

**COUNTY OF SAN DIEGO EMERGENCY MEDICAL SERVICES
 POLICY / PROCEDURE / PROTOCOL**

**Number S-163
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**SUBJECT: PEDIATRIC TREATMENT PROTOCOL
 CPR / ARRHYTHMIAS**

Date 07/01/2021

BLS

ALS

<ul style="list-style-type: none"> • Compression rate 100-120/min • Ventilation rate (compression-to-ventilation ratio) <ul style="list-style-type: none"> • Neonate: 20-30/min (3:1) • Pediatric: 10-12/min (15:2)* • Use metronome or other real-time audiovisual feedback device • Rotate compressor at least every 2 min • Use mechanical compression device, if size-appropriate available • O₂ and/or ventilate with BVM • Monitor O₂ saturation • Apply AED during CPR and analyze as soon as ready <p>VAD</p> <ul style="list-style-type: none"> • Perform CPR • Contact BH for additional instructions <p>TAH</p> <ul style="list-style-type: none"> • Contact BH for instructions 	<ul style="list-style-type: none"> • Apply defibrillator pads during CPR. Defibrillate immediately for VF/pulseless VT. • IV/IO SO • Capnography SO PRN with waveform and value • NG/OG tube PRN SO <p>Team leader priorities</p> <ul style="list-style-type: none"> • Monitor CPR quality, rate, depth, full chest recoil, and capnography value and waveform • Minimize interruption of compressions (<5 sec) during EKG rhythm checks • Charge monitor prior to rhythm checks. Do not interrupt CPR while charging. <p>VAD/TAH</p> <ul style="list-style-type: none"> • See Adjunct Cardiac Devices section <p>Capnography</p> <ul style="list-style-type: none"> • If EtCO₂ rises rapidly during CPR, pause CPR and check for pulse <p>Specific protocols (see below)</p> <ul style="list-style-type: none"> • Arrhythmias <ul style="list-style-type: none"> • Unstable bradycardia • Supraventricular tachycardia • Ventricular tachycardia • Ventricular fibrillation / pulseless VT • Pulseless electrical activity / asystole • Return of Spontaneous Circulation • Adjunct Cardiac Devices
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*Continuous compressions are an acceptable alternative for pediatric CPR

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CPR / ARRHYTHMIAS**

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UNSTABLE‡ BRADYCARDIA

- Obtain 12-lead EKG, when able

Infant/child (<9 years) with HR <60 BPM

OR

Child (9-14 years) with HR <40 BPM

- Ventilate with BVM

If no increase in HR after 30 sec of BVM ventilations

- Begin CPR
- Epinephrine 1:10,000 per drug chart IV/IO SO, MR x2 q3-5 minutes SO.
MR q3-5 minutes BHO.
- After 3 doses of epinephrine
 - Atropine per drug chart IV/IO SO, MR x1 in 5 min SO
- Consider midazolam per drug chart IV/IO PRN pre-pacing BHO
- Consider cardiac pacing BHO

‡Exhibiting any of the following signs of inadequate perfusion, e.g.,

- Altered mental status (decreased LOC, confusion, agitation)
- Pallor, mottling, or cyanosis
- Diaphoresis
- Difference in peripheral vs. central pulses
- Delayed capillary refill
- Hypotension by age
 - <1 month: SBP <60 mmHg
 - 1 month – 1 year: SBP <70 mmHg
 - 1 year – 10 years: SBP <70 mmHg + (2x age in years)
 - >10 years: SBP <90 mmHg

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SUPRAVENTRICULAR TACHYCARDIA

- Obtain 12-lead EKG

Infant/child (<4 years) with HR \geq 220 BPM

OR

Child (\geq 4 years) with HR \geq 180 BPM

Stable (symptomatic)

- Consider VSM SO
- Fluid bolus per drug chart IV/IO SO
- Adenosine per drug chart rapid IV/IO, followed with 20 mL NS rapid IV/IO SO, MR x2 SO

Unstable[‡] (or refractory to treatment)

- Consider midazolam per drug chart IV/IO pre-cardioversion BHPO
- Synchronized cardioversion at manufacturer's recommended energy dose BHPO, MR x2 BHPO
 - If no manufacturer recommendation, synchronized cardioversion per drug chart BHPO, MR x2 BHPO

[‡]Exhibiting any of the following signs of inadequate perfusion, e.g.,

- Altered mental status (decreased LOC, confusion, agitation)
- Pallor, mottling, or cyanosis
- Diaphoresis
- Difference in peripheral vs. central pulses
- Delayed capillary refill
- Hypotension by age
 - <1 month: SBP <60 mmHg
 - 1 month – 1 year: SBP <70 mmHg
 - 1 year – 10 years: SBP <70 mmHg + (2x age in years)
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VENTRICULAR TACHYCARDIA

- Obtain 12-lead EKG

Stable

- Fluid boluses per drug chart IV/IO to maintain SBP appropriate for age SO
- Amiodarone per drug chart BHPO
OR
- Lidocaine per drug chart BHPO

Unstable‡

- Consider midazolam per drug chart IV/IO pre-cardioversion BHO
- Synchronized cardioversion at manufacturer's recommended energy dose BHPO, MR x2 BHPO
 - If no manufacturer recommendation, synchronized cardioversion per drug chart BHPO, MR x2 BHPO
- After successful cardioversion
 - Check BP. If hypotensive for age[§] and rales not present, fluid bolus per drug chart IV/IO SO, MR SO.
 - Obtain 12-lead EKG

‡Exhibiting any of the following signs of inadequate perfusion, e.g.,

- Altered mental status (decreased LOC, confusion, agitation)
- Pallor, mottling, or cyanosis
- Diaphoresis
- Difference in peripheral vs. central pulses
- Delayed capillary refill
- [§]Hypotension by age
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VENTRICULAR FIBRILLATION / PULSELESS VT

- CPR
- Defibrillate as soon as monitor available/charged
- Defibrillate q2 min while VF/VT persists
- Epinephrine 1:10,000 per drug chart IV/IO q3-5 min SO

Persistent VF/VT after 3 defibrillation attempts

- Amiodarone per drug chart IV/IO, MR per drug chart x2 SO
- OR**
- Lidocaine per drug chart IV/IO SO, MR per drug chart IV/IO q5 min SO
 - If VF/VT persists after 2 antiarrhythmic doses, contact BH for direction

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PULSELESS ELECTRICAL ACTIVITY / ASYSTOLE

- CPR
- Epinephrine 1:10,000 per drug chart IV/IO q3-5 min SO

Suspected hyperkalemia

- CaCl₂ per drug chart IV/IO SO
- NaHCO₃ per drug chart IV/IO BHO

Suspected hypovolemia

- Fluid bolus per drug chart IV/IO, MR x2 SO

Suspected poisoning / OD

- Consider treatment per Poisoning / Overdose Protocol (S-165) BHO

Prolonged asystole / PEA

- After ≥ 20 min, contact BH physician for direction

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RETURN OF SPONTANEOUS CIRCULATION

- Ventilate PRN (goal of EtCO₂ = 40 mmHg)
- Obtain BP
 - If hypotensive[§] and rales not present, fluid bolus per drug chart IV/IO SO, MR SO
 - If unresponsive to fluid boluses, push-dose epinephrine 1:100,000 (0.01 mg/mL) per drug chart IV/IO BHPO, MR q3 min BHPO
- Obtain 12-lead EKG
- Provide cardiac monitor data to agency QA/QI department

Push-dose epinephrine mixing instructions

1. Remove 1 mL normal saline (NS) from the 10 mL NS syringe
 2. Add 1 mL of epinephrine 1:10,000 (0.1 mg/mL) to 9 mL NS syringe
- The mixture now has 10 mL of epinephrine at 0.01 mg/mL (10 mcg/mL) concentration.

[§]Hypotension by age

- <1 month: SBP <60 mmHg
- 1 month – 1 year: SBP <70 mmHg
- 1 year – 10 years: SBP <70 mmHg + (2x age in years)
- >10 years: SBP <90 mmHg