Cardiac Arrest Management When a Physician or Nurse Practitioner is Not Immediately Available (ED, Critical Care)

Site Applicability

St. Paul's Hospital & Mount St. Joseph Hospital Emergency Departments and Critical Care Units

Practice Level

Advanced Skill

Critical care and emergency department registered nurses (RNs) with:

- o   Current certification in Advanced Cardiovascular Life Support (ACLS), for adult patients
- o   Current certification in Pediatric Advanced Life Support (PALS), for pediatric patients

Need to Know

Upon identifying a patient in cardiac arrest who does not have a known Code Status that indicates no CPR, RNs should ensure chest compressions are initiated and to contact a physician or nurse practitioner immediately as per the Cardiac Arrest (Code Blue): Initiating and Responding guideline. When a physician or nurse practitioner is unavailable, then the trained Critical Care/Emergency RN may also:

- Defibrillate patients in pulseless ventricular tachycardia (pVT) or ventricular fibrillation (VF)
- Administer epinephrine, amiodarone, and lidocaine for cardiac arrest

Trained Critical Care/Emergency RNS are NOT authorized to perform the following actions without a provider order:

- Emergency synchronized cardioversion
- Transcutaneous or transvenous pacing
- Carotid sinus massage
- Administering adenosine or vasoactive infusions
- Discontinuing resuscitation efforts, unless resuscitation has been initiated in error and does not align with a previously-document scope of treatment (e.g. Code Status order in Cerner, advanced directives, etc.).

Background

This guideline has been informed by the *Scope of Practice* document for registered nurses by the British Columbia College of Nurses & Midwives (see "[Section 6: Restricted activities that do not require an order](#)"); and Providence Health Care's Heart Centre decision support tools for the provision of emergency cardiac care (see "[RN-Initiated Emergency Cardiac Care: Decision Support Tool #2 [Emergency Cardiac Care in Areas using Cardiac Monitoring, Defibrillation and Emergency Cardiac Drugs]](#)").

Cardiac arrest is a medical emergency that requires immediate intervention from clinicians. The Heart and Stroke Foundation of Canada provides extensive guidelines for adult and pediatric populations to guide cardiac arrest management. Both the adult Advanced Cardiac Life Support (ACLS) and Pediatric Advanced Life Support (PALS) recommend prompt initiation of cardiopulmonary resuscitation (CPR), early defibrillation (for shockable rhythms), and early epinephrine (for non-shockable rhythms) to increase survivability and decrease neurologic sequelae (Panchal et al., 2020). In circumstances where a physician or nurse practitioner is not immediately available due to extenuating circumstances, such as if they are concurrently caring for another critically-ill patient, or while the patient is being transferred between units within the hospital, it is reasonable for a trained and competent nurse to initiate cardiac arrest management until return of spontaneous circulation (ROSC) or a physician or nurse practitioner can attend to the arrest.

Guideline

Upon activation of a Code Blue where a physician or nurse practitioner is not readily available, a trained and competent critical care/emergency RN should:

1. Perform a primary assessment and attach monitor/defibrillator.
2. If patient does not have a pulse, follow the appropriate adult or pediatric cardiac arrest algorithms based on the rhythm on the monitor/defibrillator, and the equipment and medication available. Note that the PALS pediatric guidelines are used for infants, children, and adolescents who are 17 years of age or younger (Topjian et al., 2020).
   - [Appendix A: HSF/AHA Adult Cardiac Arrest Algorithm, 2020 Edition](#)
   - [Appendix B: HSF/AHA Pediatric Cardiac Arrest Algorithm, 2020 Edition](#)

RNs may only terminate cardiac arrest management under the direction of a physician or a nurse practitioner, or if there are signs of ROSC including any combination of the following:

- Increasing alertness
- A palpable pulse
- Pulsatile waveform on SpO_2 or arterial line monitor
- Sudden increase in end-tidal CO_2 capnography

If ROSC has been achieved and a physician or nurse practitioner is still unavailable, the nurse should ensure that the patient is appropriately monitored and adequately oxygenated and ventilated.

Documentation

Code Blue documentation is completed on the Cardiac Arrest Record. As part of this documentation, the RN should also document all attempts to contact the physician or nurse practitioner.

Patient and Family Education

Discussions with patients and their family should align with the Cardiac Arrest (Code Blue): Initiating and Responding decision support tool. After resuscitation efforts have ended, patients and family should be updated about the resuscitation event by a member of the healthcare team as soon as it is feasible to do so.

Related Documents

1. B-00-07-10060: Cardiac Arrest (Code Blue): Initiating and Responding
2. B-00-11-10116: Code Status (Options for Care)

References

Alberta Health Services. (2020). *Management of Cardiac Arrest when a Physician or Nurse Practitioner is Not Immediately Available*. Retrieved from https://extranet.ahsnet.ca/teams/policydocuments/1/clp-ed-cardiac-arrest-hcs-272-01.pdf

Heart and Stroke Foundation of Canada. (2020) *Advanced Cardiovascular Life Support*: *ACLS Provider Manual*. Ottawa ON: Heart and Stroke Foundation of Canada.

Heart and Stroke Foundation of Canada. (2020). *Pediatric Advanced Life Support*: *PALS Provider Manual*. Ottawa ON: Heart and Stroke Foundation of Canada.

Mackay, M., Providence Health Care Heart Centre & Emergency Cardiac Care Working Group. (2021). *RN-initiated Emergency Cardiac Care: Decision Support Tool #2: Emergency Cardiac Care in Areas Using Cardiac Monitoring, Defibrillation and Emergency Cardiac Drugs*. Retrieved from http://heartcentre.ca/sites/default/files/Emergency%20Cardiac%20Care%20DST%20%232%20FINAL%20jun2821.pdf

Panchal, A. R., Bartos, J.A., Cabañas J. G., Donnino, M. W., Drennan, I. R., Hirsch, K. G., …, Berg, K. M. (2020). Part 3: Adult basic and advanced life support: 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation*, *142*, S366-S468. doi:10.1161/CIR.0000000000000916

Topjian, A. A., Raymond, T. T., Atkins, D., Chan, M., Duff, J. P., Joyner Jr., B. L., …, Schexnayder, S. M. (2020). Part 4: Pediatric basic and advanced life support: 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation*, *142*, S469-S523. doi:10.1161/CIR.0000000000000901
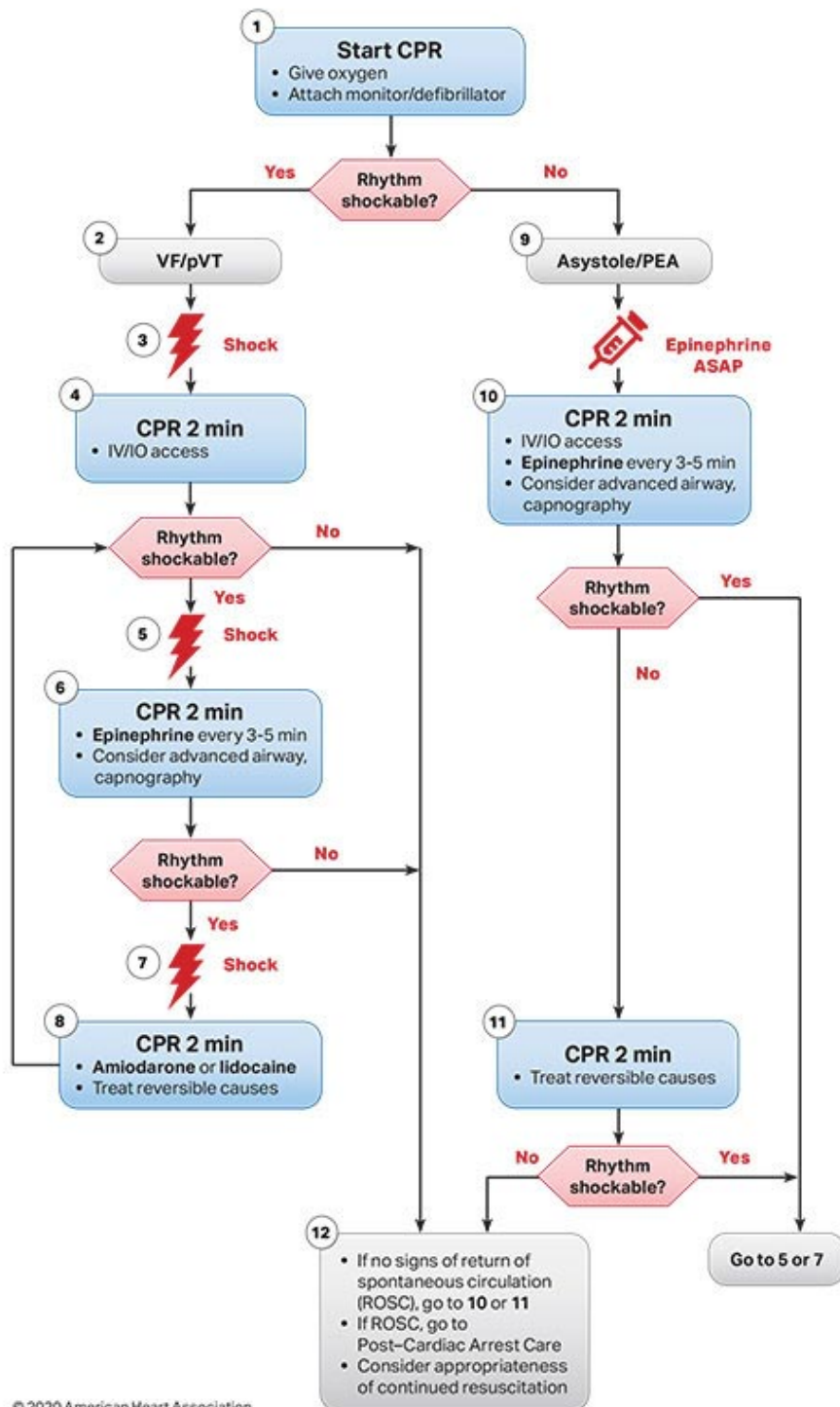
Definitions

For the purposes of delineating between ACLS and PALS algorithm, pediatric patients are defined as "infants, children, and adolescents up to 18 years of age, excluding newborns." (Topjian et al., 2020).

Appendices

- [Appendix A: HSF/AHA Adult Cardiac Arrest Algorithm, 2020 Edition](#)
- [Appendix B: HSF/AHA Pediatric Cardiac Arrest Algorithm, 2020 Edition](#)

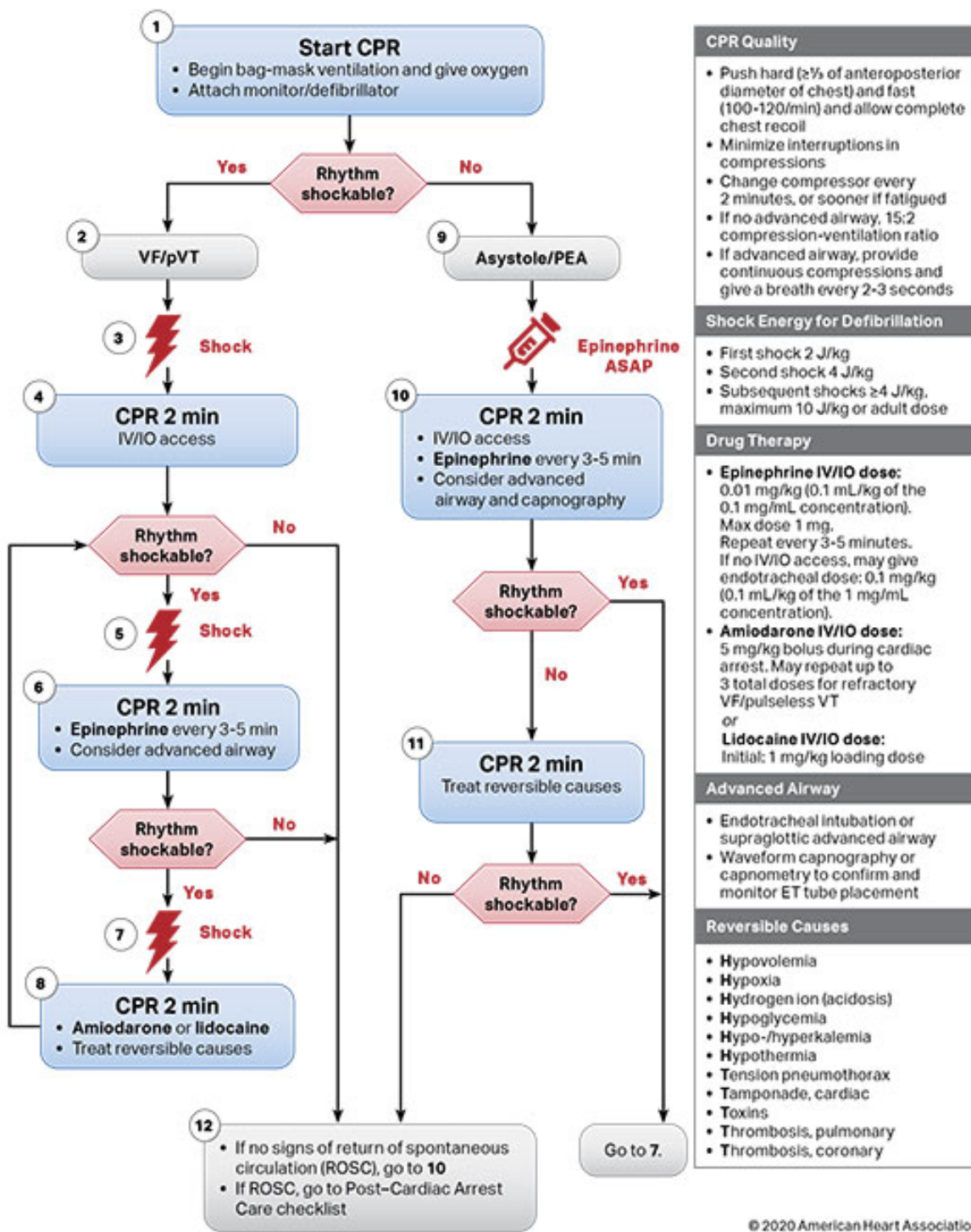**Appendix A: HSF/AHS Adult Cardiac Arrest Algorithm, 2020 Edition**

Adult Cardiac Arrest Algorithm (VF/pVT/Asystole/PEA)

1. Start CPR
- Give oxygen
- Attach monitor/defibrillator

Rhythm shockable? — Yes / No

2. VF/pVT

3. Shock

4. CPR 2 min
- IV/IO access

Rhythm shockable? — No / Yes

5. Shock

6. CPR 2 min
- Epinephrine every 3-5 min
- Consider advanced airway, capnography

Rhythm shockable? — No / Yes

7. Shock

8. CPR 2 min
- Amiodarone or lidocaine
- Treat reversible causes

9. Asystole/PEA

Epinephrine ASAP

10. CPR 2 min
- IV/IO access
- Epinephrine every 3-5 min
- Consider advanced airway, capnography

Rhythm shockable? — Yes / No

11. CPR 2 min
- Treat reversible causes

Rhythm shockable? — No / Yes

Go to 5 or 7

12.
- If no signs of return of spontaneous circulation (ROSC), go to **10** or **11**
- If ROSC, go to Post–Cardiac Arrest Care
- Consider appropriateness of continued resuscitation

© 2020 American Heart Association

CPR Quality
- Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If $PETCO_2$ is low or decreasing, reassess CPR quality.

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

Drug Therapy
- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg.
  or
  Lidocaine IV/IO dose: First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.

Advanced Airway
- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Return of Spontaneous Circulation (ROSC)
- Pulse and blood pressure
- Abrupt sustained increase in $PETCO_2$ (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

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

Appendix B: HSF/AHA Pediatric Cardiac Arrest Algorithm, 2020 Edition

Pediatric Cardiac Arrest Algorithm

CPR Quality

- Push hard (≥⅓ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Change compressor every 2 minutes, or sooner if fatigued
- If no advanced airway, 15:2 compression-ventilation ratio
- If advanced airway, provide continuous compressions and give a breath every 2-3 seconds

Shock Energy for Defibrillation

- First shock 2 J/kg
- Second shock 4 J/kg
- Subsequent shocks ≥4 J/kg, maximum 10 J/kg or adult dose

Drug Therapy

- **Epinephrine IV/IO dose:** 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Max dose 1 mg. Repeat every 3-5 minutes. If no IV/IO access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration).
- **Amiodarone IV/IO dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 3 total doses for refractory VF/pulseless VT
  or
  Lidocaine IV/IO dose: Initial: 1 mg/kg loading dose

Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement

Reversible Causes

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

© 2020 American Heart Association

Groups/Persons Consulted:

PHC Cardiac Arrest Committee

PHC Critical Care Nurse Educators

Developed/Revised By:

SPH Emergency Department Educator

First Released Date:	DD-MMM-YYYY
Posted Date:	DD-MMM-YYYY
Last Revised:	DD-MMM-YYYY
Last Reviewed:	DD-MMM-YYYY
Approved By: *(committee or position)*	PHC
Owners: *(optional)*	PHC