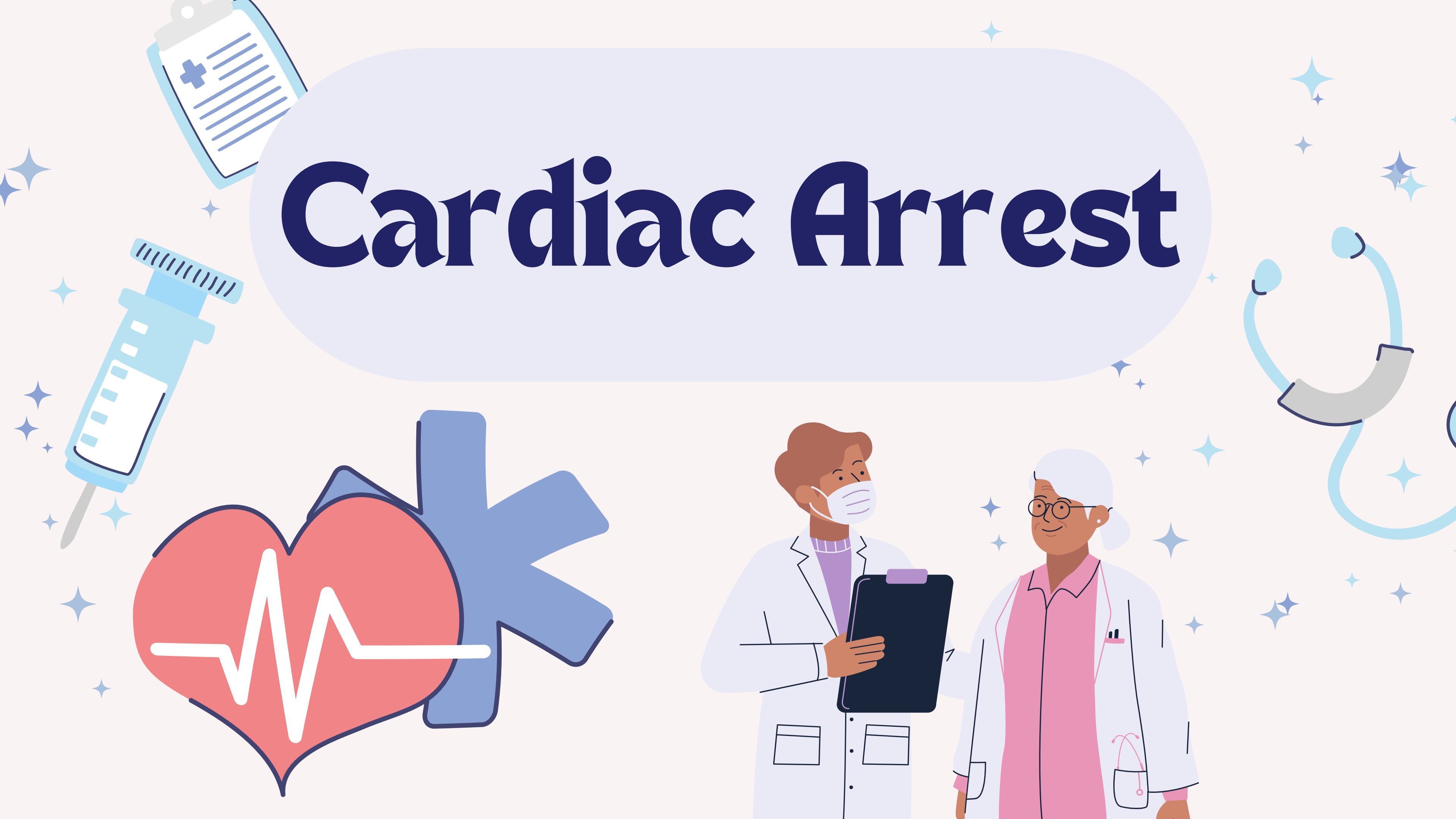


Cardiac Arrest





Cardiac Arrest

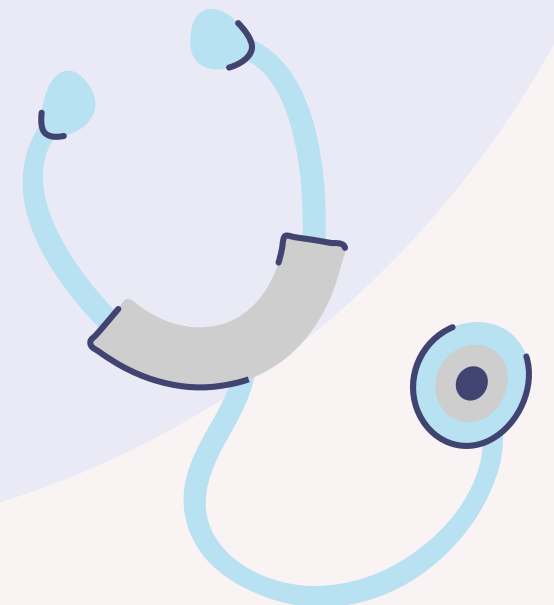
The sudden loss of all heart activity due to an irregular heart rhythm.

Breathing stops.

The person becomes unconscious.

Without immediate treatment, sudden cardiac arrest can lead to death.

Sudden cardiac arrest isn't the same as a heart attack. A heart attack happens when blood flow to a part of the heart is blocked. Sudden cardiac arrest is not due to a blockage. However, a heart attack can cause a change in the heart's electrical activity that leads to sudden cardiac arrest.



Causes of cardiac arrest

- 1-Coronary artery disease :** Sudden cardiac arrest may occur if the heart arteries become clogged with cholesterol and other deposits (atherosclerosis) ,reducing blood flow to the heart.
- 2-Enlarged heart called cardiomyopathy:** This condition (such as hypertrophic cardiomyopathy or dilated cardiomyopathy) usually happens when the walls in the heart muscle stretch. The heart muscle gets bigger or thicker.
- 3-Arrhythmias:** Irregular heart rhythms like ventricular fibrillation (VF) or ventricular tachycardia (VT) can disrupt the heart's ability to pump blood effectively, leading to cardiac arrest.

4-trauma: Severe trauma,, can lead to cardiac arrest.

5-Electrolyte Imbalance: Abnormal levels of potassium, magnesium, can disrupt the heart's electrical activity, potentially causing cardiac arrest.

6-Drug Overdose: Certain drugs, especially those affecting the heart's electrical conduction system (like some illegal drugs or medications), can trigger cardiac arre .

7- Scarring of heart tissue: heart attack can leave scar tissue in the heart. The scar tissue can cause changes in the heartbeat.

8-Chronic health conditions.

9-hypothermia.

10-respiratory arrest.



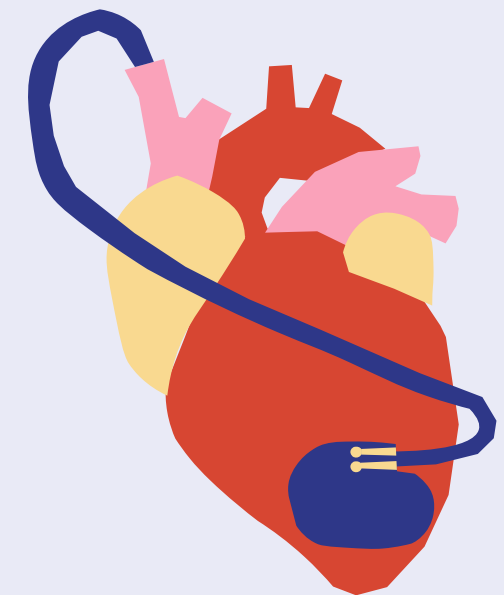
Basic life support

The BLS algorithm allows appropriately trained individuals to recognize cardiac arrest, provide high-quality chest compressions, deliver ventilations, and utilize an AED.

BLS algorithm

The optimal sequence of some BLS steps varies **between single-rescuer BLS** and **two-rescuer BLS**.

- **Assess scene safety**: e.g., check for fire and other hazards, don PPE for infectious or toxic exposures
- **Assess patient responsiveness**: Proceed with BLS if no response or only abnormal breathing (e.g., gasping).
- **Call for help**: Shout for assistance and/or activate the emergency response.
- **Retrieve an AED or defibrillator**: e.g., from the nearest crash cart
- **Assess for signs of life**: Check pulse and respiration simultaneously.
 - Perform airway opening maneuvers as needed.
 - Look, listen, and feel for air movement.
 - Check for a central pulse for no longer than 10 seconds.
 - If no palpable pulse, apnea, and/or agonal respirations: Begin CPR immediately.
 - If respirations are normal: Place the patient in the recovery position before continuing with medical assessment.



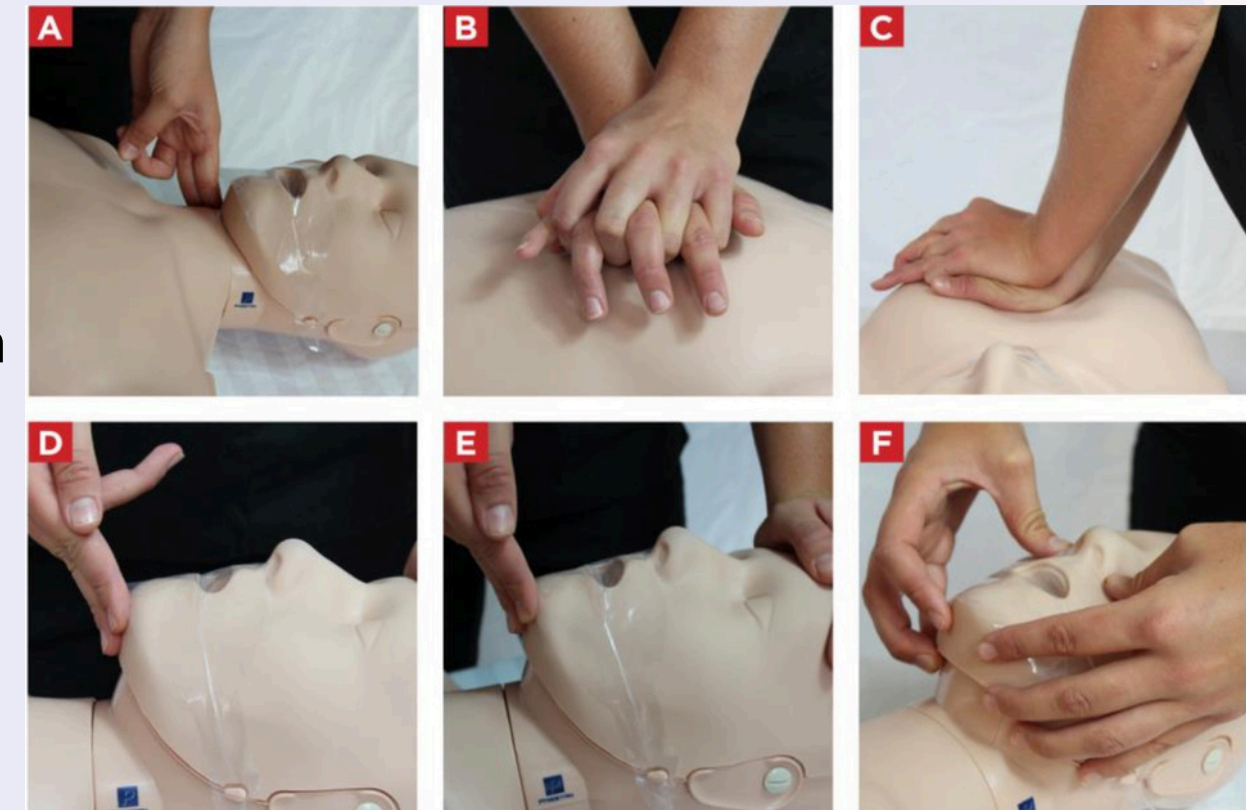


Perform high-quality CPR.

- Position patient supine on a hard surface (activate CPR mode on the bed if present).
- Maintain appropriate CPR ratio: 30:2 for adults, i.e., 30 chest compressions followed by 2 rescue breaths per cycle
- Regularly switch roles if performing two-rescuer CPR.
- Minimize interruptions to CPR.

CPR technique

- Single-rescuer CPR: a single rescuer provides both chest compressions and rescue breaths
- Continuous compression-only CPR is reasonable if BMV is unavailable and mouth-to-mouth breathing is deemed risky
- Two-rescuer CPR: one rescuer performs chest compressions and the other provides rescue breaths
- Change roles every 2 minutes (or earlier if fatigued).



- **Defibrillate as needed.**
- Use an AED or defibrillator as soon as it is available.
- Perform 5 cycles (2 minutes) of CPR between each rhythm analysis and/or shock.
- **Endpoints**
- The patient shows clear signs of life: e.g., coughing, breathing, movement of the extremities
- Rescuers are too fatigued to continue
- ACLS-trained providers arrive

Minimizing the interruption and delays to the initiation of high-quality CPR and early defibrillation of shockable rhythms are the most important factors for survival and reducing long-term complications after cardiac arrest. For a collapsed patient, remember the DRs ABCD: Check the environment for Danger, assess for a Response, shout for help, open the Airway, check for Breathing, start CPR, and attach the Defibrillator.

Basic Life Support (BLS)	
1	Check responsiveness and call for help.
2	Open the airway and assess breathing (and carotid pulse if trained).
3	With help: Ask for 911 call and AED Alone: Call 911, and get AED if nearby
4	30 chest compressions
5	2 rescue breaths
6	Rhythm analysis when AED arrives, then every 2 minutes.
7	Deliver shock if indicated.
8	Immediately restart CPR and continue until professional help arrives or patient shows clear signs of life.

1 Are you alright? Help!



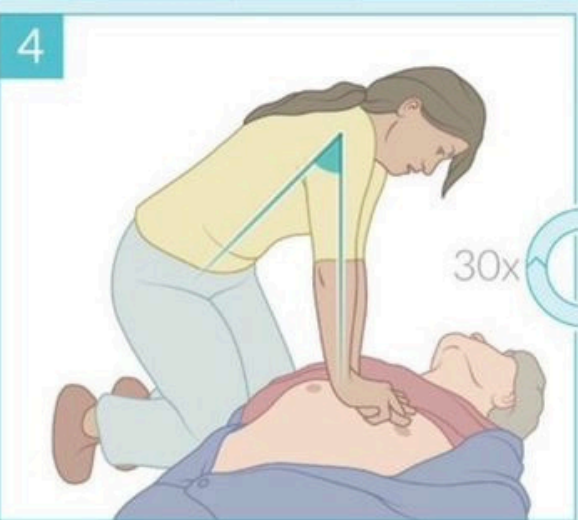
2



3 Call 911 and get an AED!



4



5



6

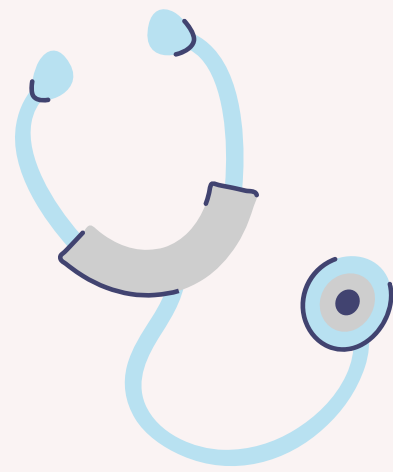


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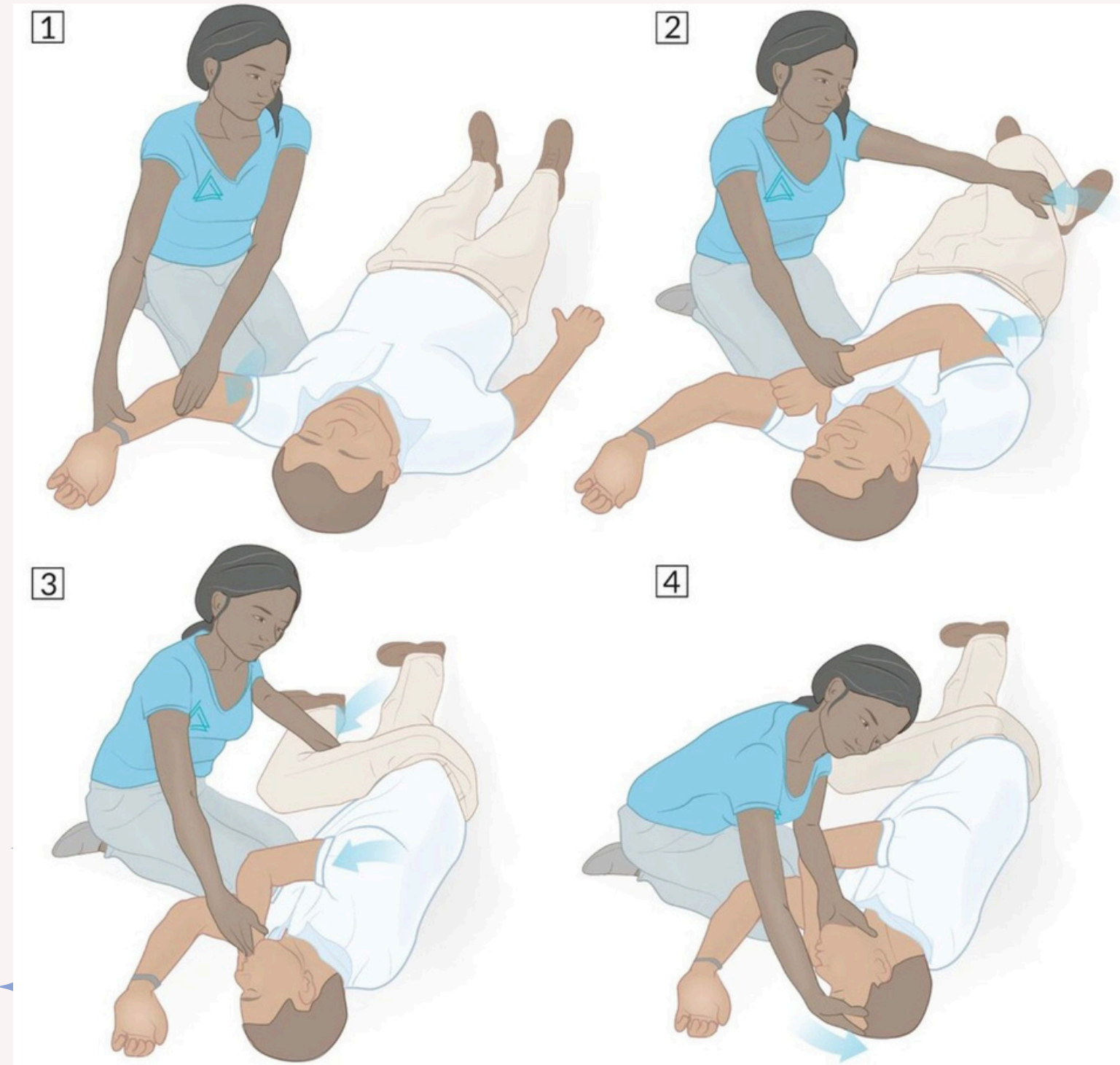


8





Recovery position

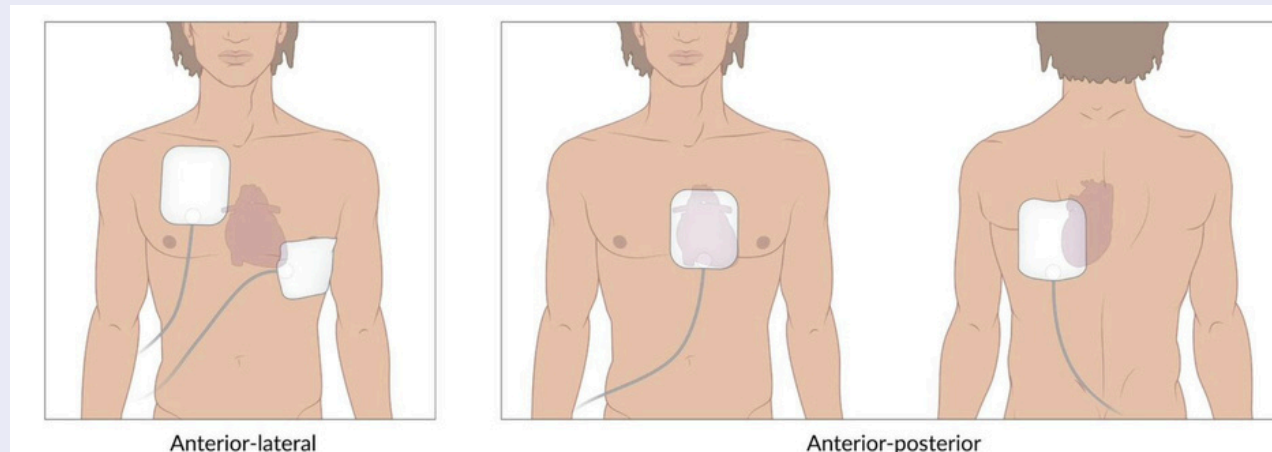


Automated external defibrillator (AED)

- **Instructions :**
- **Dry chest**
- **Remove medication patches**
- **Check for pacemaker or internal defibrillator.**

Position :

- **one pad on upper right chest above the breast.**
- **the second pad on lower left chest below the armpit.**



Choking

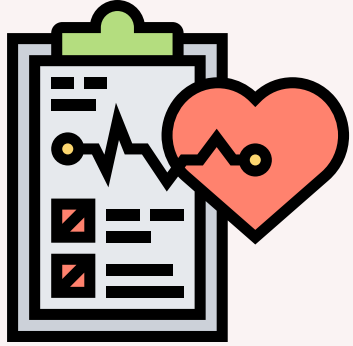
- Choking is a common preventable cause of cardiac arrest. The correct response for a choking person depends on the degree of airway obstruction, whether the person is responsive or not, and the age of the person.

Degree of Obstruction	Person's Response	Rescuer's Action
Mild Obstruction	- Breathing but may also be wheezing - Coughing and making noise	- Stay with the person and try to keep them calm - Encourage them to cough - Call 911/EMS if the person seems to be getting worse
Severe Obstruction	Clutching the neck (universal sign of choking) - Weak or no cough - Unable to make noise or talk; may make high-pitched noise - Little or no breathing - May be cyanotic (blue around lips and fingertips)	- Use abdominal thrusts to attempt to remove obstruction - Call 911/EMS - Begin BLS if the person becomes unresponsive



Degree of Obstruction	Infant's Response	Rescuer's Action
Mild Obstruction	- Breathing but may also be wheezing - Coughing and making noise	- Stay with the infant and try to keep them calm- Do not do a blind finger sweep- Call 911/ EMS if infant does not quickly clear the obstruction
Severe Obstruction	- Weak or no cough- Unable to make noise; may make high-pitched noise- Little or no breathing- May be cyanotic (blue around lips and fingertips)	- Use abdominal thrusts to attempt to remove obstruction - Call 911/EMS - Begin BLS if the person becomes unresponsive





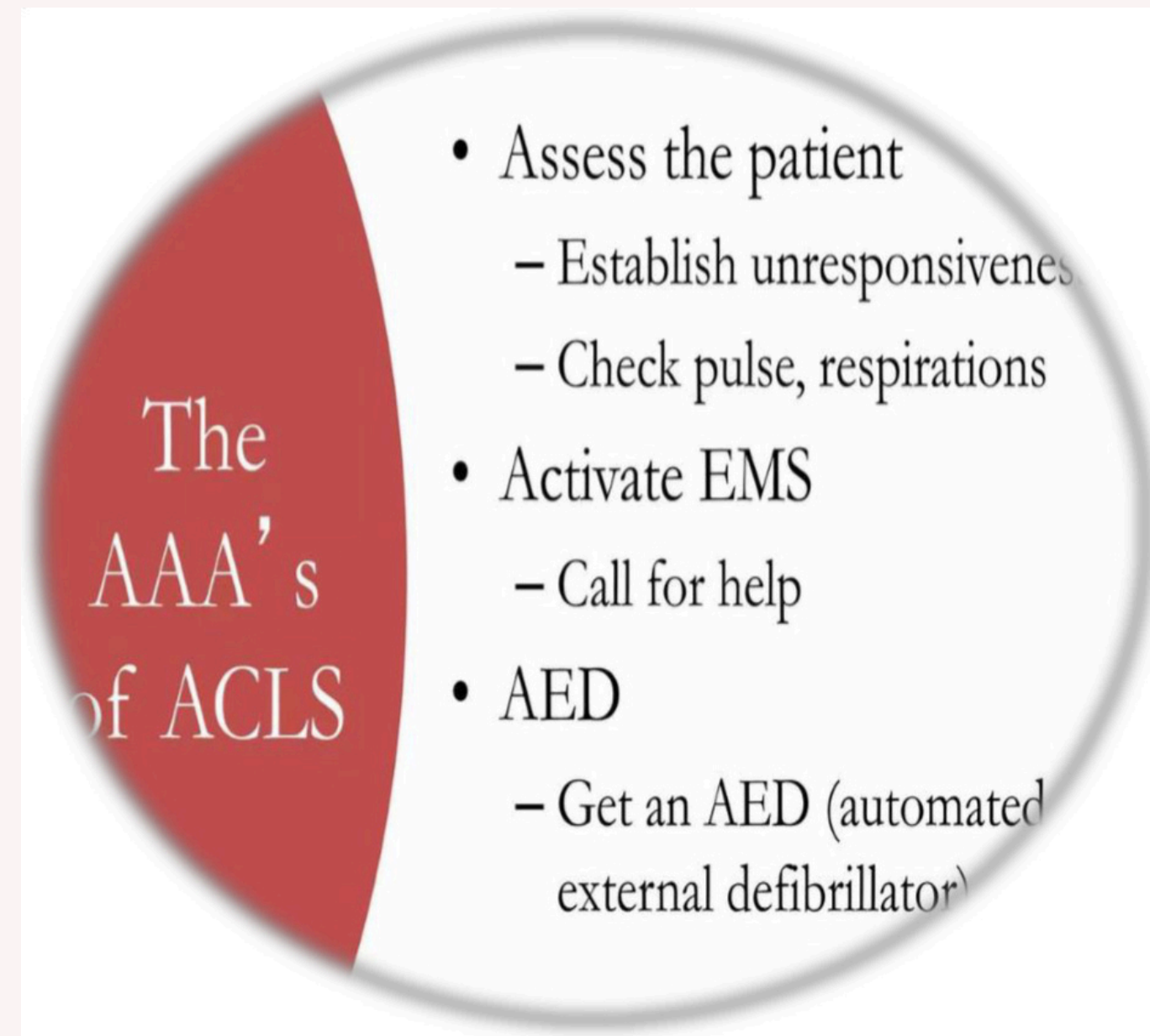
ADVANCED CARDIAC LIFE SUPPORT

- Advanced cardiac life support or advanced cardiovascular life support

(ACLS) refers to a set of clinical interventions for the urgent treatment of cardiac arrest and other life-threatening medical emergencies, as well as the knowledge and skills to deploy those interventions.

- ACLS is a series of evidence based responses simple enough to be committed to memory and recall under moments of stress.

- AMERICAN HEART ASSOCIATION (AHA) protocols are considered to be the GOLD standard ACLS protocols.



AHA CHAINS OF SURVIVAL

AHA **Adult** Chain of Survival

- Immediate recognition of cardiac arrest and activation of the emergency response system
- Early CPR with an emphasis on chest compressions
- Rapid defibrillation
- Effective advanced life support
- Integrated post-cardiac arrest care

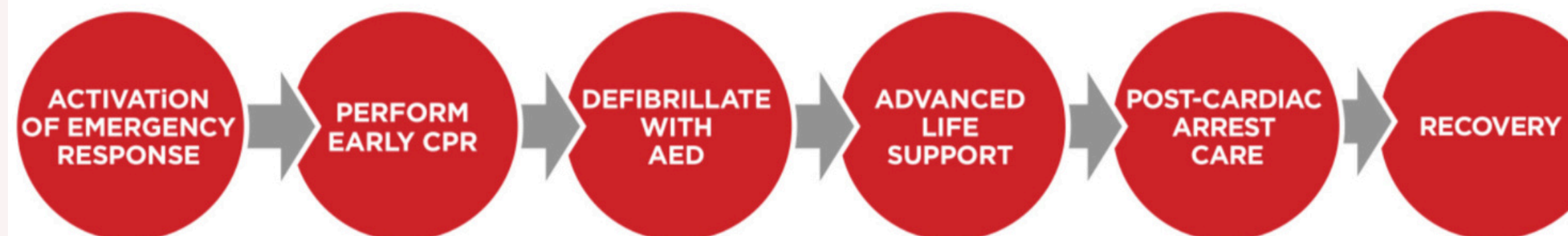
AHA **PEDIATRIC** Chain of Survival

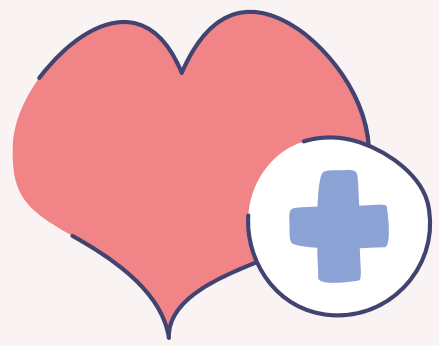
Pediatric Chain of Survival



Figure 2

Adult Chain of Survival





SECODARY SURVEY (ACLS)

A–Airway

- Maintain patent airway.
- Maintain proper head position.
- Use oropharyngeal or nasopharyngeal airway if indicated.
- Use advanced airway if indicated (laryngeal mask airway [LMA], laryngeal tube, esophageal-tracheal tube, endotracheal tube [ET]).

B–Breathing

Perform bag-mask ventilation.

Provide supplemental oxygen.

Monitor adequacy of ventilation and oxygenation.

Ensure adequate chest rise.

Use CO2 detector or quantitative waveform capnography.

Measure oxygen saturation.

Avoid excessive ventilation

A

- Maintain airway in unconscious patient
- Consider advanced airway
- Monitor advanced airway if placed with quantitative waveform capnography



B

- Give 100% oxygen
- Assess effective ventilation with quantitative waveform capnography
- Do NOT over-ventilate



C

- Evaluate rhythm and pulse
- Defibrillation/cardioversion
- Obtain IV/IO access
- Give rhythm-specific medications
- Give IV/IO fluids if needed



D

- Identify and treat reversible causes
- Cardiac rhythm and patient history are the keys to differential diagnosis
- Assess when to shock versus medicate

C–Circulation.

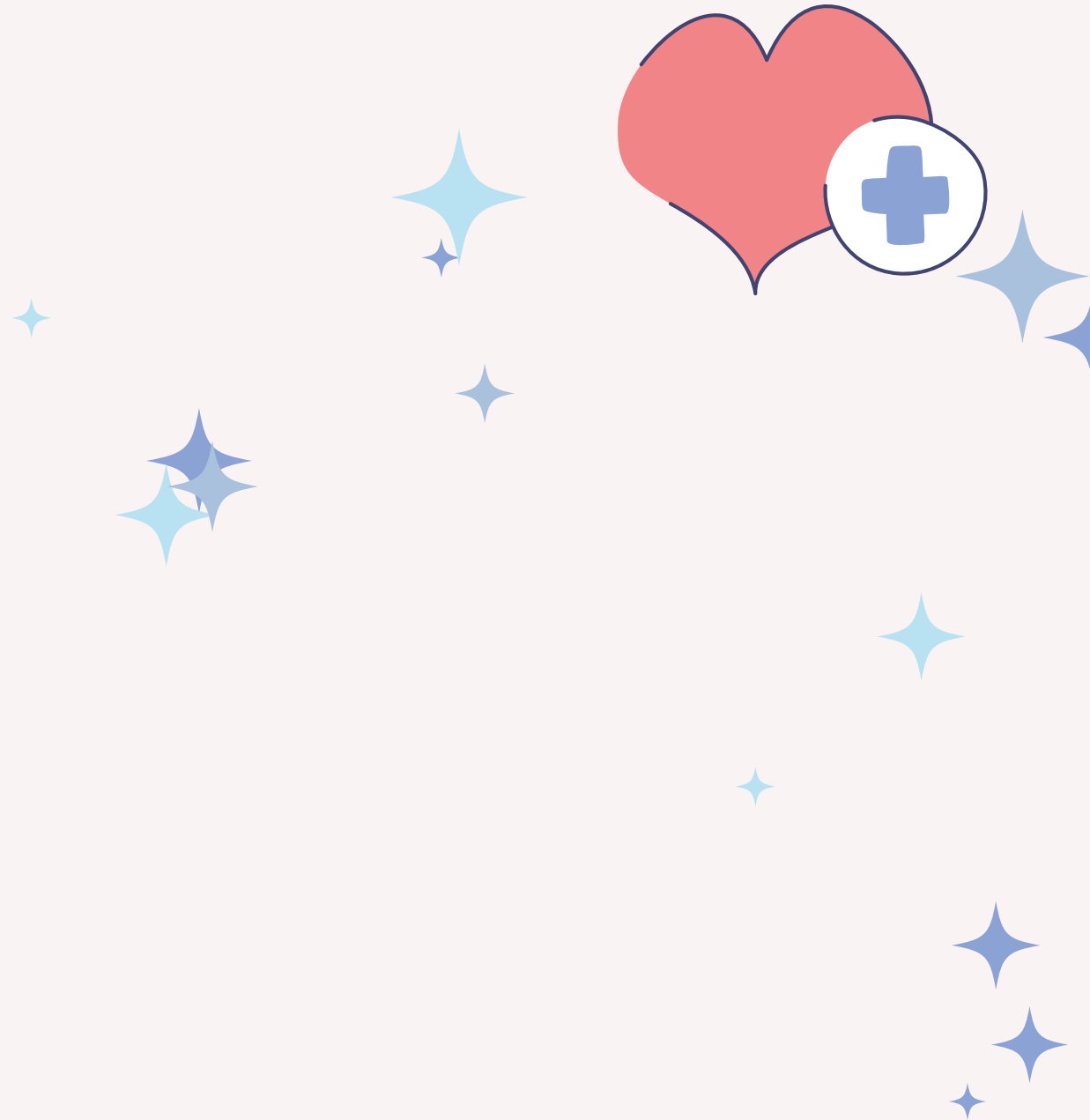
- Provide high-quality CPR.
- Monitor cardiac rhythm & BP.
- Initiate prompt defibrillation/cardioversion when indicated.
- Establish IV/IO access.
- Administer medication when indicated.
- Administer volume resuscitation when indicated.
- Assess for ROSC.

D–Differential Diagnosis

Identify and treat potentially reversible causes. Assess Hs and Ts (see Cardiac Arrest Algorithms)

Reversible Causes of Cardiac Arrest (5-H/5-T), According to the AHA-Algorithm

Hypovolemia *	Tension pneumothorax *
Hypoxia	Tamponade (cardiac) *
Hypothermia	Thrombosis (myocardial infarction) *
H+ ions (acidosis)	Thrombosis (pulmonary) *
Hypo-/hyperkalemia	Toxins



■ CPR: Adult, Child, or Infant

1. **Unresponsive?** (Not breathing, or only gasping?)
2. **Call for assistance**—have someone get defibrillator/AED.
3. **Check pulse within 10 seconds** (If present, give 1 breath every 5–6 seconds; check pulse every 2 minutes).

IF NO PULSE:

4. **Position patient supine** on hard, flat surface.
5. **Begin chest compressions**, 30:2, push hard and fast ≥ 100 /minutes, allow full chest recoil—minimize interruptions.
6. **Open airway:** head-tilt/chin-lift, ventilate $\times 2^*$ (avoid excessive ventilations).
7. **Attach AED** to adult (and child >1 year old).

SHOCKABLE RHYTHM?

Yes

No

- | | |
|---|---|
| 8. Shock $\times 1$. | 8. Resume CPR immediately for 2 minutes. |
| 9. Resume CPR immediately for 2 minutes. | 9. Initiate ALS interventions. |
| 10. Check rhythm. | 10. Check rhythm every 2 minutes. |
- IF SHOCKABLE:**
11. **Shock $\times 1$; resume CPR.**



Lower half of sternum



Head-tilt/chin-lift

Shockable

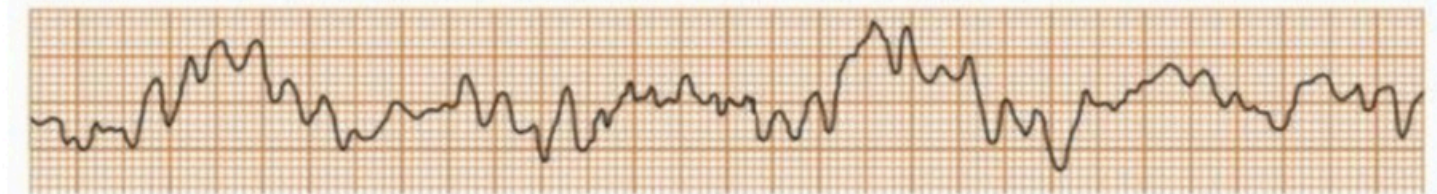
VT

Monomorphic
or polymorphic

VF

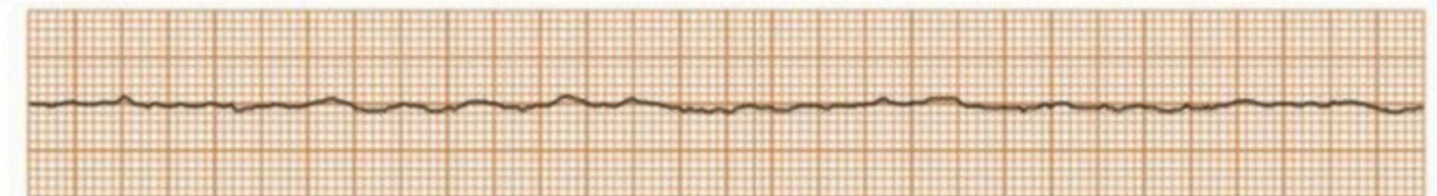
Fine or Coarse
VF

■ Cardiac Arrest Rhythms



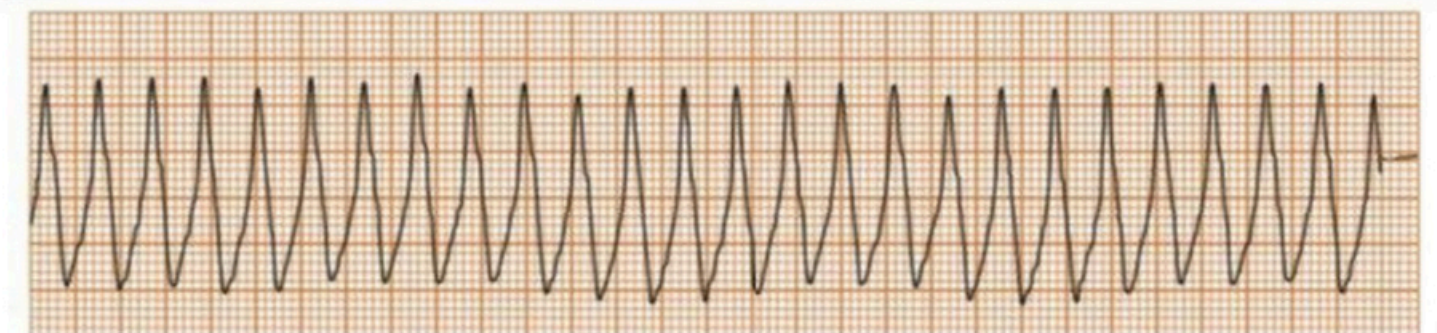
Coarse Ventricular Fibrillation

Note the chaotic, irregular electrical activity. **Treatment:** Shock.



Fine Ventricular Fibrillation

Note the low-amplitude, irregular electrical activity. **Treatment:** Shock.



Ventricular Tachycardia

Note the rapid, wide complexes. **Treatment:** Shock if no pulse.

• **ACLS: Adult Arrest**

1. The initial evaluation is as follows :

- Activate emergency response system.
- Initiate adult basic life support (BLS) algorithm.

2. The initial intervention is as follows:

- Start high-quality cardiopulmonary resuscitation (CPR).
- Administer oxygen if hypoxemic.
- Attach monitor/defibrillator.
- Monitor blood pressure and oximetry; do not delay defibrillation.

3. Check rhythm, as follows:

tachycardia (VF/Vi = Ventricular fibrillation or pulseless ventricular

- Nonshockable rhythm = Asystole/pulseless electrical activity (PEA)

Shockable Rhythm

1. Initial treatment of VT/VF is as follows:

- Defibrillate immediately.
- Continue CPR for 2 minutes.
- Obtain intravenous (IV)/intraosseous (IO) access; IO access if IV not possible.
- Consider advanced airway, end-tidal carbon dioxide tension (PETCO₂).

2. Administer vasopressor (epinephrine q3-5min)

3. Check pulse and rhythm every 2 minutes, as follows:

- If nonshockable
- If shockable and administer amiodarone after second defibrillation attempt.
- Rotate chest compressors.
- Identify and treat reversible causes.

4. If return of spontaneous circulation (ROSC), ACLS: Post-Cardiac Arrest Care.

Advanced Airway

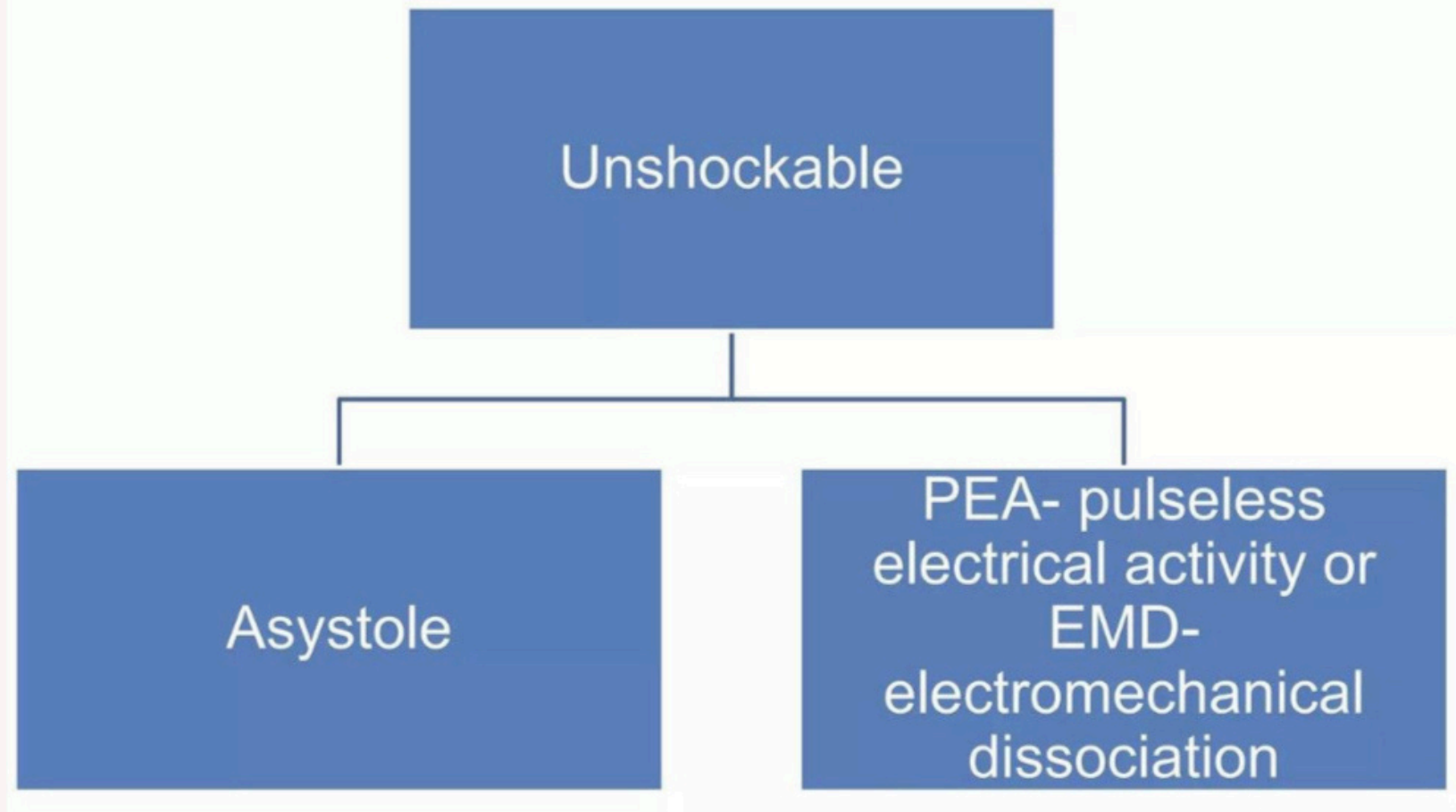
Advanced airway should be established as follows:

- Endotracheal tube (ETT) or supraglottic airway (SGA)
- Waveform capnography to confirm and monitor ET tube placement
- Ventilation every 6 seconds asynchronous with compressions
- Stop CPR for no longer than 10 seconds for the placement of an advanced airway.

Return of Spontaneous Circulation

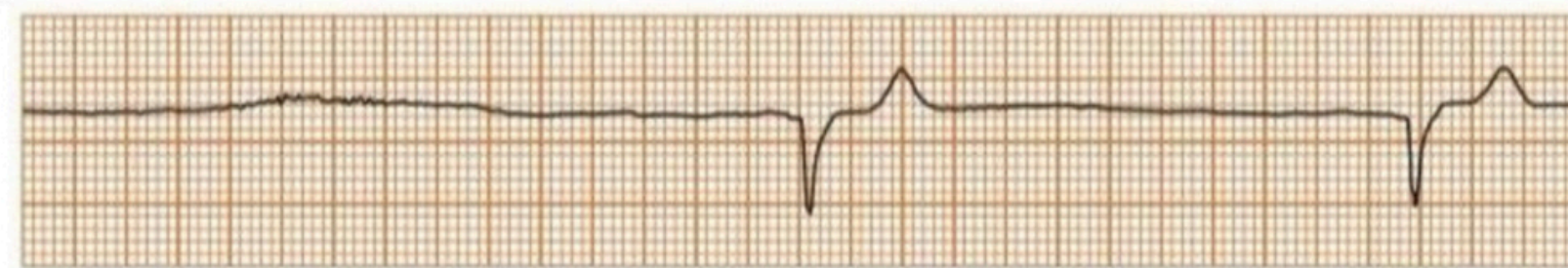
Signs of ROSC include the following:

- Pulse and blood pressure present
- Abrupt sustained increase in PETCO₂ (typically >40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring



Asystole

Note the absence of electrical activity. **Treatment:** Perform CPR.

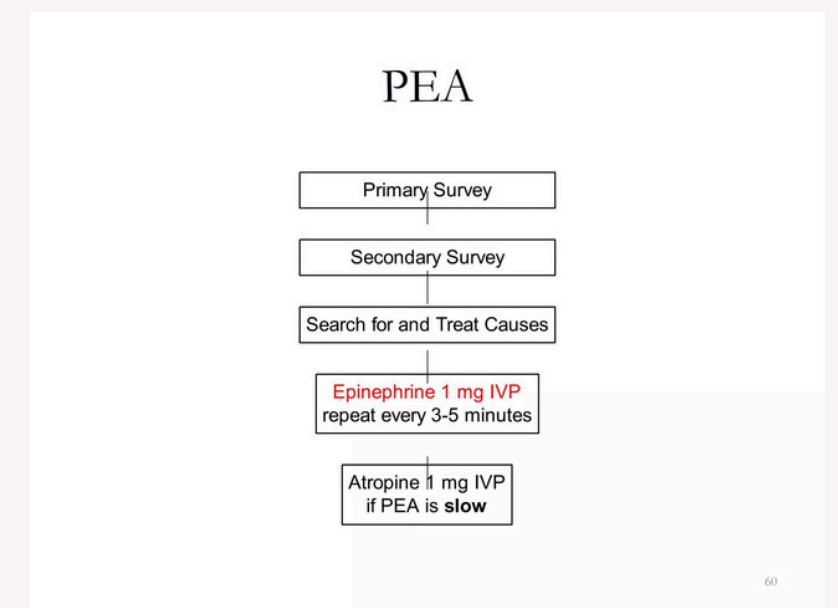
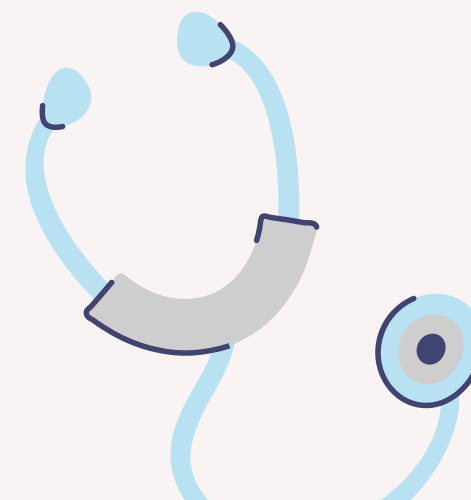


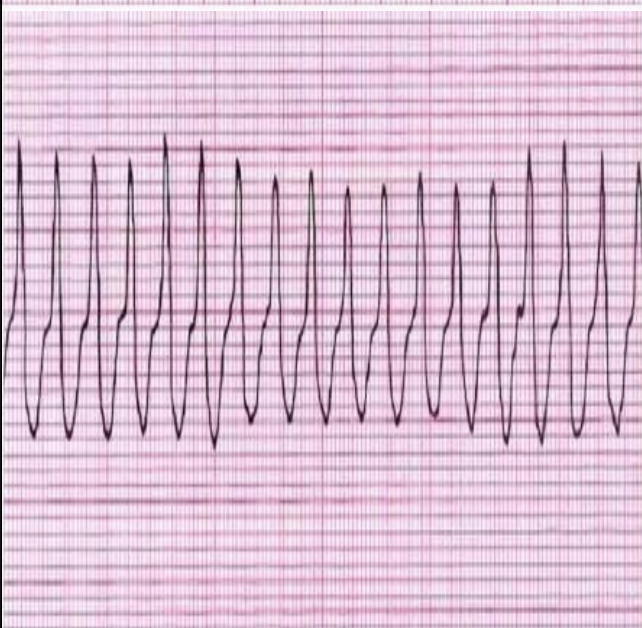
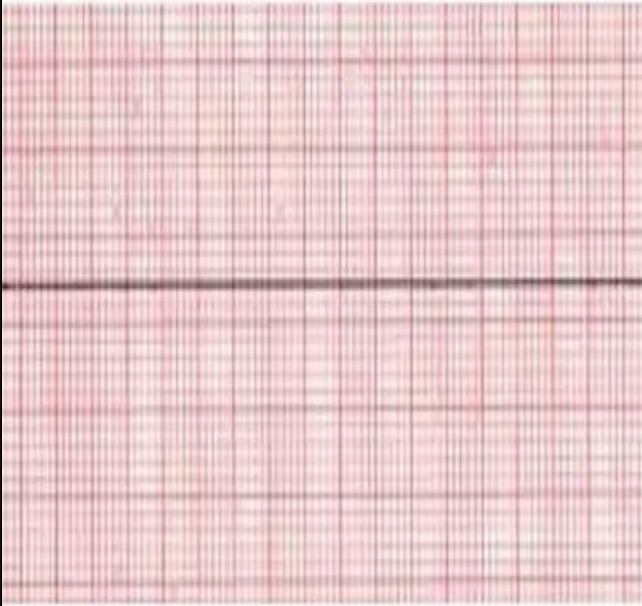
Pulseless Electrical Activity (PEA)

Any organized ECG rhythm with no pulse. **Treatment:** Perform CPR.

Nonshockable Rhythm

1. Initial treatment of asystole/PEA is as follows:
 - Continue CPR for 2 minutes.
 - Obtain intravenous (IV)/intraosseous (IO) access.
 - Consider advanced airway, end-tidal carbon dioxide tension (PETCO 2
2. Administer vasopressor (epinephrine q3-5min).
3. Check pulse and rhythm every 2 minutes, as follows:
 - If nonshockable
 - If shockable
 - Rotate chest compressors.
 - Identify and treat reversible causes.
4. If return of spontaneous circulation (ROSC), ACLS: Post-Cardiac Arrest Care



	Cardiacarrest patterns	ECG	Clinical Presentation	Commets	
SHOCKABLE	VF	No identifiable P, QRS or T wave. Rate cannot be discerned, rhythm unorganized.	Unresponsive state No respirations or only agonal respirations No pulse	Life-threatening Arrhythmia Emergency-requires BLS	Coarse VF  Fine VF 
	VT	Wide and bizarre QRS. QRSbot preceded by P wave. R-R interval usually regular. Difficult to find separation between QRS and T wave 100-250 bpm	Unresponsive state No respirations or only agonal respirations No pulse	Treatment of VT If pulseless -follow VF algorithm If stable try anti-arrhythmics Amiodarone Lidocaine Procainamide? • If patient has a pulse, but is unstable or not responding to meds - shock	
NON SHOCKABLE	Asystole	Rate, rhythm, P and QRS are absent	Unresponsive state No respirations or only agonal respirations No pulse Flat ECG tracing or only agonalrhythm; no electrical activity on monitor	No CO, contraction of the myocardium or BF	
	PEA	Low or high-amplitude T-waves Prolonged PR and QT intervals Atrioventricular disassociation Complete heart block Ventricular complexes without P-waves	Same first3 points Organized electrical rhythm on monitor but no pulse	#1 cause in adults is Hypovolemia #1 cause in children is hypoxia/ RS arrest	 IF NO PULSE WITH THIS RHYTHM?

Introduction to Basic Airway Maneuvers

What Are Basic Airway Maneuvers?

- Simple techniques to open and maintain an airway without advanced equipment.
- Common maneuvers include:
 - Head-Tilt-Chin-Lift: Tilts the head back to open the airway by moving the tongue away from the throat.
 - Jaw-Thrust Maneuver: Pulls the jaw forward to prevent airway obstruction, useful if a spinal injury is suspected.
- Importance During Cardiac Arrest:
 - Cardiac arrest often causes the loss of muscle tone, leading to airway collapse.
 - Basic airway maneuvers help ensure oxygenation and ventilation during cardiopulmonary resuscitation (CPR).

Role of Airway Patency in Oxygenation and Survival

Why Is Airway Patency Crucial?

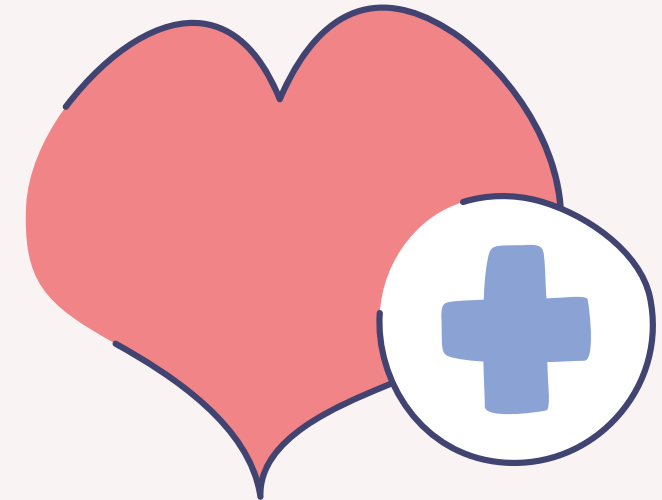
- . A clear airway allows oxygen to reach vital organs, preventing hypoxia.

- . Effective oxygenation is critical in cardiac arrest to sustain organ function and improve chances of recovery.

- . **Impact on Survival Outcomes:**

- . According to the American Heart Association (AHA), establishing a patent airway can significantly improve survival by supporting effective circulation and oxygenation (AHA, 2020).

- . Studies show that maintaining an open airway, especially in combination with continuous chest compressions, increases the likelihood of Return of Spontaneous Circulation (ROSC).



Basic Airway Maneuvers in Clinical Practice

Application in Emergency Settings:

- • First responders and healthcare providers are trained to use these maneuvers immediately upon recognizing airway obstruction during cardiac arrest.
- • In pre-hospital and hospital settings, these maneuvers are often the first line of action to secure the airway until advanced airway devices can be placed if necessary.

Training and Preparedness:

- • Evidence-based guidelines from the AHA and ERC emphasize regular training on basic airway maneuvers for all healthcare providers.
- • Frequent practice and skill assessment improve confidence and response time during emergencies.

Practical Recommendations:

- • Healthcare professionals should apply these maneuvers promptly and assess effectiveness to ensure optimal oxygenation during resuscitation.



Challenges and Future Directions



Challenges in Applying Basic Airway Maneuvers:

- **Skill Retention:** Evidence shows that without regular practice, healthcare providers may struggle with effective airway maneuvers, impacting patient outcomes.
- **Variation in Skill Levels:** Proficiency with these techniques varies across providers, especially among non-specialists or those without frequent emergency experience.
- **Patient Factors:** Anatomical differences, such as obesity or facial injuries, can make basic airway maneuvers more challenging.

Bag mask ventilation

Bag-valve-mask (BVM) ventilation is a critical technique used to provide rescue ventilation and serve as a bridge to a definitive airway, such as an endotracheal tube.

Indications :

- 1-Emergency ventilation for apnea, respiratory failure, or impending respiratory arrest
- 2-Pre-ventilation or interim ventilation during efforts to achieve and maintain a definitive airway (e.g., endotracheal intubation)



Complications

- 1-Gastric insufflation leading to aspiration risk.
- 2-Barotrauma if excessive pressure is applied.
- 3-Hypoventilation or hyperventilation if not performed correctly

Equipment Needed

Bag-valve-mask (BVM) device

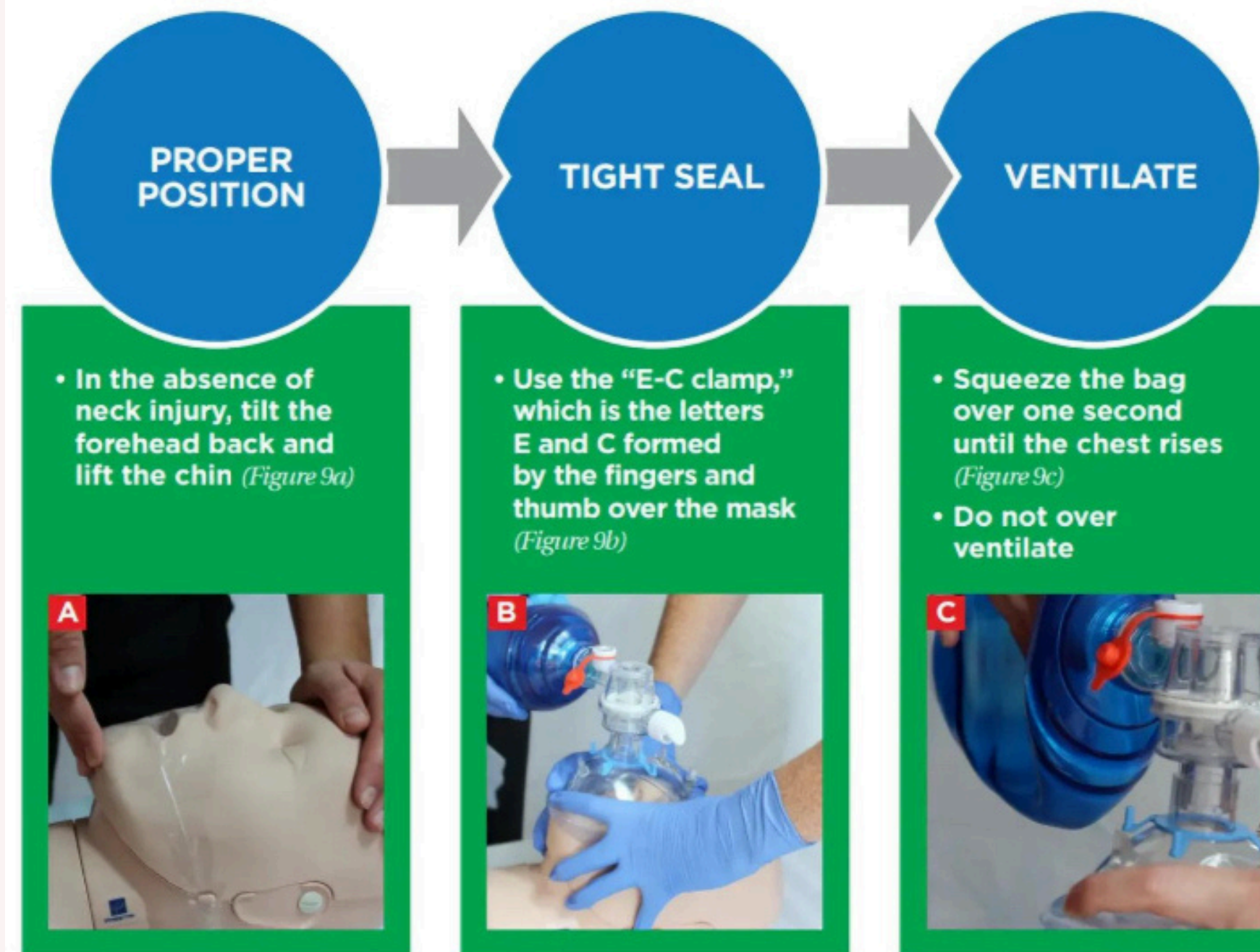
Oxygen source

Reservoir bag

Airway adjuncts (e.g., oropharyngeal or nasopharyngeal airways)

Positive end-expiratory pressure (PEEP) valve (if needed)

Here's a step-by-step guide to the technique:





METHODS OF Applying BAG MASK VENTILATION

The operator's position

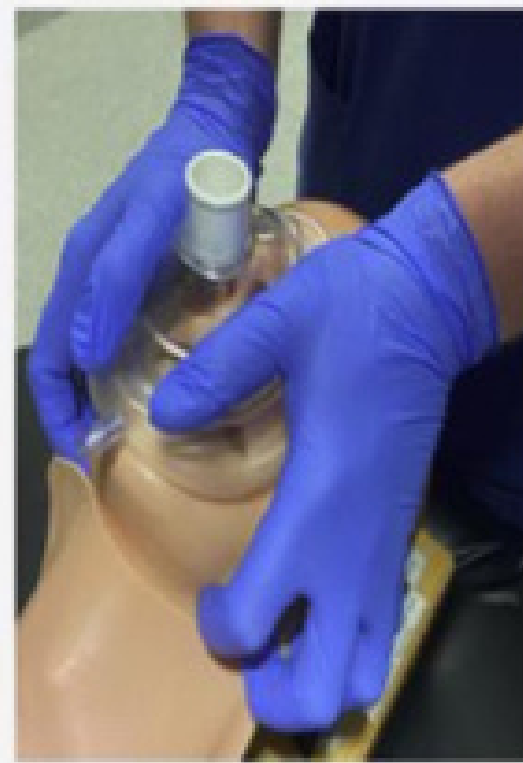
METHODS OF Applying BAG MASK VENTILATION



One-handed C-E grip



Two-handed C-E grip



Two-handed vice grip



Combin C-E vice grip

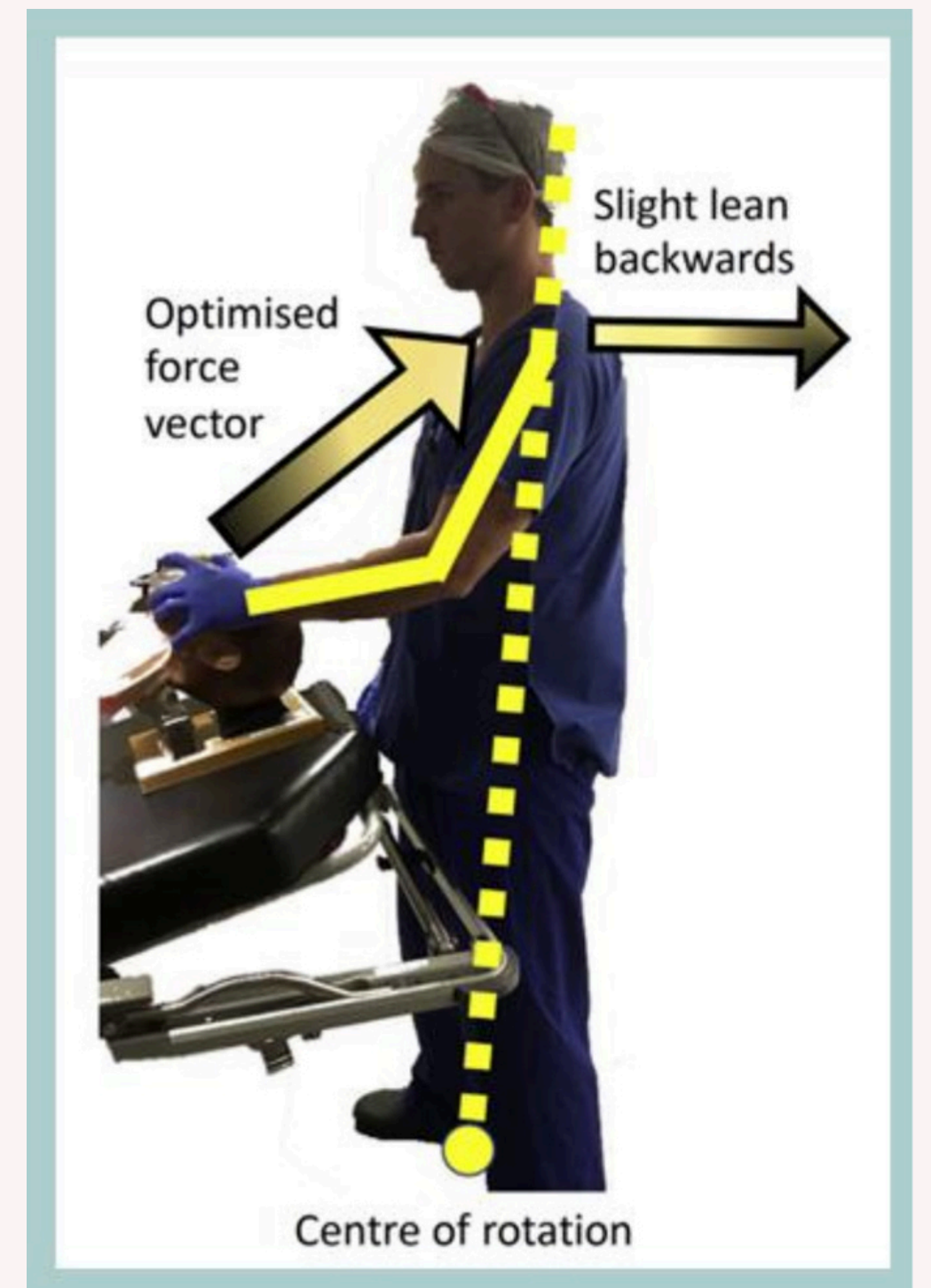


Table 1 Causes of difficult facemask ventilation.

Equipment-related factors	Failure of gas delivery Size of airway adjuncts Size or shape of facemask
Disruptors of facemask seal	Edentulism Facial deformities (e.g. retrognathia) Facial hair Foreign objects (e.g. nasogastric tube)
Upper airway obstruction	Airway oedema (e.g. from repeated airway instrumentation) External compression (e.g. neck haematoma) Laryngospasm Obstructive sleep apnoea Posterior displacement of tongue or epiglottis Tumour
Lower airway obstruction	Airway mucus plugging Aspiration Bronchospasm External compression (e.g. mediastinal mass) Foreign body Tumour
Decreased respiratory compliance	Abdominal compartment syndrome Chest wall deformity Gastric distension Obesity Pregnancy Restrictive lung disease Tension pneumothorax
Technique-related factors	Cricoid pressure causing airway closure Inexperienced or unskilled operator Pharmacological (e.g. inadequate depth of anaesthesia, absence of neuromuscular blockade, use of high-dose opioids)

Table 2 Methods of improving difficult facemask ventilation. CPAP, continuous positive airway pressure; NPA, nasopharyngeal airway; OPA, oropharyngeal airway.

<i>Poor facemask seal</i> • Optimise operator's position • Optimise patient's position e.g. head tilt, chin lift, jaw thrust, head rotation • Ensure face is lifted to facemask rather than facemask being pushed onto face • Change to a two-handed or four-handed (two-person) technique • Change of equipment (e.g. different size or shape of facemask) • Remove any apparatus causing leak e.g. nasogastric tube • For patients with facial hair: shave; apply plastic film or saline-soaked gauze to beard; use a small amount of lubricant gel to mat beard (can make grip more slippery) • For patients who are edentulous: leave dentures in place; use excessive buccal tissue to assist with seal formation; consider packing the buccal cavities with gauze <i>Challenges other than poor facemask seal</i> • Increase depth of anaesthesia • Apply CPAP • Use OPA and NPA as adjuncts • Use suction if airway is soiled • Give a neuromuscular blocking drug • Treat any underlying cause e.g. bronchospasm, foreign body, laryngospasm, pneumothorax <i>General considerations</i> • Consider change of personnel • Consider alternative means of oxygenation, such as insertion of a supraglottic airway device or tracheal tube. Note that concomitant use of high-flow nasal oxygen and facemask ventilation is not recommended.
--

Importance of effective chest compressions



Maintain blood circulation

Chest compressions mimic the heart pumping action, circulating the blood to vital organs which sustain vital organ from failure like brain

Return oxygen delivery

By providing a continuous flow of oxygenated blood to body's tissues and cells which is essential for survival

Better chance of survival

the chance of a successful return of spontaneous circulation and the survival rates

Decrease interruptions

because any interrupt can impact the efficacy of resuscitation effort



Importance of effective chest compressions

Increase effectiveness of Defibrillation

compressions improve the chance of defibrillation success, CPR that meets quality standards optimizes this readiness and the likelihood to restore normal rhythm





Indications and importance of early Defibrillation

Indications

- 1. Ventricular Fibrillation (VF):** VF is a chaotic, irregular heart rhythm that prevents effective pumping and results in no blood flow. Defibrillation is the primary treatment.
- 2. Pulseless Ventricular Tachycardia (VT):** This is a rapid heart rhythm, which can prevent the heart from pumping effectively which may result in loss of consciousness and lack of pulse . When VT is pulseless, immediate defibrillation is indicated.

Importance

Improves survival rates

Restores Normal Cardiac Rhythm: Defibrillation delivers an electrical shock to the heart, aiming to depolarize the

heart muscle all at once. This can stop the erratic rhythm and give the heart's natural pacemaker a chance to re-

establish a normal rhythm.

Reduces Long-Term Neurological Damage and give good outcomes

Pharmacological tools

Epinephrine

Indications:

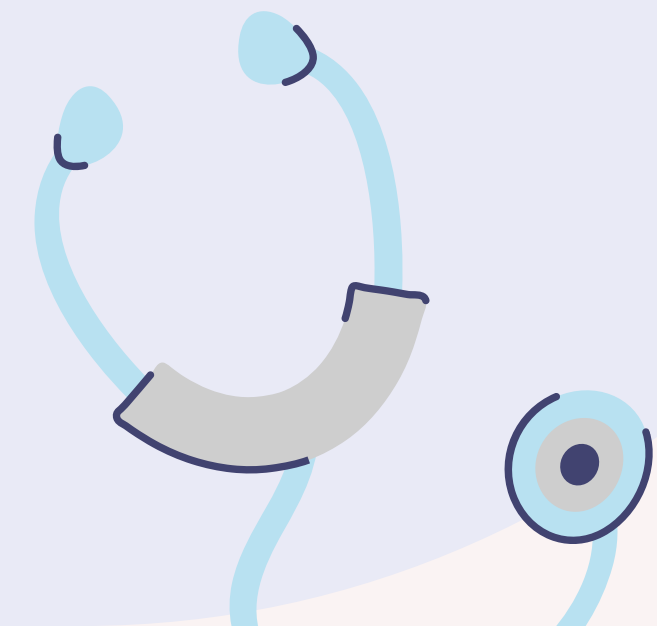
Epinephrine is primarily used in cases of pulseless cardiac arrest, including ventricular fibrillation (VF), pulseless ventricular tachycardia (pVT), asystole, and pulseless electrical activity (PEA). It is a potent vasoconstrictor and helps increase coronary and cerebral blood flow by raising aortic pressure.

Mechanism of action :

Epinephrine is an adrenergic agonist, stimulating alpha and beta receptors. This increases heart rate, myocardial contractility, and vasoconstriction, aiming to improve perfusion to vital organs.

Dosage:

1 mg IV every 3-5 minutes during cardiac arrest.



Amiodarone

Indications:

Amiodarone is indicated for shock-resistant ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT) after defibrillation attempts and administration of epinephrine have failed. It is also used for stable ventricular arrhythmias in certain cases.

Mechanism of action :

Amiodarone is a Class III antiarrhythmic, acting by prolonging the action potential duration and refractory period in cardiac tissue. It also affects sodium, potassium, and calcium channels and has alpha and beta-blocking properties, helping to stabilize cardiac rhythms.

Dosage:

300 mg IV for the first dose, followed by a second dose of 150 mg if needed.

Lidocaine

Indications:

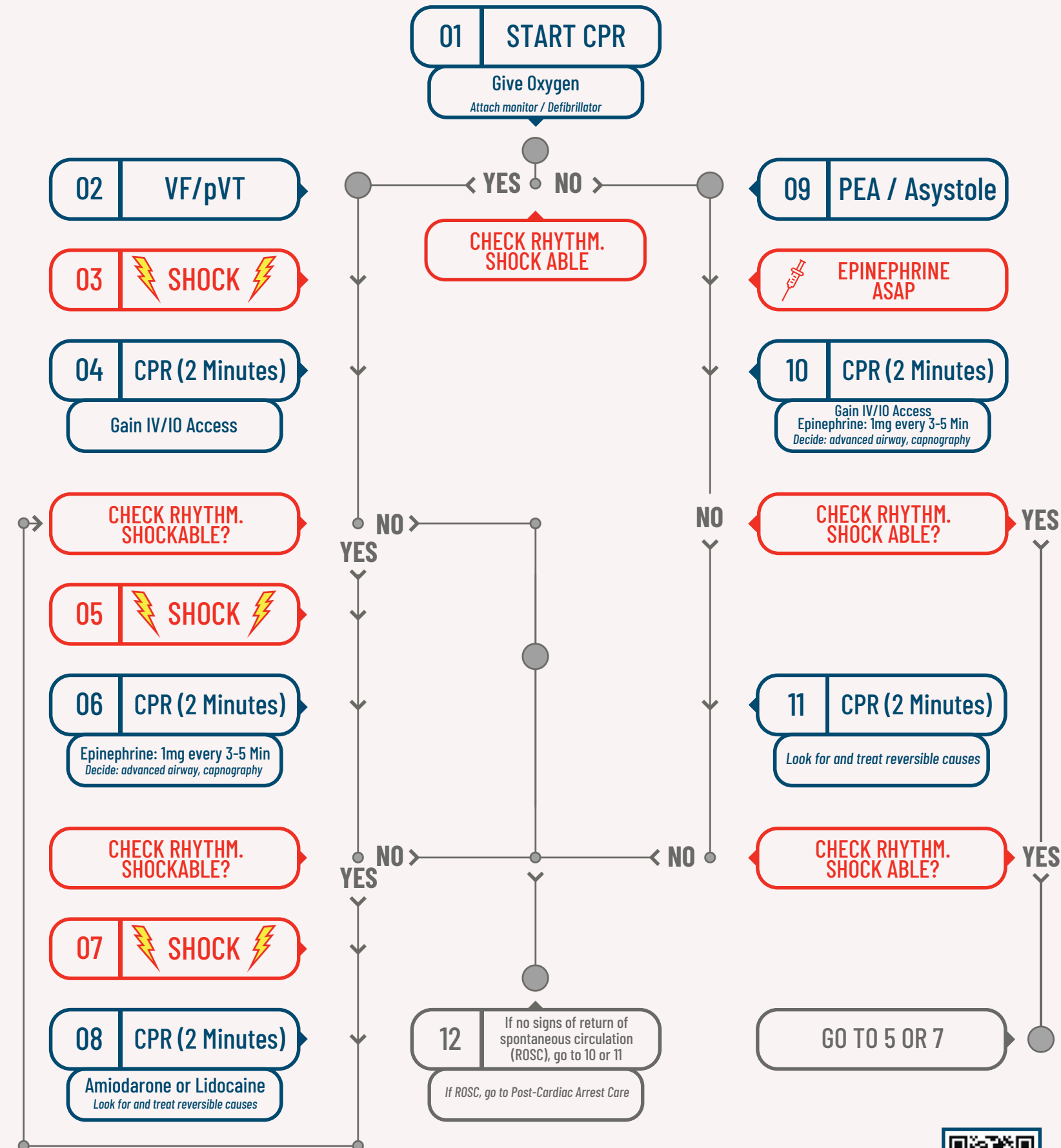
Lidocaine is used as an alternative to amiodarone for shock-resistant VF or pVT if amiodarone is not available or if there is a contraindication.

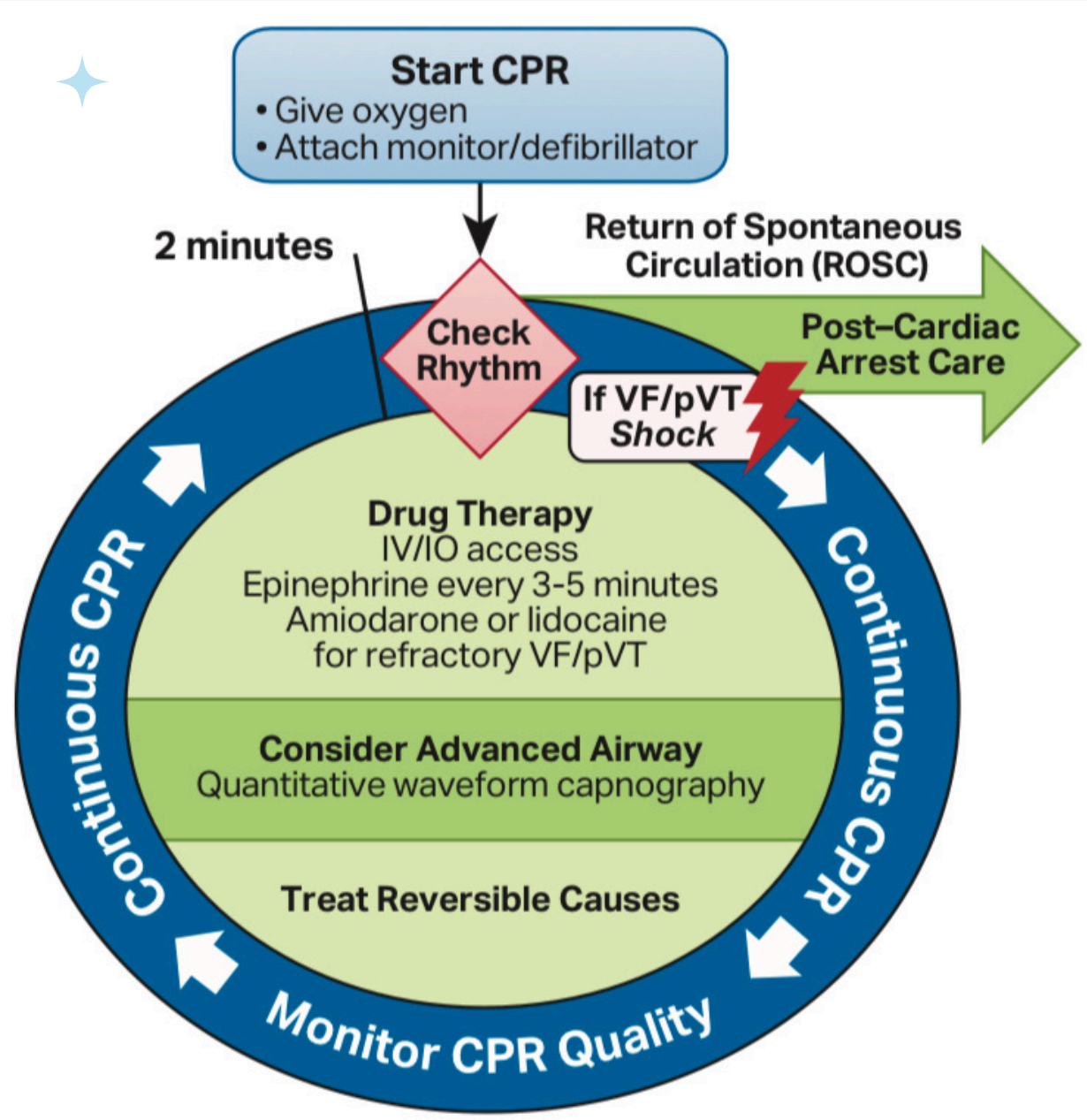
Mechanism of action :

Lidocaine is a Class IB antiarrhythmic. It stabilizes cardiac cell membranes by blocking sodium channels, which reduces automaticity and suppresses ventricular ectopy.

Dosage:

Initial dose of 1-1.5 mg/kg IV, followed by 0.5-0.75 mg/kg every 5-10 minutes up to a maximum dose of 3 mg/kg.





CPR Quality	
• Pushhard(atleast2inches[5cm])andfast(100-120/min)and allow complete chest recoil. • Minimizeinterruptionsincompressions. • Avoidexcessiveventilation. • Changecompressorevery2minutes,orsooneriffatigued. • Ifnoadvancedairway,30:2compression-ventilationratio. • Quantitativewaveformcapnography – If Petco2 is low or decreasing, reassess CPR quality.	
Shock Energy for Defibrillation	
• Biphasic:Manufacturerrecommendation(eg,initialdoseof 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered. • Monophasic:360J	
Drug Therapy	
• EpinephrineIV/IOdose:1mgevery3-5minutes • AmiodaroneIV/IOdose:Firstdose:300mgbolus.Second dose: 150 mg. or LidocaineIV/IOdose:Firstdose:1-1.5mg/kg.Seconddose: 0.5-0.75 mg/kg.	
Advanced Airway	
• Endotrachealintubationorsupraglotticadvancedairway • Waveformcapnographyorcapnometrytoconfirmandmonitor ET tube placement • Onceadvancedairwayinplace,give1breathevery6seconds (10 breaths/min) with continuous chest compressions	
Return of Spontaneous Circulation (ROSC)	
• Pulseandbloodpressure • Abrupt sustained increase in Petco2 (typically ≥40 mm Hg) • Spontaneousarterialpressurewaveswithintra-arterial monitoring	
Reversible Causes	
• Hypovolemia • Hypoxia • Hydrogenion(acidosis) • Hypo-/hyperkalemia • Hypothermia	• Tensionpneumothorax • Tamponade,cardiac • Toxins • Thrombosis,pulmonary • Thrombosis,coronary

**Thank you for your
attention**

