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Sudden cardiac arrest

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Definition:

- Sudden cardiac arrest (SCA) is a sudden and unexpected pulseless condition caused by a disturbance in the heart's electrical activity. The electrical disturbance may be due to a heart attack, a severe imbalance of electrolytes, an inherited genetic mutation that predisposes the heart to electric abnormalities, an electric shock (e.g., from lightning), or blunt force trauma to the chest leading to commotio cordis. Symptoms include an almost instantaneous loss of consciousness and collapse .
- The treatment goal for SCA is to restore a healthy heart rhythm and good neurological outcome.



Causes of sudden cardiac arrest

- Coronary artery disease.
- Dilated cardiomyopathy.
- Hypertrophic Cardiomyopathy.
- Congenital heart disease Like heart defects or blood vessel abnormalities.
- Personal or family history of long QT syndrome or wolf Parkinson white syndrome
- Family history of sudden cardiac arrest or sudden cardiac death.
- Recreational medication.

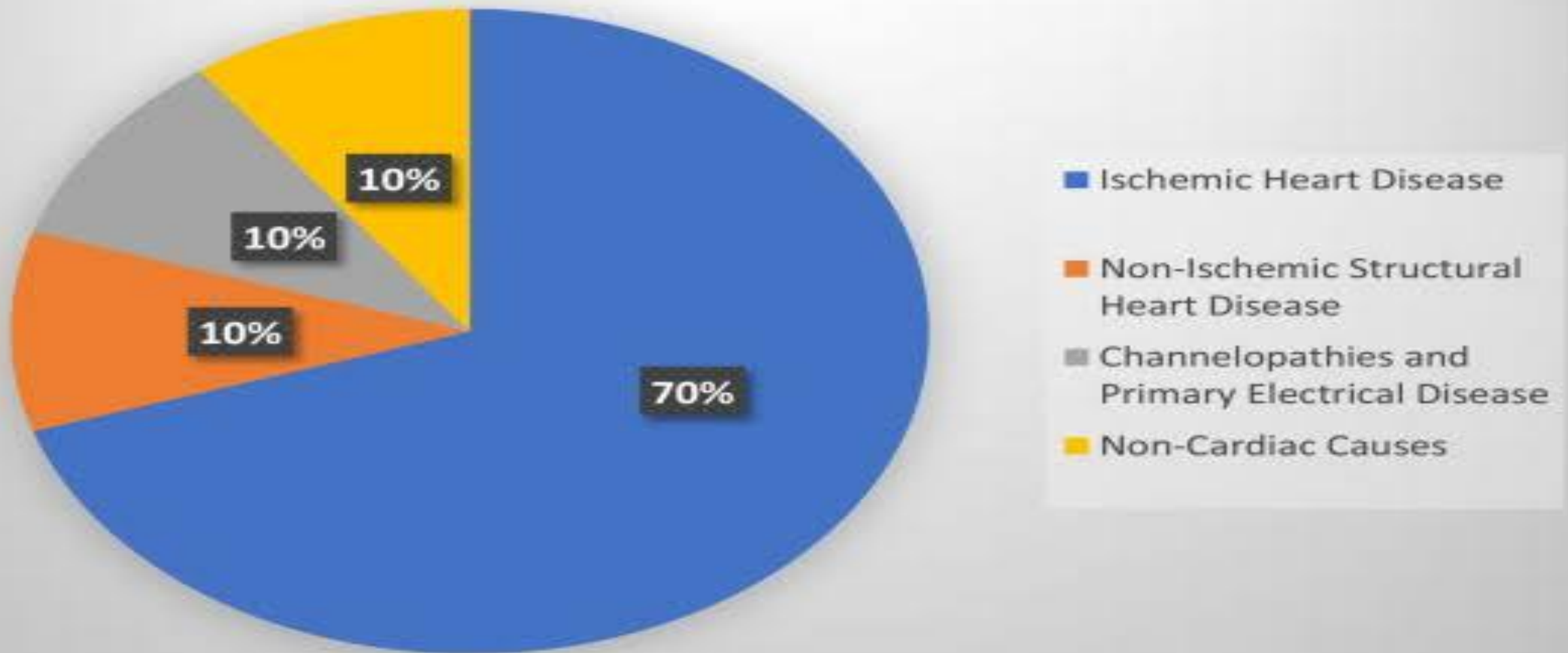


Other risk factors include:

- **Diabetes .**
- **Smoking.**
- **Obesity.**
- **Unhealthy life style**

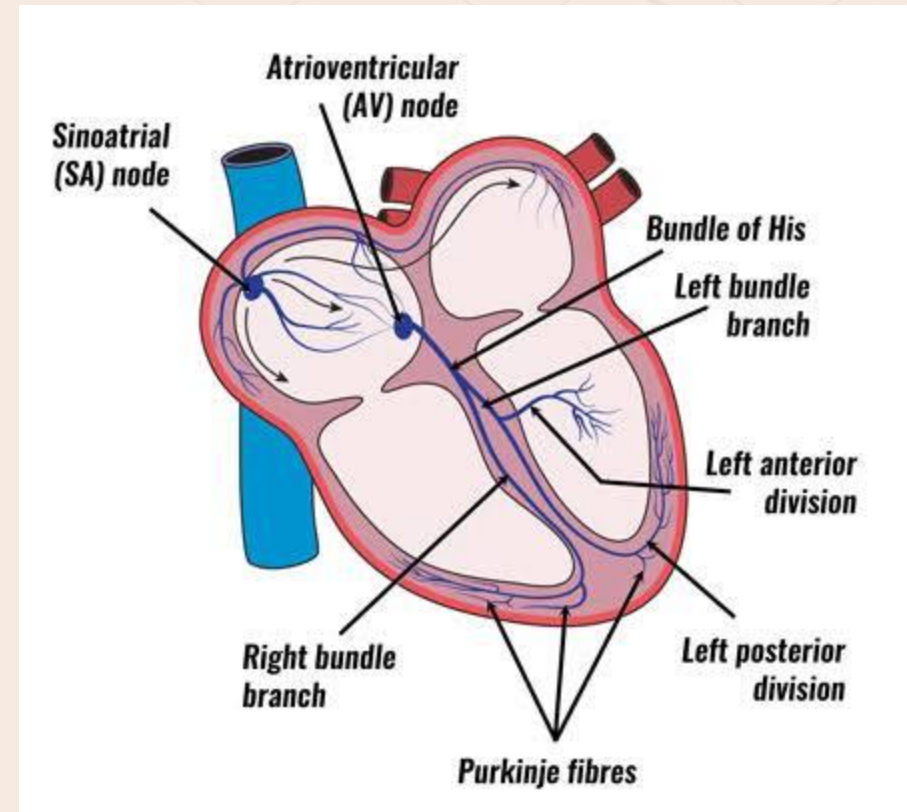


Etiology of Sudden Cardiac Death



Heart conduction system

- The cardiac conduction system is a collection of nodes and specialized conduction cells that initiate and coordinate contraction of the heart muscle. It consists of:
 - Sinoatrial node
 - Atrioventricular node
 - Atrioventricular bundle (bundle of His)
 - Purkinje fibers



Cardiac arrest vs heart attack



Symptoms of SCA

- Sudden collapse .
- Unresponsive .
- No breathing.
- No pulse.



Chain of survival: In hospital cardiac arrest.



Out hospital cardiac arrest



Early recognition and prevention

Early recognition. If possible, recognition of illness before the person develops a cardiac arrest will allow the rescuer to prevent its occurrence. Early recognition that a cardiac arrest has occurred is key to survival, for every minute a patient stays in cardiac arrest, their chances of survival drop by roughly 10%



- 1. Make sure is scene safe.**
- 2. Check for responsiveness.** Shake or tap the person gently. See if the person moves or makes a noise. Shout, Are you OK?
- 3. Call for help.** Shout for Help and send someone for retrieve an automated external defibrillator.
- 4. Carefully place the person on their back.** If there is a chance the person has a spinal injury, two people should move the person to prevent the head and neck from twisting.
- 5. If victim unresponsive check carotid pulse** for less than 10 seconds if no pulse begin high quality CPR



Compression. Airway. Breathing



Compressions

Push hard and fast
on the center of
the victim's chest



Airway

Tilt the victim's head
back and lift the chin
to open the airway



Breathing

Give mouth-to-mouth
rescue breaths

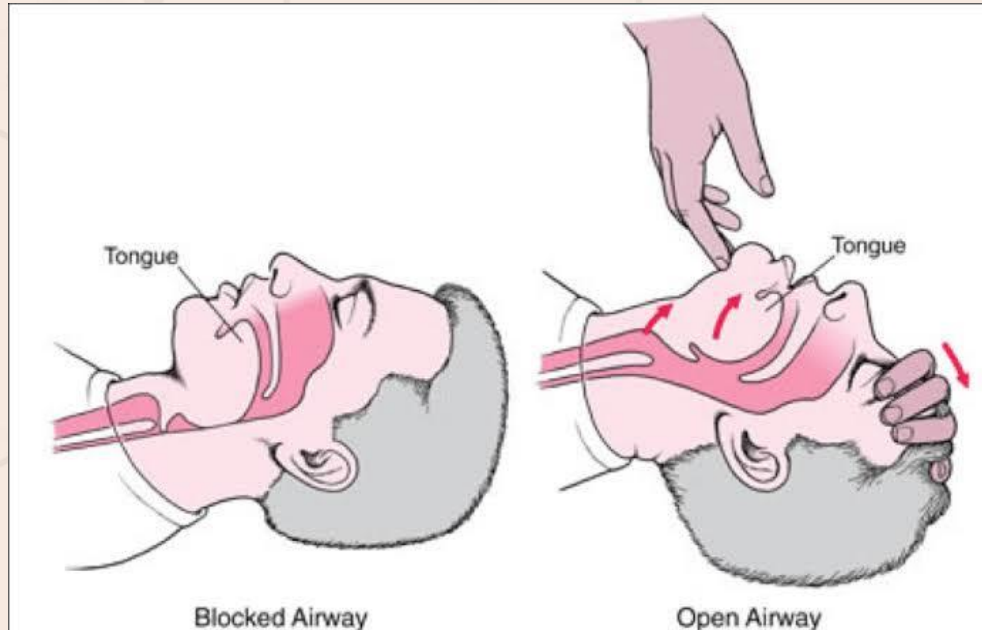
High quality CPR components

- Chest compression fraction (CCF) >80%
- Compression depth 5-6 cm.
- Compression rate 100-120 per minute.
- Full chest recoil.
- Avoid excessive ventilation.
- Minimize time interruption

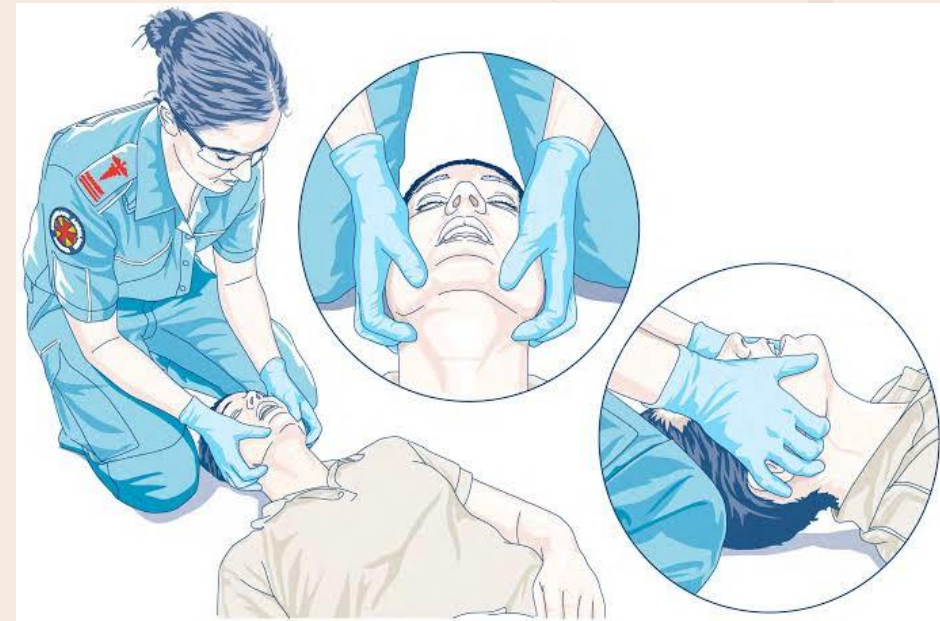


Opening airway maneuvers

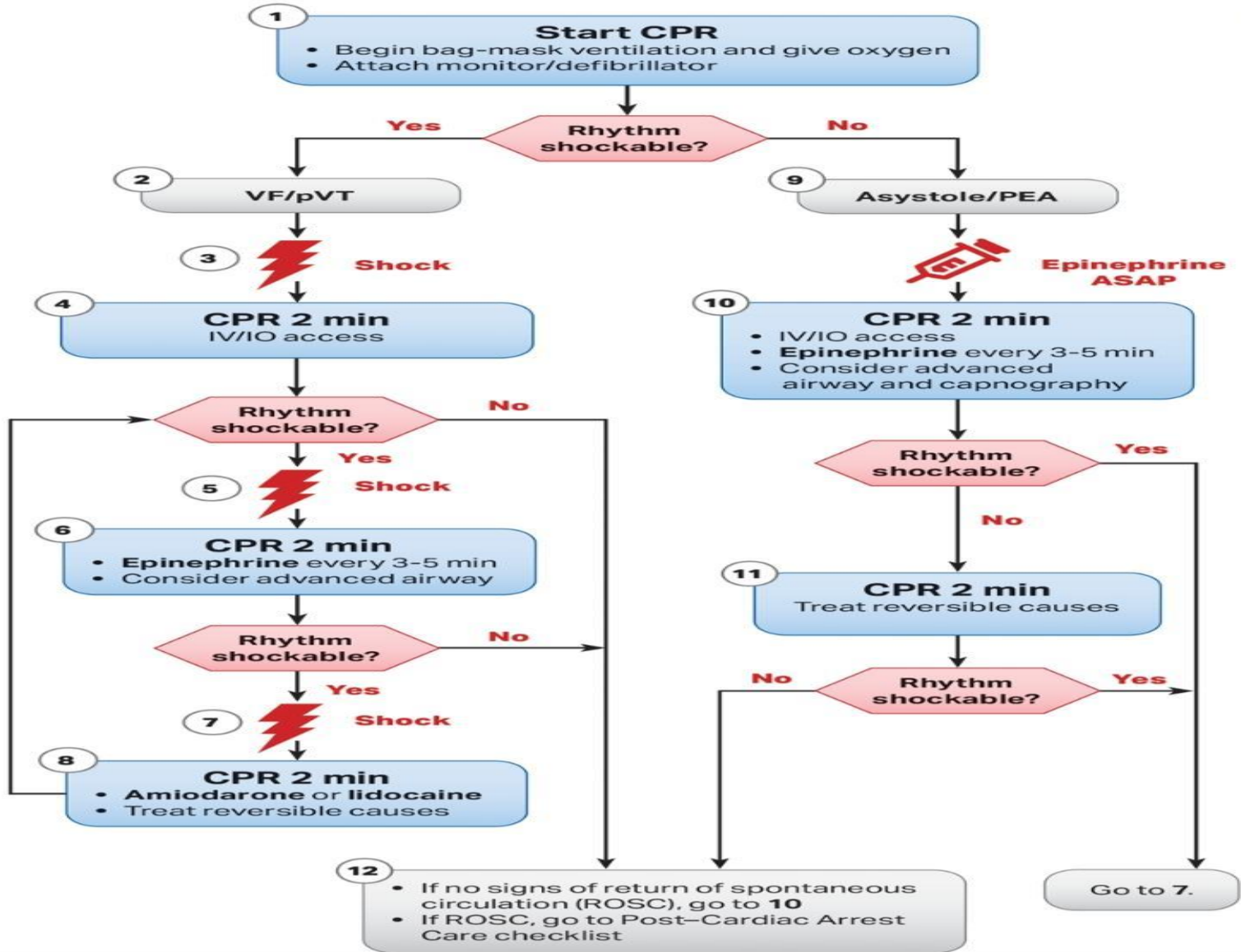
Head tilt chin lift



Jaw thrust



Defibrillation



CPR Quality
<ul style="list-style-type: none"> • Push hard ($\geq\frac{1}{3}$ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil • Minimize interruptions in compressions • Change compressor every 2 minutes, or sooner if fatigued • If no advanced airway, 15:2 compression-ventilation ratio • If advanced airway, provide continuous compressions and give a breath every 2-3 seconds
Shock Energy for Defibrillation
<ul style="list-style-type: none"> • First shock 2 J/kg • Second shock 4 J/kg • Subsequent shocks ≥ 4 J/kg, maximum 10 J/kg or adult dose
Drug Therapy
<ul style="list-style-type: none"> • Epinephrine IV/IO dose: 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Max dose 1 mg. Repeat every 3-5 minutes. If no IV/IO access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration). • Amiodarone IV/IO dose: 5 mg/kg bolus during cardiac arrest. May repeat up to 3 total doses for refractory VF/pulseless VT • Lidocaine IV/IO dose: Initial: 1 mg/kg loading dose
Advanced Airway
<ul style="list-style-type: none"> • Endotracheal intubation or supraglottic advanced airway • Waveform capnography or capnometry to confirm and monitor ET tube placement
Reversible Causes
<ul style="list-style-type: none"> • Hypovolemia • Hypoxia • Hydrogen ion (acidosis) • Hypoglycemia • Hypo-/hyperkalemia • Hypothermia • Tension pneumothorax • Tamponade, cardiac • Toxins • Thrombosis, pulmonary • Thrombosis, coronary

Automated External Defibrillator (AED)



Life drone AED



Advanced resuscitation



Investigation for screening causes of SCA

- **Electrocardiogram (ECG).**
- **Echocardiography.**
- **Chest x-ray.**
- **Cardiac MRI.**
- **Coronary angiography .**
- **Blood test.**
- **Genetics test.**

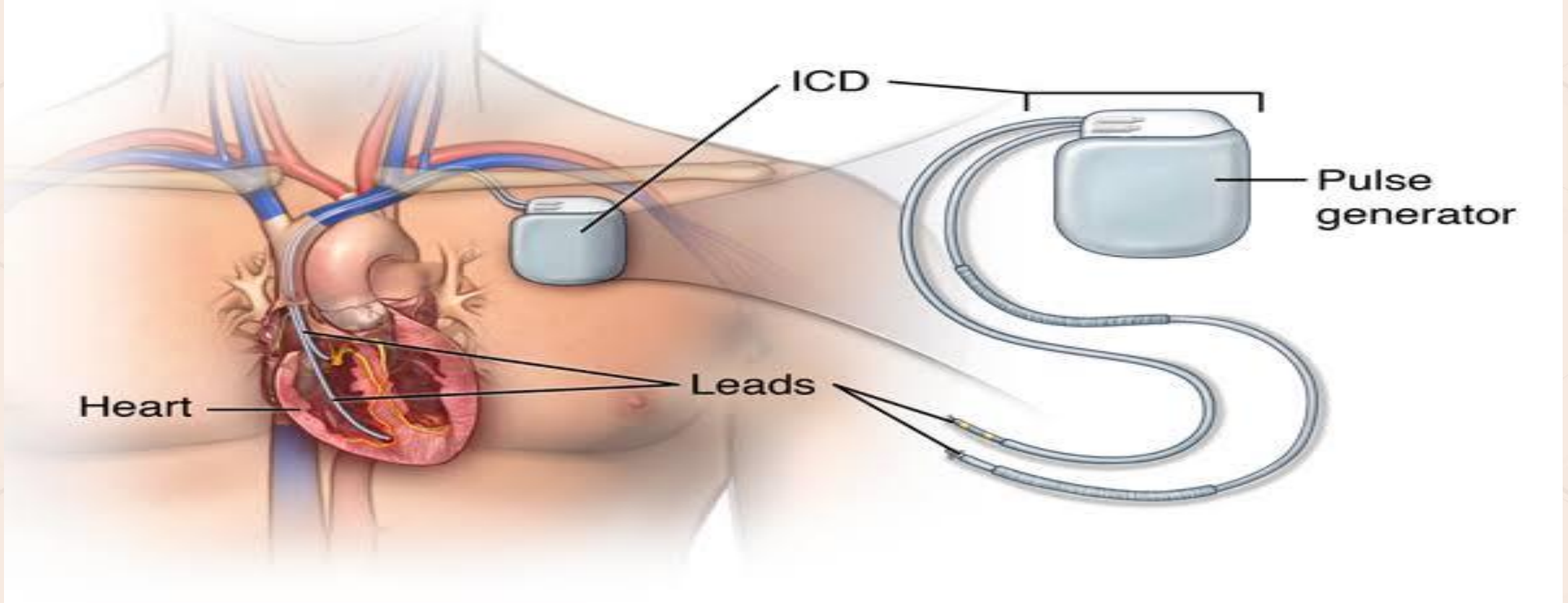


Post cardiac arrest care

- Acute cardiovascular intervention: included ECG and coronary angiography for patient with STEMI
- Hemodynamic stability: avoiding and immediately correcting hypotension
- Targeted temperature management: maintaining temperature between 32c and 36c
- Seizure management
- Ventilation and oxygenation
- Glucose control
- Treat irreversible causes



Implantable cardioverter defibrillator (ICD)





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