

**COUNTY OF SACRAMENTO
EMERGENCY MEDICAL SERVICES AGENCY**



Program Document: **Non-Traumatic Cardiac Arrest**

Policy Number: 8031.28

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Signature on File

EMS Medical Director

Signature on File

EMS Administrator

Purpose:

- A. To establish the treatment standard for non-traumatic cardiac arrest patients.

NOTE: For traumatic arrest, see PD# 8032 – Traumatic Cardiac Arrest

- B. To serve as the treatment standard for Non-Traumatic Asystole, Pulseless Electrical Activity (PEA), Ventricular Fibrillation (VF), and Pulseless Ventricular Tachycardia (VT).

Authority:

- A. California Health and Safety Code, Division 2.5
- B. California Code of Regulations, Title 22, Division 9

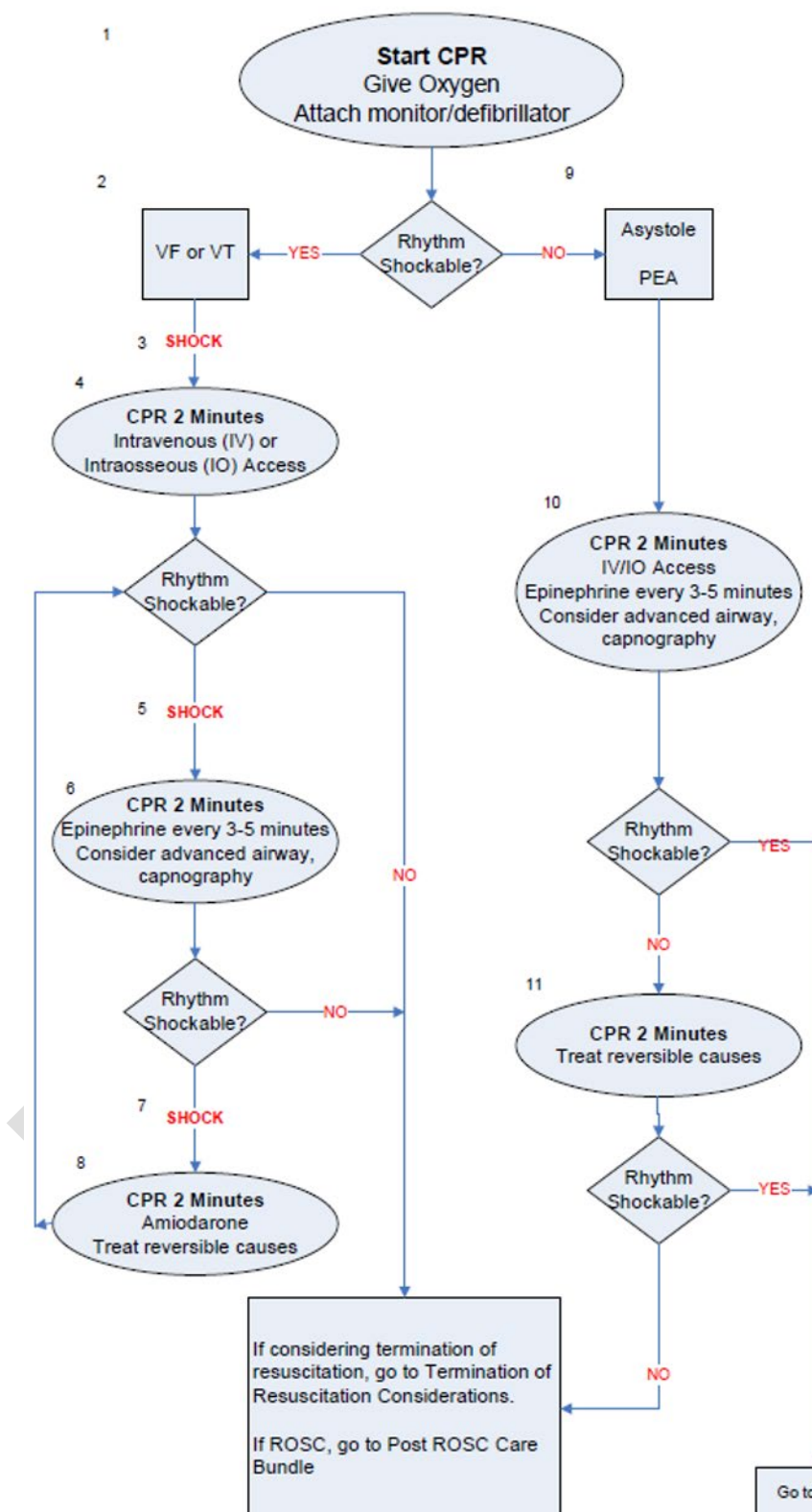
Protocol:

- A. High-quality Cardiopulmonary Resuscitation (CPR) is fundamental to the management of all cardiac arrest rhythms. Periodic pauses in CPR should be as brief as possible and only as necessary to assess rhythm, shock VF/VT, and perform a pulse check when an organized rhythm is detected.
- B. CPR must be performed with a "Chest Compressions, Airway, Breathing" sequence (C-A-B) to emphasize the importance of maintaining blood flow with good compressions.
- C. Performing CPR while a defibrillator is readied for use is strongly recommended for all patients in cardiac arrest.
- D. Advanced airway placement shall be confirmed with ETCO₂ detection device or waveform capnography.

- E. Vascular access, drug delivery, and advanced airway placement should not cause significant interruptions in chest compressions or delay defibrillation.
- F. Treatment on scene- Movement of a patient may interrupt CPR or prevent adequate depth and rate of compressions. Consider resuscitative efforts on scene to maximize chances of Return of Spontaneous Circulation (ROSC).
- G. Patients in ~~persistent/refractory~~ resistant VF/VT: ~~at 15 minutes should be transported to the closest receiving facility.~~
 - 1. If a second cardiac monitor or AED is available on scene, implement the Double Sequential External Defibrillation (DSED) algorithm.
 - 2. If a second cardiac monitor or AED is not available and patient remains in resistant VF/VT for 15 minutes, transport to a STEMI center.

NOTE: Consider changing the vector of single monitor defibrillation by changing the pad placement from anterolateral to anteroposterior (or vice versa).

- H. Whenever feasible, and safe to do so, transport the medical Durable Power of Attorney (DPOA) or immediate family member with the patient to the hospital. DPOA and immediate family members can provide medical insight and consent for special therapies or termination of resuscitation to hospital staff.
- I. Perform an early Pre-Alert notification to the receiving hospital.



CPR Quality

- Push hard (≥ 2 inches [5 cm]) and fast (≥ 100 /min) and allow complete chest recoil
- Minimize interruption in compressions
- Avoid excessive ventilation
- Rotate compressor every 2 minutes
- If no advanced airway, 30:2 compression-ventilation ratio
- Quantitative waveform capnography
- If PETCO₂ < 10 mmHg, attempt to improve CPR quality

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in PETCO₂ (typically ≥ 40 mmHg)

Shock Energy

- Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 Joules); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- Monophasic: 360 Joules.

Drug Therapy

- Epinephrine IV/IO Dose: 1 mg every 3-5 minutes
- Amiodarone IV/IO Dose: First dose: 300 mgs bolus. Second dose: 150 mg
- Magnesium Sulfate
If at any time a patient presents with suspected polymorphic ventricular tachycardia (Torsades de Pointes). Magnesium sulfate 2g IV/IO over 1-2 minutes may be given at any time after the first epinephrine dose.

Advanced Airway

- Supraglottic advanced airway or endotracheal (ET) intubation
- Waveform capnography to confirm and monitor tube placement
- 8-10 breaths per minute with continuous chest compressions

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo/Hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

Double Sequential External Defibrillation (DSED)

A. Indication

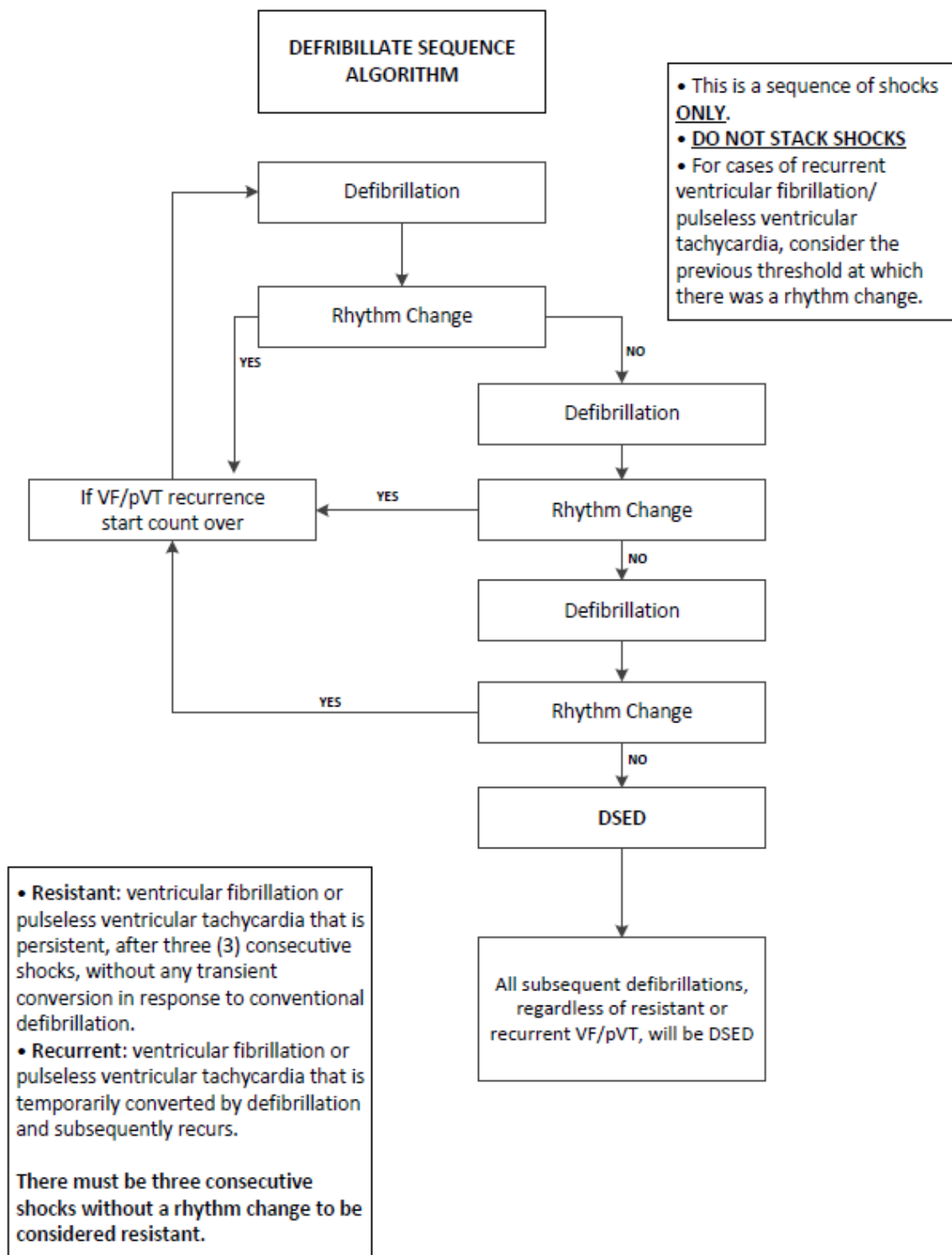
1. In cases where an adult cardiac arrest patient in ventricular fibrillation or pulseless ventricular tachycardia is resistant to conventional methods of defibrillation and ventricular fibrillation or pulseless ventricular tachycardia persists after 3 consecutive defibs (including from AED), without a rhythm change.

B. Procedure

1. Ensure continuous uninterrupted chest compressions.
2. Confirm presence of cardiac arrest with resistant ventricular fibrillation or pulseless ventricular tachycardia.
3. Apply pads to patient's chest in anterior-lateral and anterior-posterior positions and connect two separate defibrillators.
4. Charge both defibrillators to highest energy setting. If using an AED, activate AED for rhythm analysis.
5. Defibrillate on both defibrillators sequentially. If using an AED, defibrillate the AED first followed by the other monitor. If no AED is used, no specified order of defibrillation is made.
6. Immediately resume CPR for two (2) minutes.
7. If indicated by response and rhythm, repeat.
8. Any subsequent defibrillations for resistant or recurrent ventricular fibrillation or pulseless ventricular tachycardia are administered as DSEDs.
9. If a non-shockable rhythm presents, resume resuscitative efforts according to the appropriate protocol.
10. If ventricular fibrillation or pulseless ventricular tachycardia persists after first DSED, transport to the closest STEMI receiving facility for further treatment.
11. Prior to DSED, providers should verify that the pads are well-adhered and not touching.

C. Definitions

1. Resistant: ventricular fibrillation or pulseless ventricular tachycardia that is persistent, after three (3) consecutive defibs, without any transient conversion in response to conventional defibrillation.
2. Recurrent: ventricular fibrillation or pulseless ventricular tachycardia that is temporarily converted by defibrillation and subsequently recurs.



Post Resuscitation Considerations:

- A. Any patient with a shockable rhythm (VF or VT or shocked by an AED) at any time who has a ROSC during any part of the resuscitation and who is transported, shall be transported to a STEMI center.
 - 1. Any other cardiac arrest patient who is transported, shall be transported to the time closest hospital.
- B. Intravenous (IV) or Intraosseous (IO) fluids should be placed at, to keep open (TKO) unless hypotension is present.
- C. Post-ROSC Care Bundle
 - 1. ROSC Obtained:
 - a. Manage airway
 - i) Early placement of supra-glottic airway or endotracheal tube.
 - b. Manage respiratory parameters – SpO2 92-98%. End tidal CO2 measurement between 35-45 mm Hg.
 - i) Initial respiratory rate, 10/minute.
 - c. Manage hypotension/shock with the goal of Systolic Blood Pressure (SBP) $\geq$ 90 mmHg
 - i) Normal Saline 1000 ml bolus AND concurrent Push Dose Epinephrine 0.01 mg/ml (10mcg/ml). Dose: 0.5-2 ml every 2-5 minutes (5-20mcg).
 - ii) Titrate to SBP $\geq$ 90 mmHg. Reassess vital signs after each bolus.
 - d. Obtain a 12 – Lead ECG approximately 7 minutes post-ROSC.
 - e. Remain on scene for approximately 10 minutes for post-ROSC care to optimize parameters listed in a-d. Evaluate and treat for reversible causes for arrest (H's and T's).
 - 2. Bradycardia, refer to PD# 8024 – Cardiac Dysrhythmias.
 - 3. Congestive Heart Failure/Pulmonary Edema refer to PD# 8026 – Respiratory Distress.

Termination of Resuscitation Considerations:

- A. Consider termination of resuscitation efforts after twenty (20) minutes of Advanced Life Support (ALS) care if BOTH of the following are present:
1. Pulseless, apneic, or agonal respirations with no signs of life (non-reactive pupils, no response to pain, no spontaneous movement).
 2. Asystole, or wide complex Pulseless Electrical Activity with HR < 40 bpm.

Cross Reference:

PD# 8024 – Cardiac Dysrhythmias

PD# 8026 – Respiratory Distress