ACLS

ADVANCED CARDIOVASCULAR LIFE SUPPORT

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CARDIAC ARREST

Cardiac arrest is a condition in which the heart suddenly and unexpectedly stops beating.

When the heart stops, blood cannot circulate properly through the body and the blood flow to the brain and other organs is decreased.

Heart attack vs. cardiac arrest: What's the difference?

A heart attack happens when blood flow to the heart is blocked. A cardiac arrest occurs when the heart suddenly stops beating.

The only way to save a person’s life is to restart the heart using CPR and an AED.

ACLS

Definition:

Advanced Cardiac Life Support (ACLS) is a set of advanced life-saving protocols and skills for medical professionals to manage life-threatening cardiovascular emergencies like cardiac arrest, stroke, and acute coronary syndromes.

It builds on Basic Life Support (BLS) by including advanced techniques such as airway management, defibrillation, medication administration, and high-performance team dynamics to provide comprehensive care for severe cardiovascular events.

Benefits of ACLS:

1. Improves patient survival rates

2. Enhances team communication and leadership

3. Standardizes emergency response

4. Builds confidence in high-stress situations

The Six Links of the Out-of-Hospital Chain of Survival

1. Early Recognition and Activation
2. Immediate High-Quality CPR
3. Rapid Defibrillation
4. Advanced Life Support
5. Post-Cardiac Arrest Care
6. Recovery

Early Recognition and Activation

Recognize the signs of a sudden cardiac arrest and call for emergency medical help (e.g., 911 in the JOR).

Quick recognition is critical because it allows treatment to start as soon as possible. Delayed action can lead to brain damage or death.

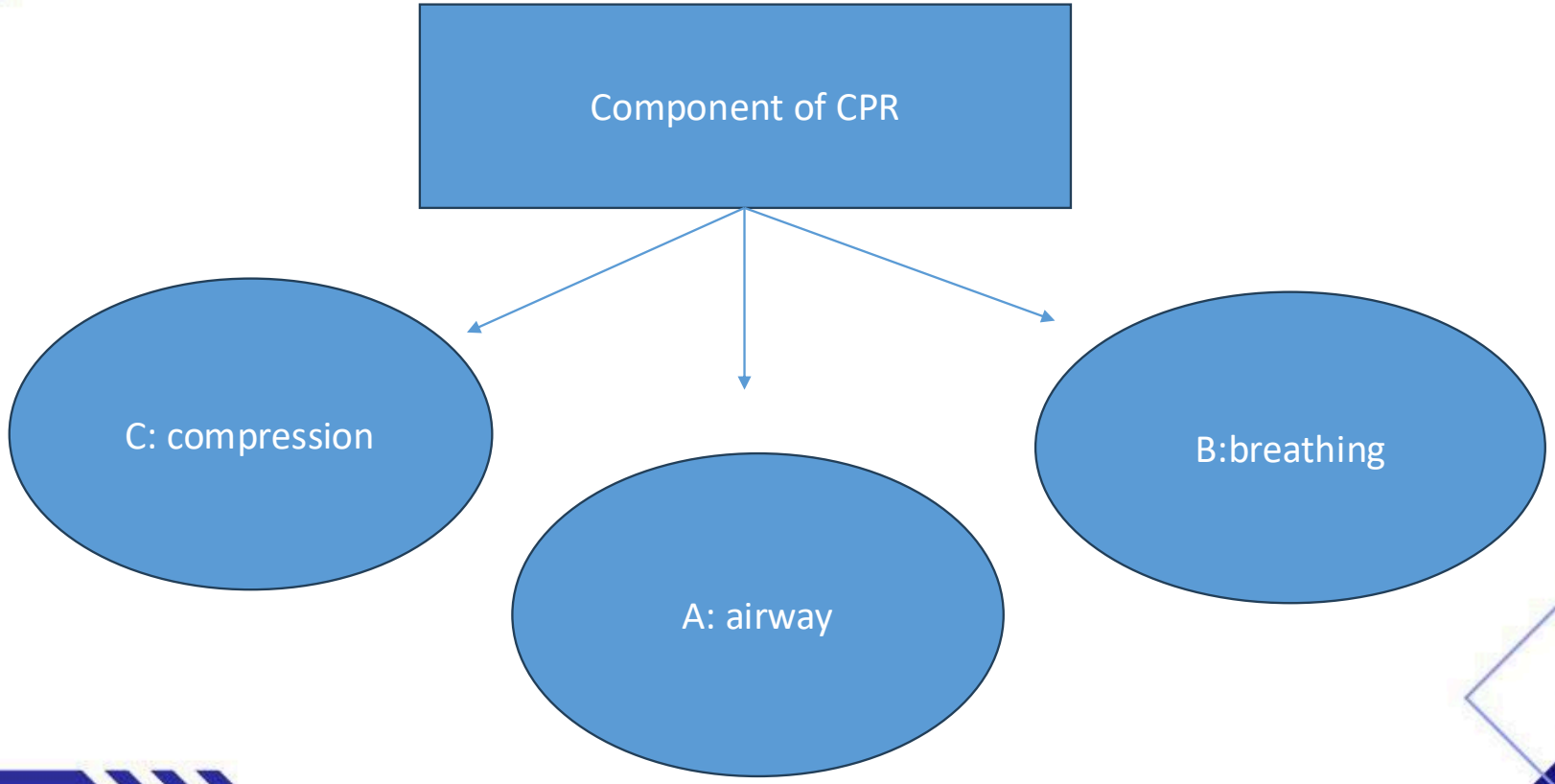
Immediate high-quality CPR

- Assessment:
- Assess the surrounding environment: By looking if there is any dangerous situation around for the rescuer, quickly move the victim to a safe place without any harm for the rescuer, for example, if the victim is beside fire, try to move the victim to a safer place.
- If the place is safe, do not try to move the victim as he/she may have other injuries that you cannot see. Simply put him onto his back over a firm surface and start to assess the victim.

Immediate high-quality CPR

- Assess the Victim by tapping at his shoulder and talk to him loudly, if not responding Call for help (911) and ask to bring AED.
- Assess pulse and Breathing for at least 5 seconds but not more 10 seconds.
- Assess the **carotid pulse** for adults by **sliding 2 or 3 fingers into the groove between the trachea and the neck muscles** at the side of the neck and **look for the chest movement** (rise and fall).

Immediate high-quality CPR



Immediate high-quality CPR

- Compression:
- Chest compressions are the most important component of high quality CPR, during cardiac arrest, the heart stops pumping oxygenated blood to the brain and vital organs, and can cause irreversible damage in minutes.

- Chest compression helps in blood flow out of the heart to reach brain and vital organs through arteries, and When pressure on the chest is released, blood is allowed to return to the heart, which may help in minimizing the damage and to stimulate the normal activity of the heart.

Immediate high-quality CPR

- To perform the compression in effective and correct way follow these steps for performing CPR compressions:
- 1. Put the victim on his or her back on a firm surface like floor or backboard
- 2. Kneel at the victim's side.
- 3. Place the lower palm (heel) of one hand over the center of the victim chest, between the two nipples.
- 4. Place your other hand on top of the first hand and interlace your
- fingers.

Immediate high-quality CPR

5. Keep your elbows straight and position your shoulders directly above your hands in a straight line.

6. Push straight down on compress) the chest at least 2 inches at least 2 inches (5 centimeters) but no more than 2.4 inches (6 centimeters), push by using your body weight.

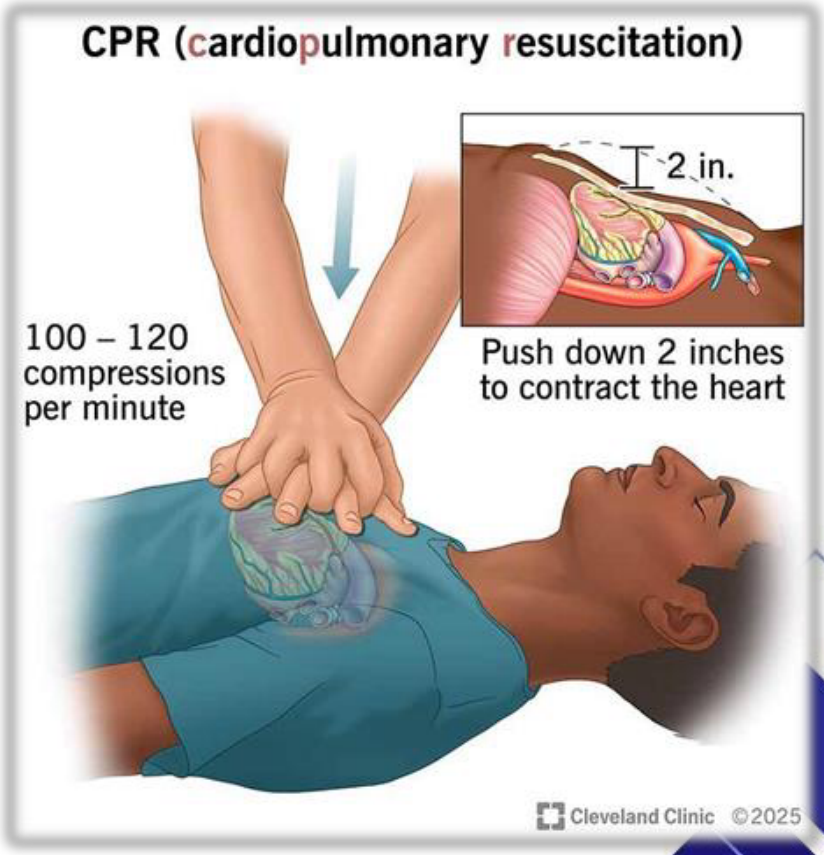
7. Push fast at a rate of 100 to 120 compressions per minute

Immediate high-quality CPR

8. Allow the chest to recoil (return the chest to normal position) in between compressions. If you do not allow the chest to recoil, the heart will not fill completely, because less blood will be pumped out of the heart to brain and vital organs with the next compression.

9. Rescuer should start CPR within 10 seconds from recognizing cardiac arrest and try to minimize chest compression interruption when finish 30 compressions (in 15-18 second) to give 2 breaths to less than 10 second to improve survival rate.

Immediate high-quality CPR



Immediate high-quality CPR

- <u>Airway:</u>
- After performing 30 chest compressions, open the person's airway by using the head-tilt chin-lift maneuver by putting your palm on the person's forehead and gently tilt the head back. Then with the other hand, lift the chin forward to open the airw

Head tilt chin lift maneuver

Immediate high-quality CPR

- Jaw thrust is performed if there are suspected head injuries.
- It is performed by putting the index and middle fingers to push the posterior part of lower jaw upwards while thumbs push down on the chin to open the mouth.

Jaw thrust maneuver

Immediate high-quality CPR

- Breathing:
- Follow these steps after opening the airway:

1. Pinch the nostrils shut for mouth-to-mouth breathing and cover the person's mouth with yours, making a seal.

2. Prepare to give two rescue breaths. Give the first rescue breath — lasting one second — and watch to see if the chest rises.

3. If the chest rises, give a second breath.

Immediate high-quality CPR

4. If the chest doesn't rise, repeat the head-tilt, chin-lift maneuver. Then give a second breath. Thirty chest compressions followed by two rescue breaths is considered one cycle.

Be careful not to provide too many breaths or to breathe with too much force.

5. Continue chest compressions to restore blood flow.

Defibrillation

- Cardiac Arrest Rhythms:

When a patient is in cardiac arrest, ACLS divides rhythms into **shockable** and **non- shockable**.

- Defibrillator Use:

- Indication: Only for shockable rhythms (VF/pulseless VT).
- Energy (for biphasic defibrillators, which are most common today):
- First shock: 120–200 J (manufacturer recommendation).
- If unknown: use maximum available dose.
- Subsequent shocks: same or higher energy.
- Monophasic defibrillator (rare nowadays): Always 360 J.
- Always resume CPR immediately after shock (don’t wait for rhythm check until 2 min later).

Defibrillation

- **Shockable Rhythms**
- A shockable rhythm is a life-threatening arrhythmia that can be reversed by defibrillation, an electric shock delivered to the heart.
- The two types of shockable rhythms are ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT).
- An Automated External Defibrillator (AED) analyzes the heart rhythm during a cardiac arrest to determine if it's shockable. If it is, the AED will advise and deliver an electric shock to try and restore a normal heart rhythm.

Defibrillation

- **Types of Shockable Rhythms:**
- Ventricular Fibrillation (VF): A chaotic, uncoordinated twitching of the heart's lower chambers, preventing them from beating effectively and pumping blood.

- Pulseless Ventricular Tachycardia (VT): An extremely fast and abnormal rhythm from the heart's lower chambers that does not produce a palpable pulse and therefore does not circulate blood

Defibrillation

- **Non-Shockable Rhythms**
- A non-shockable rhythm a heart rhythm that cannot be corrected by an electrical shock from a defibrillator.
- The two primary non-shockable rhythms are Pulseless Electrical Activity (PEA)) and asystole.

Non-shockable rhythm

- **Asystole**

- **Pulseless Electrical Activity**

Defibrillation

- **Types of Non-Shockable Rhythms:**
- Asystole: Also known as "flat-lining," asystole occurs when the heart's electrical system shuts down completely. There is no electrical activity, and thus no heartbeat or pulse, making it impossible for a defibrillator to do anything other than confirm the lack of electrical activity and instruct the rescuer to begin CPR.

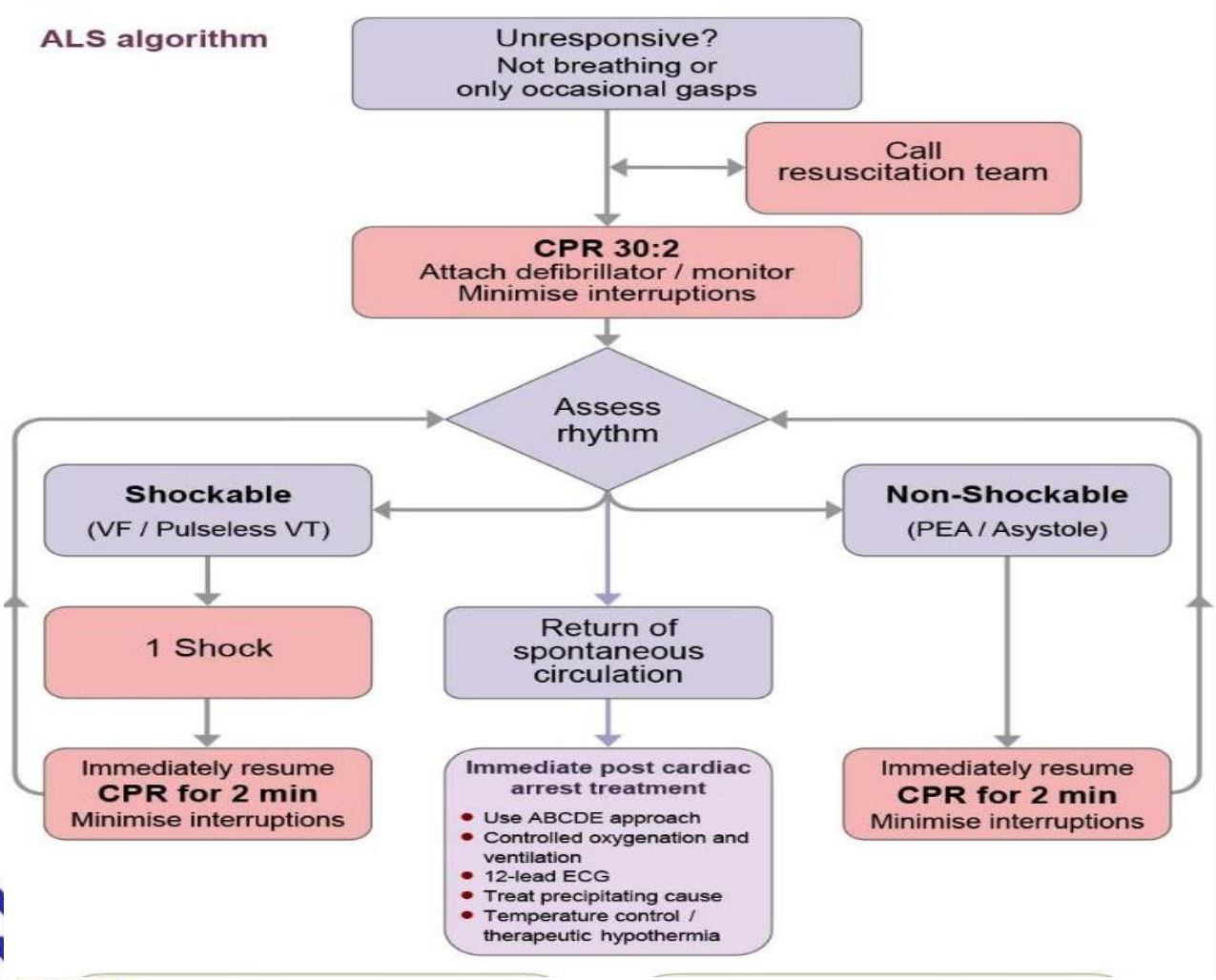
- Pulseless Electrical Activity (PEA): This is a complex situation where the heart has electrical activity, but the heart muscle is not contracting effectively enough to produce a pulse and cardiac output. There is still electrical activity present on the ECG, but without a corresponding pulse.

Defibrillation

- **Treatment for Each Type of Rhythm:**
- **Shockable Rhythms:** If a rhythm is shockable, the priority is to deliver an electrical shock as soon as possible after connecting the defibrillator and while performing high-quality chest compressions.

- **Non-Shockable Rhythms:** The patient requires immediate, high-quality cardiopulmonary resuscitation (CPR). In addition to CPR, medical professionals will administer medications and manage the patient's airway to address reversible causes of the arrest.

Defibrillation



Recovery

- Focuses on post-resuscitation care after a patient regains a pulse, involving identifying and treating the underlying causes of cardiac arrest, providing supportive care, and managing conditions that arose from the event.
- Key aspects include therapeutic temperature management to protect organs, coronary angiography for suspected heart attacks, supportive care for organ systems, and addressing any factors like electrolyte imbalance or pregnancy that may have contributed to the arrest.

THANK YOU