

Cardiac Arrest – Pediatric Ventricular Fibrillation / Pulseless Ventricular Tachycardia Protocol

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Preamble

In contrast to cardiac arrest in adults, cardiopulmonary arrest in pediatric patients is rarely a sudden event and does not often result from a primary cardiac cause. When it does occur, pediatric cardiac arrest usually represents the terminal event of progressive shock or respiratory failure.

The management of a pediatric cardiopulmonary arrest patient is similar to that of adult ACLS, with emphasis of ensuring airway maintenance, proper oxygenation and ventilation, establishing vascular access, and treatment of reversible causes of cardiopulmonary arrest.

Requirements

1. Fully licensed Technician-Advanced Paramedic.
2. Certification in tracheal intubation protocol for pediatric patients by the Medical Director.
3. Certification in cardiac arrest – pediatric ventricular fibrillation / pulseless ventricular tachycardia protocol by the Medical Director.
4. Certification in the other “cardiac arrest” protocols as determined by the Medical Director.
5. Certification in intraosseous cannulation and infusion protocol (if a treatment option) by the Medical Director.
6. Current certification as an advanced cardiac life support provider.
7. Current certification as a pediatric advanced life support provider.

Indications

1. Patient with absent vital signs and either ventricular fibrillation or ventricular tachycardia on the cardiac monitor.

Contraindications

1. Patient age 16 years or greater.
2. Cardiac arrest possibly due to hypothermia.
3. Use of amiodarone (if an option in this protocol) is contraindicated in patients with renal failure.

Drug Doses and Frequencies

1. epinephrine
IV / IO*: 0.01 mg / kg IV/IO* bolus; repeat q3-5minutes prn
ETT: 0.1 mg / kg diluted in normal saline to a total of 3-5 ml
repeat q3-5minutes prn
2. amiodarone (if an option)
IV/IO*: 5 mg / kg IV/IO* slow push, as a single dose
no repeat dose is permitted as part of this protocol
3. lidocaine
IV/IO*: 1 mg / kg IV/IO* bolus
ETT: 2-3 mg/kg
dilute in normal saline to a total of 3-5ml
dose may be repeated q5-10minutes prn
maximum total dose by ETT route: 3 mg / kg

- * intraosseous route is not permitted unless approved for use by the regional EMS medical director and the paramedic is certified in the intraosseous cannulation and infusion protocol

Note

- amiodarone should not be added to an EMS service unless the physician(s) in the EMS service's region are familiar with and routinely use amiodarone, and the hospital(s) in the region routinely stock amiodarone
 - documentation to this effect will be required before Manitoba Health will grant a waiver to carry this agent

Procedure

1. Perform patient assessment and record vital signs, level of consciousness, and pupil size.
2. Assess that patient meets criteria for this protocol.
3. Ensure there are no contraindications to use of this protocol.
4. Initiate and continue cardiopulmonary resuscitation (CPR) at a rate of 30 compressions to 2 ventilations (1 rescuer) or 15 compressions to 2 ventilations (2 rescuers).
 - ensure effective bag-mask ventilation
5. Attach patient to ECG monitor. If rhythm is ventricular fibrillation or pulseless ventricular tachycardia, defibrillate at 2 J / kg monophasic (or biphasic equivalent as per manufacturer).
 - Note: For <12 months or <10kg, use pediatric paddles
For >12 months or > 10 kg use adult paddles
(if adult paddles do not fit on anterior chest wall, may apply to anterior and posterior chest)
(although manual defibrillation at set doses is preferred, if manual defibrillation equipment not available, may use SAED for providing shocks as indicated)
6. If at any time, a rhythm other than ventricular fibrillation or pulseless ventricular tachycardia appears, treat as per the protocol for that rhythm.
7. Continue bag mask ventilation. Intubate if unable to adequately ventilate by bag-mask ventilation. If intubated, ventilate at 10 breaths/min (no need to coordinate with compressions).
8. Establish a large bore intravenous of normal saline, TKVO.
 - intravenous fluids may be infused at a different rate if indicated
 - consider intraosseous cannulation only if indicated, intraosseous route is approved for use by regional EMS medical director, and the EMS is certified in intraosseous cannulation and infusion protocol

9. Reassess after 2 minutes (5 cycles) of CPR. Defibrillate at 4 J / kg monophasic (or biphasic equivalent as per manufacturer), and immediately administer initial dose epinephrine.
10. Reassess after 2 minutes (5 cycles) of CPR. Defibrillate at 4 J / kg (or biphasic equivalent as per manufacturer) and immediately administer initial dose lidocaine (or amiodarone, if protocol option exists).
11. Reassess after 2 minutes (5 cycles) of CPR. Defibrillate at 4 J / kg (or biphasic equivalent as per manufacturer).
12. Repeat epinephrine and reassess after 30 seconds of CPR. Defibrillate at 4 J / kg (or biphasic equivalent as per manufacturer) within 30-60 seconds of when drug was administered, if indicated.
13. If no change in rhythm, initiate transport.
14. Epinephrine and lidocaine may be repeated based on dosing schedule, as required. CPR should be performed for 30 seconds after each drug administration, defibrillating at 4 J / kg (or biphasic equivalent as per manufacturer) within 30-60 seconds of when drug was administered, as indicated.
 - if lidocaine is administered but the ventricular fibrillation / pulseless ventricular tachycardia remains refractory, amiodarone (if the option exists) may be used in addition to the lidocaine
 - if amiodarone is initially used (instead of lidocaine), lidocaine may be used in addition to the lidocaine if the VF / pulseless VT remains refractory
 - if amiodarone is initially used, a repeat dose of amiodarone is not indicated

Note:

- all medications should be circulated for 30 seconds prior to defibrillation
- if a medication was administered and defibrillation is attempted, the attempt should be made within 30-60 seconds of medication administration
- if a perfusing rhythm develops after defibrillation, lidocaine should not be given if the perfusing rhythm is a bradycardia with heart block or a wide complex idioventricular rhythm with a rate less than 100 per minute
- if the patient has a return of spontaneous circulation after initial management, contact physician online medical control (if available) for possible orders to initiate an infusion of lidocaine; an amiodarone infusion is not indicated

Documentation Requirements

The following information must be documented on the patient care report form:

1. Patient's presenting signs and symptoms, including vital signs.
2. Indications for protocol use.
3. Dose(s), time(s), route(s), and effect(s) of medications used.
4. All cardiac rhythm strips.
5. Repeat assessment and vital signs, as indicated.
6. Changes from baseline, if any, that occur during treatment or transport.
7. Signature and license number of Technician-Advanced Paramedic performing any transfer of function skills.

Certification Requirements

1. Attend in-depth classes and lectures on static and dynamic rhythm interpretation.
2. Demonstrate an understanding of the pharmacology, mechanism of action, and potential side effects of epinephrine, atropine, and amiodarone (if a treatment option).
3. Pass a written examination.
4. Pass practical scenarios incorporating variations of the cardiac arrest – pediatric ventricular fibrillation / pulseless ventricular tachycardia protocol.
5. Certification is by the Medical Director.

Recertification Requirements

1. Review class and recertification is done every 12 months.
2. Advanced cardiac life support and pediatric advanced life support provider certifications must be kept current.
3. A record will be kept to document all cases where this protocol is used.

Decertification

1. Decertification is at the discretion of the Medical Director or the Provincial Medical Director, Manitoba Health & Healthy Living.

Quality Assurance Requirements

1. Appropriate quality assurance policies must be in place. The Medical Director or designate must review all instances where this protocol is used. As a minimum, the following must be assessed:
 - i) appropriateness of implementation
 - ii) adherence to protocol
 - iii) any deviation from the protocol
 - iv) corrective measures taken, if indicated
2. Yearly statistics for protocol use compiled and forwarded to Emergency Medical Services Branch, Manitoba Health & Healthy Living