Pediatric Post Cardiac Arrest Pathway

The following information is intended as a guideline. Management of your patient may require a more individualized approach.

This pathway is to be applied to patients admitted to the PICU/PCICU who have received chest compressions/CPR for at least 1 minute with ROSC with change in mental status from baseline and/or need for mechanical ventilation or sustainment of life on ECLS or inability to assess altered mental status due to clinical condition

Goals: To promote the best possible neurologic outcome by

- Minimizing further brain injury by maintaining neuroprotective measures
- Monitoring for and treating post-arrest seizures
- Preventing hypoglycemia, severe hyperglycemia, hypotension, fever, hypo/hyperoxia, and hypo/hyperventilation

Possible Metrics:

- % of time core temperature maintained < 38^{o}C
- % of time without hypotension
- % of time without hypoxia

Recommendations

MONITORING

End-tidal CO2

Continuous core temperature (esophageal, rectal, or foley thermometer)

Continuous blood pressure monitoring via arterial line

Pediatric neurology consult and continuous EEG monitoring

NIRS (cerebral and somatic)

LAB TESTING

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Suggested duration is 3 days of the following:

Daily assessment of end-organ function with LFTs, lipase, and DIC profile

Twice daily assessment of CBC and Chemistry

Q4 ABG

IMAGING

Consider Echo in patient with persistent circulatory dysfunction following ROSC or other signs of end-organ dysfunction (neurologic, renal, hepatic)

Consider non-contrast head CT for diagnostic evaluation of occult brain pathology especially if the cause of arrest is not clear. Could consider head ultrasound instead in patients with open fontanelle.

Consider brain MRI within 3-5 days to support prognostication

CLINICAL PARAMETERS

Targeted temperature management

Prevent fever. Consider scheduled acetaminophen.

Place patient on Arctic Sun or Blanketrol III for first 24 hours and set temp to 36.8C +/- 0.7C. May continue device longer if needed.

Maintain core temperature 36 – 37.5^{o}C for a minimum of 48 hours and up to 120 hours post arrest

Prevent shivering: Maintain RASS goal -1. Consider increased sedation +/- paralytic infusion to prevent shivering

Normoglycemia (80-200 mg/dL)

Normoxia (SpO_2 94-99%) unless patient has congenital heart disease with alternate saturation goals

Normocapnia (CO_2 35-45) with use of pH (7.35-7.4) in cases of chronic hypercapnia or metabolic alkalosis

Normotension for age with special consideration to diastolic blood pressure to ensure adequate coronary perfusion pressure and myocardial recovery

2020 AHA PALS guidelines: Age-based norms for blood pressure

AGE	SYSTOLIC pressure (mmHg)	DIASTOLIC pressure (mmHg)	MEAN arterial pressure (mmHg)
Birth (12h, < 1000g)	39-59	16-36	28-42
Birth (12h, 3kg)	60-76	31-45	48-57
Neonate (96h)	67-84	35-53	45-60
Infant (1-12mo)	72-104	37-56	50-62
Toddler (1-2y)	86-106	42-63	49-62
Preschooler (3-5y)	89-112	46-72	58-69
School age (6-9y)	97-115	57-76	66-72
Preadolescent (10-12y)	102-120	61-80	71-79
Adolescent (12-15y)	110-131	64-83	73-84

PROGNOSTIC GUIDANCE

Prognosis following cardiac arrest is individualized and is often aided by consultation with pediatric neurology. Prognosis should take into account the patient's pre-arrest neurologic status, co-morbid acute and chronic medical issues, post-arrest neuroimaging, EEG studies, and clinical exam. Clinicians should ensure adequate clearance of sedative medications prior to conferring a prognosis.

DISPOSITION

After stabilization of acute medical concerns, patients following recovery of cardiac arrest may have varying medical and social needs. These may include dependence on new technologies, neuropsychiatric difficulties, and social challenges. Given these anticipated changes, there should be consideration to evaluation of all post-arrest patients for services/support from the following:

- PM&R
- Social Work
- Children's supportive care team
- Pediatric Neurology
- Physical therapy
- Occupational therapy
- Speech therapy

Resources:

- Post-cardiac arrest syndrome: epidemiology, pathophysiology, treatment, and prognostication. A consensus statement from the International Liaison Committee on Resuscitation. Circulation. 2008 Dec 2;118(23):2452-83

- 2019 American Heart Association Focused Update on Pediatric Advanced Life Support: An Update to the American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2019 Nov 14;140(24):e904–e914
- Pediatric Post–Cardiac Arrest Care: A Scientific Statement From the American Heart Association. Circulation. 2019 Jun 27;140(6):e194–e233