

**C005 ADULT (AGE ≥ 12 years) CARDIAC ARREST
GENERAL PRINCIPLES**

Specific Information Needed For Patient Care Report

- Onset (witnessed or unwitnessed), preceding symptoms, bystander CPR, downtime before CPR and duration of CPR
- Past History: medications, medical history, suspicion of ingestion, trauma, and environmental factors (hypothermia, inhalation, asphyxiation)

Document Specific Objective Findings

- Unconscious, unresponsive
- Agonal, or absent respirations
- Absent pulses
- Any signs of trauma, blood loss
- Skin temperature

General Guidelines: Chest Compressions

- 1 cycle of CPR = 30:2 chest compressions: breaths
- 5 cycles CPR = 2 minutes chest compressions
- Push hard and push fast (at least 100/minute)
- Ensure full chest recoil
- Rotate compressors every 2 minutes with rhythm checks
- During CPR, any interruption in chest compressions deprives heart and brain of necessary blood flow and lessens chance of successful defibrillation
 - Continue CPR while defibrillator is charging, and resume CPR immediately after all shocks. Do not check pulses except at end of CPR cycle and if rhythm is organized at rhythm check

General Guidelines: Defibrillation

- In unwitnessed cardiac arrest, give first 2 minutes of CPR without interruptions for ventilation. During this time period passive oxygenation is preferred with OPA and NRB facemask. If arrest is witnessed by EMS, immediate defibrillation is first priority
- All shocks should be given as single maximum energy shocks
 - Manual biphasic: follow device-specific recommendations for defibrillation. If uncertain, give maximum energy (e.g. 200J)
 - Manual monophasic: 360J
 - AED: device specific

Double Sequential External Defibrillation (DSED)¹: Optional intervention for non-traumatic ventricular fibrillation refractory to three standard defibrillation attempts. Requires second monitor.

- Initial pads are placed either in the antero-lateral (A/L) or anterior-posterior (A/P) placement (A/P preferred).
- If three standard defibrillation attempts are unsuccessful, providers elect to perform DSED, and a second monitor is available, then:
 - 1) A second set of pads are placed in the alternate positions (if first pads were placed A/P the second set are placed A/L, and vice versa).
 - 2) Connect second monitor to second set of pads.
 - 3) Set both monitors to a defibrillation dose of 200J and charge.
 - 4) Follow standard procedure for CPR pre-defibrillation and clearing patient for shock.
 - 5) Once both monitors are charged and ready to shock deliver two shocks separated by a short pause. Pause no longer than 1 second (preferably shorter). Avoid delivering shocks perfectly simultaneously to protect monitors' circuitry.
 - 6) Immediately continue CPR and resuscitative efforts.

¹ <https://www.acc.org/latest-in-cardiology/clinical-trials/2022/11/05/02/59/dose-vf>

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Use of Mechanical Ventilator during CPR²³

- Use of mechanical ventilator may be considered during CPR and continuous chest compressions once a supraglottic airway or ET tube have been placed.
- If patient weighs <30kg do not use ventilator; BVM ventilation only.
- Use Hamilton ventilator's CPR mode. Adjust settings appropriately with particular attention paid to target ETCO₂; FiO₂ should be 100% for duration of resuscitation.
- Ensure estimated patient height is entered on start up.
- Upon ROSC select appropriate ventilator mode and settings; consider ASV initially.
- If ventilator alarms or is unable to ventilate patient then disconnect and begin BVM ventilations until source of problem can be found and fixed. Once problem is addressed and patient is easily ventilated then mechanical ventilation may be resumed.

General Guidelines: Ventilation during CPR

- If suspected cardiac etiology of arrest, during first approximately 4 minutes of VT/VF arrest, passive oxygenation with OPA and NRB facemask is preferred to positive pressure ventilation with BVM or advanced airway
- EMS personnel must use good judgment in assessing likely cause of pulseless arrest. In patients suspected of having a primary respiratory cause of cardiopulmonary arrest, (e.g.: COPD or status asthmaticus), adequate ventilation and oxygenation are a priority
- In general, patients with cardiac arrest initially have adequately oxygenated blood, but are in circulatory arrest. Therefore, chest compressions are initially more important than ventilation to provide perfusion to coronary arteries
- Do not interrupt chest compressions and do not hyperventilate. Hyperventilation decreases effectiveness of CPR and worsens outcome

General Guidelines: Timing of Placement Of Advanced Airway

- Advanced airway (e.g. King, ETT) may be placed at any time after initial 2 rounds of chest compressions and rhythm analysis, provided placement does not interrupt chest compressions
- Once an advanced airway is in place, compressions are given continuously and breaths given at 8-10 per minute
- Always confirm advanced airway placement with ETCO₂
 - Use continuous waveform capnography if available. In low flow states such as cardiac arrest, colorimetric CO₂ detector may be inaccurate and not sense very low CO₂ level

General Guidelines: Pacing

- Pacing is not indicated for asystole and PEA. Instead start chest compressions according to Universal Pulseless Arrest Algorithm.
- Pacing should **not** be undertaken if it follows unsuccessful defibrillation of VT/VF as it will only interfere with CPR and is not effective.

General Guidelines: ICD/Pacemaker patients

- If cardiac arrest patient has an implantable cardioverter defibrillator (ICD) or pacemaker: place pacer/defib pads at least 1 inch from device. Biaxillary or anterior posterior pad placement may be used.

General Notes

- CPR in a moving ambulance or pram is ineffective
- In general, work cardiac arrest on scene either to return of spontaneous circulation (ROSC) or to field pronouncement, unless scene is unsafe
 - **Contact Base** for termination of resuscitation

² [https://www.resuscitationjournal.com/article/S0300-9572\(23\)00280-0/fulltext](https://www.resuscitationjournal.com/article/S0300-9572(23)00280-0/fulltext)

³ <https://emsairway.com/2021/02/04/mechanical-ventilation-during-out-of-hospital-cardiac-arrest/>