosteroids may raise BP , must be adjusted accordingly.
- Some NSAIDS like indomethacin, ibuprofen, naproxen can reduce efficiency of antihypertensive drugs.
- While giving local anesthetic solution, epinephrine must be avoided or an aspirating syringe is used (can elevate the BP causing shock and arrhythmias.)
- Adrenaline is contraindicated in patient with systolic BP more than 150 mm Hg and diastolic BP more than 110 mm Hg.

Vasovagal Syncope

Cause:

Loss of vasomotor tone due to a massive parasympathetic discharge leading to decreased pulse rate, and decreased blood pressure which leads to cerebral hypoxia and pooling of blood.

Fainting: Vasovagal Syncope

In Dentistry

- The most common cause is psychogenic due to fear and anxiety; especially from local anesthetic
- Most common between the ages of **16 and 35**
- Males more prone than females
- Fainting is considered **SERIOUS** in **PEDIATRIC** patients and patients **OVER 40** years of age

Vasovagal Syncope

Signs/Symptoms:

1. Frightened anxious patient.
2. Decreased pulse rate.
3. Decreased blood pressure.
4. Cool, moist, clammy skin.
5. Pale appearance.

Treatment:

1. Place patient in Trendelenberg's position.
2. Monitor vital signs.
3. Administer aromatic spirits of ammonia.
4. Apply cold towel to forehead.
5. Administer 100% oxygen.
6. Reassurance.

Postural Hypotension

Cause:

- disorder of the autonomic nervous system in which syncope occurs when the patient assumes the upright position.

Fainting: Postural Hypotension

- The second most common cause of transient loss of consciousness.
- Not associated with fear an anxiety
- **Predisposing factors**
  - Administration of Drugs
    - Antihypertensive
    - Psychotropics, Sedatives, and Tranquilizers.
  - Age: increases with increasing age
  - Prolonged recumbency

Postural Hypotension

Signs/Symptoms:

- Decrease in BP and loss of consciousness without prodromal signs and symptoms
- Heart rate is normal, unlike Bradycardia in Vasovagal Syncope.
- All manifestations of unconsciousness
- When patient is placed in the supine position, consciousness rapidly returns.

Treatment:

- Stop treatment
- Assess consciousness
- Place patient in the supine position with legs elevated
- Oxygen
- Monitor vital signs
- **Slowly reposition patient**

DYSRHYTHMIA

Heart Dysrhythmias

- Dysrhythmia refers to abnormality in rate , sequence of cardiac activation due to disturbance in cardiac impulse generation or conduction.
- It is commonly seen in patients with ischemic heart disease or myocardial infraction.
- Management :
- Limit the epinephrine level to 0.04 mg.
- Stop dental treatment.
- If angina pectoris occurs, administer oxygen ,minimize stress and wait till pain resolves.

INFECTIVE ENDOCARDITIS

INFECTIVE ENDOCARDITIS

- Infective endocarditis is infection of heart chambers and heart valves caused by bacteria, viruses or fungi.
- Infective endocarditis is usually caused by STREPTOCOCCUS VIRIDANS.
- Other causative organisms include Staphylococcus and Enterococcus.
- AGGREVATING FACTORS:
- Congenital heart disease
- Rheumatic heart disease
- Prosthetic heart valve
- Scar tissue in cardiovascular system

INFECTIVE ENDOCARDITIS

- **DENTAL ASPECTS:**
- For dental point of view , it is obligatory to prevent onset of infective endocarditis.
- This can be done by planned dental care.
- Proper sterilization of dental instruments and surroundings.
- Giving appropriate antibiotics at appropriate time.
- Proper case history and examination is must in managing patient with infective endocarditis.

SBE Prophylaxis (Guidelines Update)

- The conditions for which premedication is necessary includes:
  - artificial heart valves
  - a history of infective endocarditis
  - a cardiac transplant that develops a heart valve problem
  - A complex congenital heart diseases.

SBE Prophylaxis

- Patients who previously needed antibiotic prophylactic but no longer need them include:
  - mitral valve prolapse
  - rheumatic heart disease
  - bicuspid valve disease
  - calcified aortic stenosis
  - congenital (present from birth) heart conditions such as ventricular septal defect, atrial septal defect and hypertrophic cardiomyopathy

SBE Prophylaxis

- Procedures needing prophylaxis:
  - All dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa.
  - procedures that do not require prophylaxis are radiographs, placement of removable prosthesis, and placement orthodontic bracket.

TABLE 2

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† 1 g IM or IV	50 mg/kg IM or IV 50 mg/kg IM or IV
Allergic to Penicillins or Ampicillin Oral	Cephalexin‡§ OR Clindamycin OR Azithromycin or clarithromycin	2 g 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 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.

Prior use of Oral Anticoagulants

LM is scheduled for a root canal. What should be recommended regarding LM's warfarin therapy?

A. Continue warfarin therapy
B. Stop warfarin 5 days prior to procedure
C. Stop warfarin 5 days prior and bridge with low molecular weight heparin therapy
D. Stop warfarin one day prior
E. Check INR and confirm result is < 1.5

Dental Procedures

Continue Warfarin	Consider other options
Single/multiple tooth extractions (up to 3)	Full-mouth extractions
Endodontics (root canal)	Multiple implant placements
Dental hygiene	Extractions of multiple bony impactions
Restorative surgery; supra-gingival	Gingivectomy
Dental scaling	Orthoganthic surgery
Prosthetics	
Crowns and bridges	

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Survey The Scene, then: RAP

- R - Responsiveness
  - Tap shoulder and shout “Are you ok?”

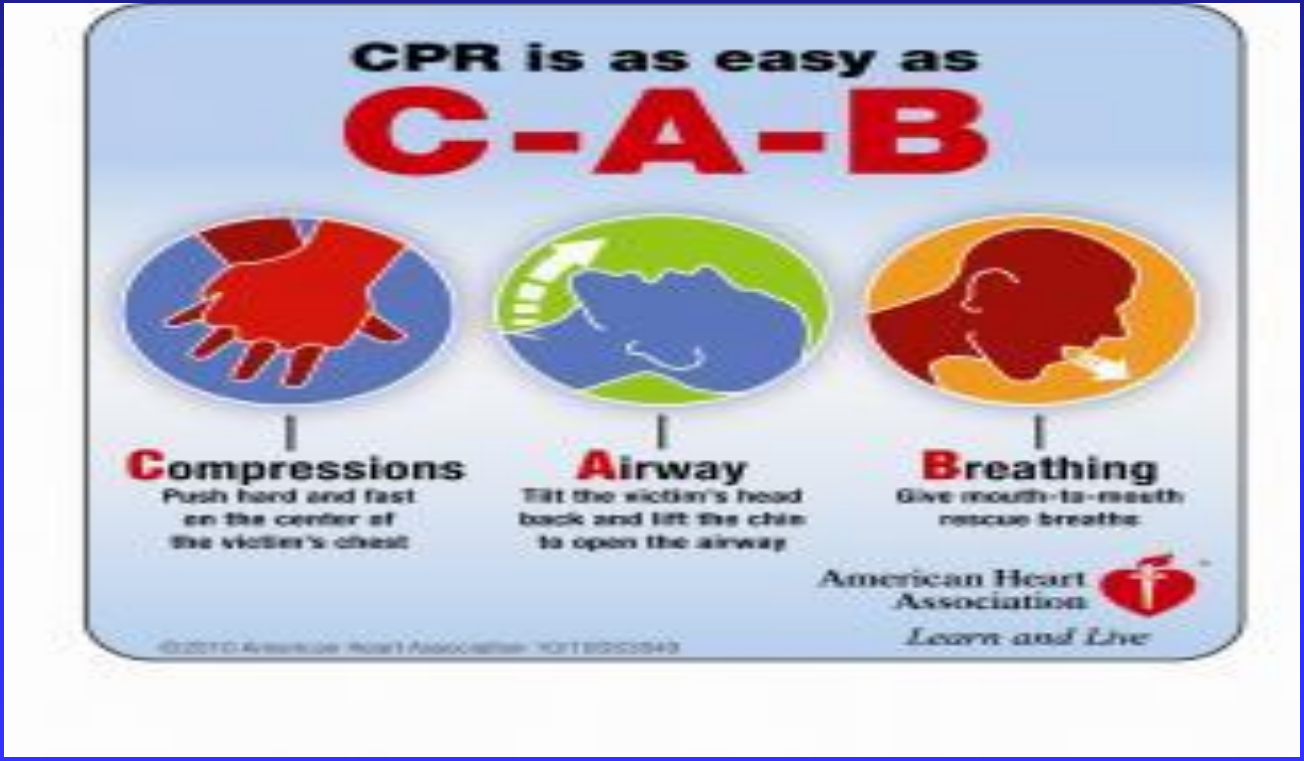
RAP Activate EMS

- Glance for spontaneous breathing and signs of survival
- A -Then Activate EMS

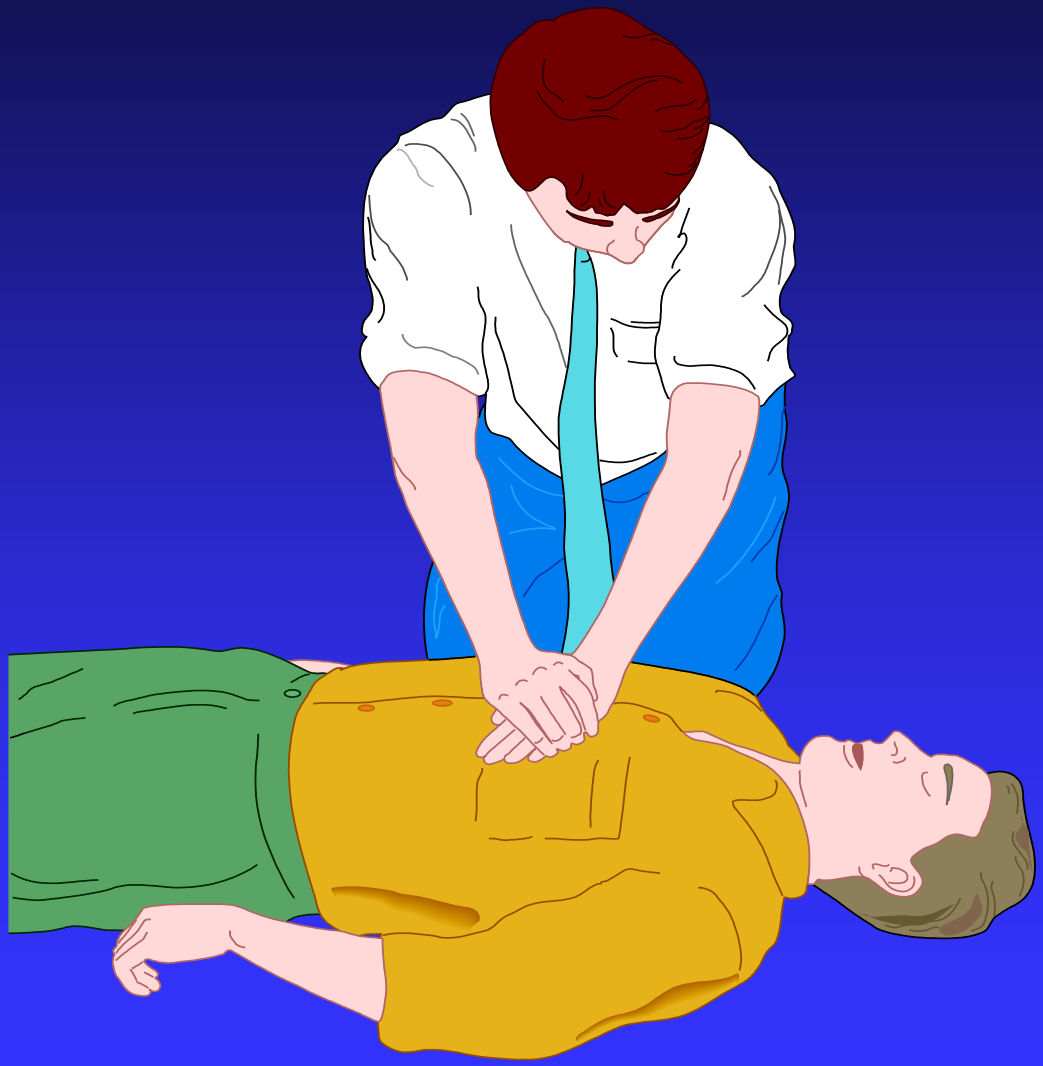
CPR Sequence C-A-B

The ***2010*** *AHA Guidelines for* ***CPR*** *and ECC recommend CAB sequence.*

(chest compressions- airway- breathing)



Basic Life Support (CPR)



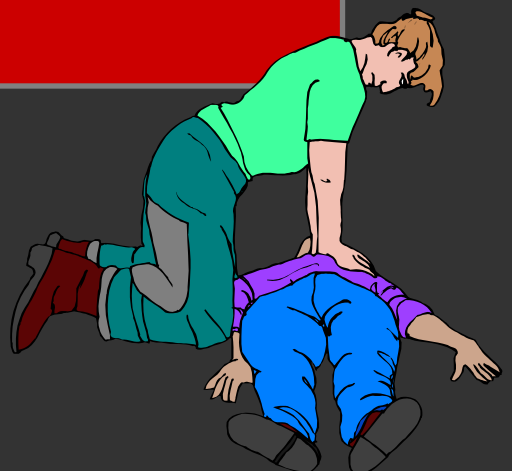
Start CPR Immediately

- Better chance of survival
- Brain damage starts in 4-6 minutes
- Brain damage is certain after 10 minutes without CPR.

Important Points

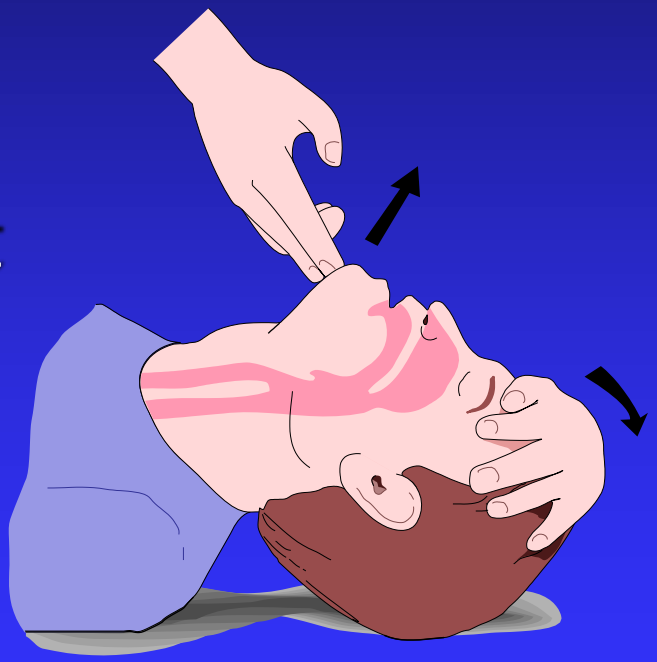
Five key aspects to Great **CPR**

- Rate
- Depth
- Release
- Ventilation
- Uninterrupted



A – Airway

- **A – Airway**
  - **Open the airway**
  - **Head tilt chin lift**

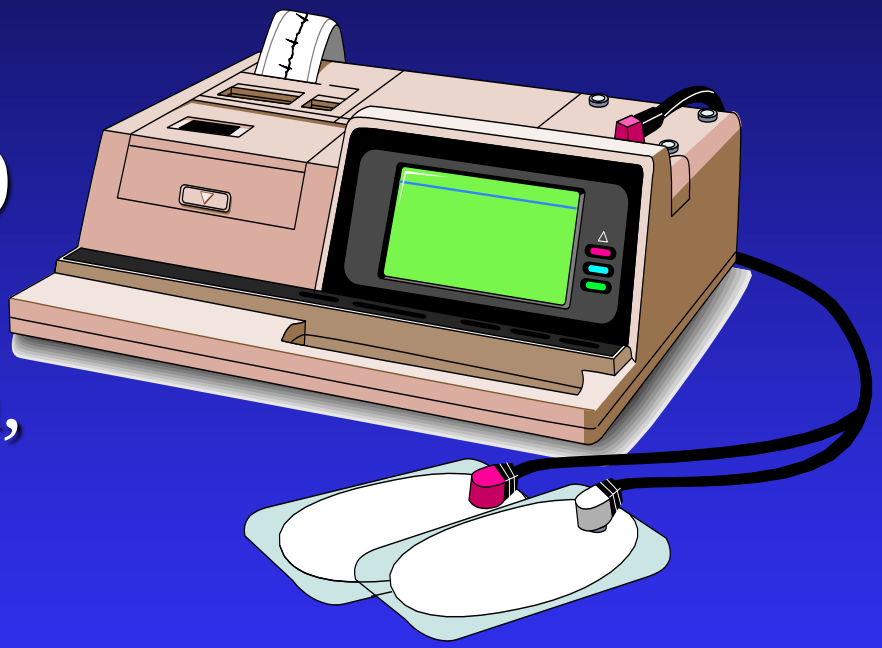


B - Breathing

- **After giving 30 uninterrupted chest compressions, give two breaths (1 second or longer)**
  - **Pinch the nose**
  - **Seal the mouth with yours.**
- Continue until help arrives or victim recovers
- If the victim starts moving: check breathing

Even With Successful CPR, Most Won't Survive Without ACLS

- ACLS (Advanced Cardiac Life Support)
- ACLS includes defibrillation, oxygen, drug therapy.



Why CPR May Fail

- Delay in starting
- Improper procedures (ex. Forget to pinch nose)
- No ACLS follow-up and delay in defibrillation
  - Only 15% who receive CPR live to go home
  - Improper techniques
- Terminal disease or unmanageable disease (massive heart attack).


Thank you