

Al Mustaqbal University

College of Health and Medical Techniques

Department of Anesthesia



Practical Anesthesia

Stage Two

Lecture 3

Cardio Pulmonary Resuscitation CPR



By Lectures

Nofal Ajami, Mohammed Saadi, Mohammed Ali

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Cardiopulmonary resuscitation

Definition

Cardiopulmonary resuscitation (CPR) is a technique of basic life support for oxygenation to the heart, lungs, and brain until and unless the appropriate medical treatment can come and restore normal cardiopulmonary function.

Cardiopulmonary resuscitation is a series of steps used to establish artificial ventilation and circulation in a patient who is not breathing and has no pulse.

Purpose

- Restore cardiopulmonary functioning.
- Prevent irreversible brain damage from anoxia.

Indication

- Cardiac Arrest.
 - Ventricular fibrillation (VF).
 - Pulseless Ventricular tachycardia (VT).
 - Asystole.
- Respiratory arrest.
- Combination of both.

Causes of cardiac arrest (6H+4T)

6H	4T
1) Hypoxia.	1) Cardiac Tamponade.
2) Hypotension.	2) Tension pneumothorax.
3) Hypothermia.	3) Thromboembolism.
4) Hypoglycemia	4) Toxicity (eg. digoxin, local anesthetics).
5) (H ⁺) Acidosis.	
6) Hypokalemia.	

Diagnosis of cardiac arrest

- Loss of consciousness.
- Loss of apical & central pulsations (carotid, femoral).
- Apnea.

How CPR work?

- ✓ Air we breathe in, travels to our lungs where oxygen is picked up by our blood and then pumped by the heart to our tissue and organs.
- ✓ When a person experiences cardiac whether due to heart failure in adults or the elderly or an injury such as near drowning, or severe trauma in a child's heart goes from a normal arrhythmic Pattern called ventricular fibrillation, and eventually ceases to beat altogether.
- ✓ This prevents oxygen from circulating throughout the body, rapidly killing cells and tissue.
- ✓ In essence, cardio (heart) pulmonary (lung) resuscitation (revive, revitalize) serves as an artificial heartbeat and an artificial respirator.
- ✓ CPR may not save the victim even when performed properly, but if started within 4 minutes of cardiac arrest and defibrillation is provided within 10 minutes, a person has a 40% chance of survival.

Phases of the CPR

Phases		Steps
Phase 1	Basic life support	C=Circulation A=Airway B=Breathing
Phase 2	Advanced life support	D=Drugs E=ECG F=Fibrillation
Phase 3	Prolonged life support	Post resuscitation care

Basic Life Support BLS: It is life support without the use of special equipment.

Advanced Life Support ACLS: It is life support with the use of special equipment (e.g., Airway, endotracheal tube, defibrillator).

1. Early recognition:

Assessment is of crucial importance.

It Includes:

- Unresponsiveness.
- No breathing or no normal breathing.
- No pulse felt within 10 seconds.



2. CPR Sequence:

A Change from A-B-C to C-A-B.

- Compressions.
- Airway.
- Breathing.

C=Chest compressions

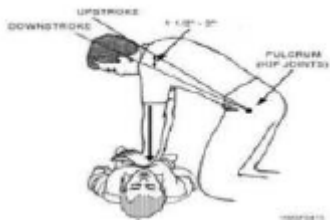
The human brain cannot survive more than 3 minutes with a lack of circulation. So, chest compressions must be started immediately for patients with absent central pulsations.

Technique of chest compression:

- ✓ The patient must be placed on a hard surface.
- ✓ The palm of one hand is placed in the lower half of the sternum 2 fingers above the xiphoid process.
- ✓ The other hand is placed over the hand on the sternum.
- ✓ Shoulders should be positioned directly over the hands. Use your upper body weight to compress.
- ✓ Sternum must be depressed at least 5 cm in adults, and 2-4 cm in children, 1-2 cm

in infants.

- ✓ Must be performed at a rate of 100-120/min.
- ✓ During CPR the ratio of chest compressions to ventilation should be as follows:
single rescuer = 30:2.
- ✓ Chest compressions must be continued for 2 minutes before reassessment of cardiac rhythm (2 minutes = equivalent to 5 cycles 30:2).



Assessment of the adequacy of chest compressions:

- Systolic BP: 60-80 mmHg.
- Diastolic BP: > 40 mmHg.

Problem and complication of chest compression

1. Rib fractures.
2. Fracture sternum.
3. Rib separation.
4. Pneumothorax.
5. Hem thorax.

A=Airway

Loss of consciousness often results in airway obstruction due to loss of tone in the muscles of the airway and falling back of the tongue.

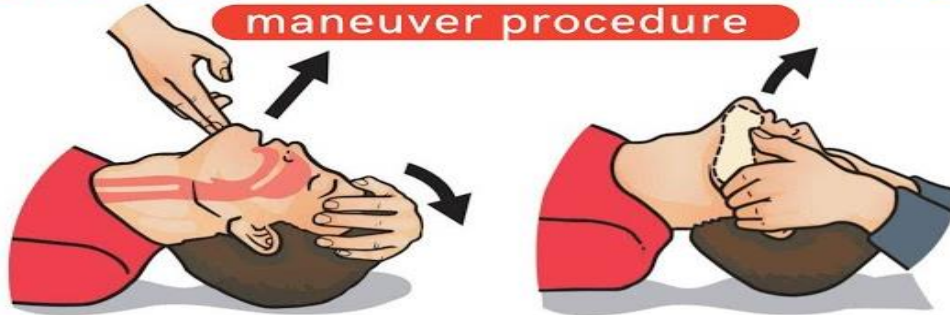


Basic techniques for airway patency:

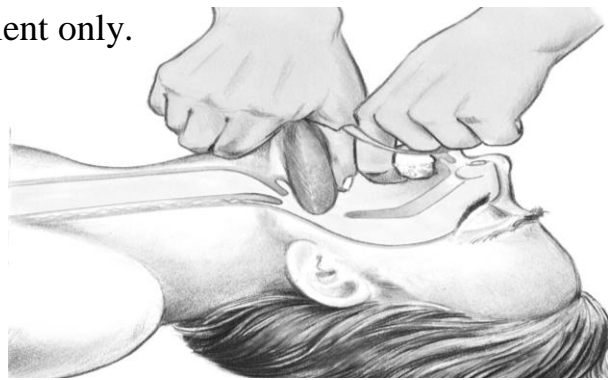
- ✓ Head tilt, chin lift: one hand is placed on the forehead and the other on the chin the head is tilted upwards to cause anterior displacement of the tongue.

HEAD TILT-CHIN LIFT & JAW THRUST

maneuver procedure



- ✓ Jaw thrust:
- ✓ Finger sweep: Sweep out the foreign body in the mouth by index finger in unconscious patient only.



- ✓ Heimlich maneuvers: if the patient is conscious of the foreign body cannot be removed by a finger sweep. It is done while the patient is standing up or lying down. This is a subdiaphragmatic abdominal thrust that elevates the diaphragm expelling a blast of air from the lungs that displaces the foreign body.

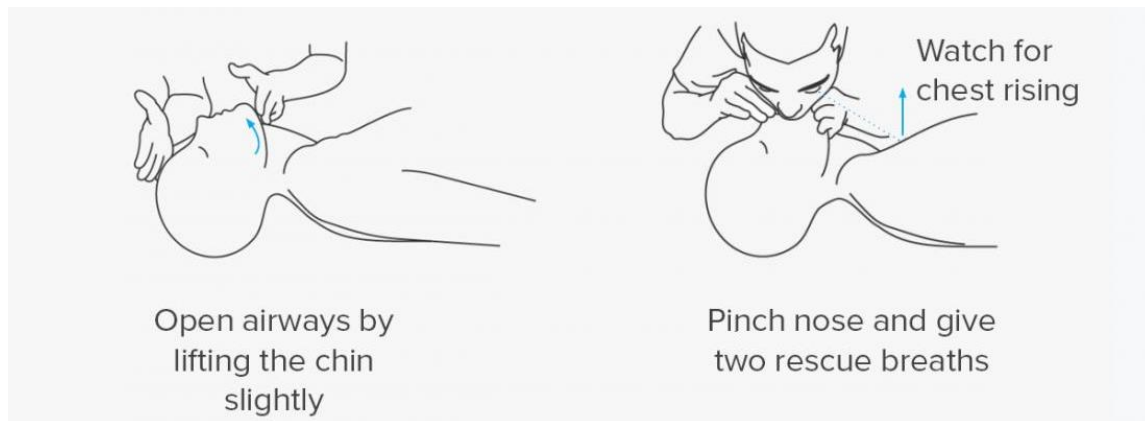


B=Breathing

Rescue breathing can be mouth-to-mouth breathing or mouth-to-nose breathing if the mouth is seriously injured or can't be opened.

Basic techniques include:

- ✓ Mouth-to-mouth breathing: with the airway held open, pinch the nostrils closed, take a deep breath, and seal your lips over the patient's mouth. Blow steadily into the patient's mouth watching the chest rise as if the patient was taking a deep breath.



- ✓ Mouth-to-nose breathing: seal the mouth shut and breathe steadily through the nose.
- ✓ Mouth to mouth and nose: is used in infants and small children.

Assessment of restoration of breathing and circulation

1. Contraction of pupil.
2. Improved color of the skin.
3. Free movement of the chest wall.
4. Swallowing attempts.

Signs of restored ventilation and circulation Include

1. Struggling movements.
2. Improved color.
3. Return of or strong pulse.
4. Return of systemic blood pressure.

When to terminate BLS

1. Pulse and respiration returns.
2. Emergency medical help arrives.
3. The physician declared patient is deceased.
4. In a non-health setting another indication to stop BLS would be that the rescuer was Exhausted and physically unable to continue to perform BLS.

Advanced life support

ACLS includes:

1. Circulation by cardiac massage.
2. Airway management by equipment.
3. Breathing by advanced techniques.
4. Defibrillation by manual defibrillator.
5. Drugs.

Advanced techniques for airway patency

1. Face mask.
2. Oropharyngeal airway.
3. Nasopharyngeal airway.
4. Laryngeal mask airway.
5. Endotracheal tube.
6. Cricothyrotomy.
7. Tracheostomy.



Advanced techniques for breathing

1. Self-inflating resuscitation bag (Ambu Bag).
2. Mechanical ventilator in OR or ICU.



Defibrillation

- ✓ Defibrillation consists of delivering a therapeutic dose of electrical energy to the affected heart with a device called a defibrillator.
- ✓ In cardiac arrest, the associated heart rhythms can be categorized into two Groups
 1. Shockable rhythm: VT/VF 100.
 2. Non-shockable rhythm: asystole and PEA.

Drugs used in CPR

1. Adrenaline.
2. Amiodarone.
3. Magnesium.
4. Calcium.
5. IV Fluids.
6. Thrombolytic.
7. Sodium bicarbonate.
8. Atropine.

