Post Cardiac Arrest Care Pathway: PICU, NICU, and CICU Management

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Children's Healthcare of Atlanta

Patient after CPR for an In-Hospital Cardiac Arrest (IHCA) or Out-of-Hospital Cardiac Arrest (OHCA)[1]

The following guidance should be applied to patients for a minimum of 72 hours after a cardiac arrest

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Begin Initial Evaluation and Neurological Assessment

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Admit to PICU/CICU/NICU
- While awaiting transfer to ICU, may obtain initial/labs imaging and continue BP monitoring[5] and maintain normothermia (*36-37.5° C*)

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ICU Evaluation and Monitoring
- General and Hemodynamic Monitoring[2]
- Labs And Imaging[3]
- Neurological Monitoring[4]
- Consult Cardiology if concern for cardiac etiology of arrest

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Treatment

Clinical Targets & Treatment*[5]

Maintain for minimum 72 hours

Neurological Monitoring[4]
- Treat Seizures
- Consult Neurology if seizures are detected
- Seizure prophylaxis not recommended

Targeted Temperature Management (TTM)
- Controlled normothermia
  - PICU/CICU: 36-37.5° C
  - NICU: 36.5-37.5° C
- Duration:
  - Minimum 72 hours
  - Up to 120 hours at provider discretion
- Recommended monitoring (any one):
  - Esophageal (placed in lower 2/3 of esophagus)
  - Bladder
  - Rectal
  - Axillary (NICU)
- Temperature control device:
  - CICU/PICU: Blanketrol III
  - NICU: Servo Skin Temp or Tecotherm
- Consider IV acetaminophen as adjunct to device-based TTM
  - Account for liver shock before ordering

Sedation Considerations
- Use analgosedation and NMB as needed to reduce metabolic demand
- Choice of sedative per unit protocol

Prevent shivering
- Per unit protocol

Fluids & Nutrition
- If <5 kg D10 IV fluids
- If ≥5 kg, D5 IV fluids
- Consider total fluid limit (TFL) to prevent fluid overload

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- Consider starting enteral nutrition if no concerns for intestinal ischemia
- If concerns for intestinal ischemia, consider starting TPN within 1-3 days for infants, and within 4-5 days for older children

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Maintain Post Cardiac Arrest Care For Minimum 72 Hours

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Prognostic Guidance
- Prognostication should be multimodal
- **Avoid neuro prognostication within 72 hours of arrest** (unless suspect patient meets brain death criteria)
- Brain MRI: useful for prognostication
  - Obtain MRI 2-5 days post cardiac arrest, or after 10 days if not stable for day 2-5 MRI

Rehabilitation
- Consider transfer to general care area vs rehab as appropriate
- Consults: PT, OT, Nutrition, SLP, Physical Medicine & Rehabilitation

***Blood Pressure Targets**

Age	MAP (mmHg)	SBP (mmHg)
0-28 days	> corrected gestational age	>60
>28 days-6 mo	>45	>70
>6mo-2 yrs	>55	>80
>2 yrs-10 yrs	>65	>90
>10 yrs	>75	>100

***Pre-Term Neonate: MAP Targets**

Corrected Gestational Age	MAP (mmHg)
< 30 weeks	>30
30-40 weeks	> corrected gestational age
> 40 weeks	> 45
> 44 weeks	> 50

**For children with congenital heart disease, optimize SBP and MAP goals based on child's cardiac physiology; avoid prolonged episodes of MAP < 5th percentile for age.*

[1]Inclusion And Exclusion Criteria

Include: (all conditions must be met)
- Patient 3 days-21 years
- Cardiac arrest requiring at least 2 minutes of chest compressions
- Unconscious, unsedated motor GCS <5 **OR** not at baseline neurologic function (due to injury, illness, or ICU interventions)

Exclude:
- Patients undergoing NICU HIE Protocol

[2]General & Hemodynamic Monitoring
- Continuous telemetry and pulse oximetry
- Continuous capnography
- Continuous core temperature monitoring
- Intra-arterial blood pressure
- Central venous pressure
- Foley (at provider discretion for neonates)

[3]Labs And Imaging

Initial labs after ROSC:
- CBC, CMP/Mg/Ph, Glucose, VBG or ABG with lactate, DIC screen, BNP, Troponin, Type & Screen
- Consider amylase/lipase (e.g., if trauma)
- Consider toxicology screen

Ongoing lab monitoring:
- q4h ABG, lactate
- At least q4h glucose (per protocol if on insulin)
- q12h BMP/Mg/Ph, CBC
- q24h DIC, hepatic function panel, ScvO2
- PRN BNP, troponin, amylase/lipase

Imaging:
- Chest radiograph, ECG, ECHO
- ED: Consider point of care heart ultrasound if concern for cardiac etiology. ***Do not delay ICU transfer for ultrasound.***
- For out-of-hospital arrest: Head CT, Skeletal Survey (for <2 years) - obtain when medically stable

NICU Considerations:
- Initial troponin at provider discretion
- Lab frequency at provider discretion
- ECG, ECHO, and head CT at provider discretion
- Cranial Ultrasound: consider on day of insult to rule out head bleed, if cause of arrest is unclear, persistently altered mental status, or unable to obtain MRI in recommended window

[4]Neurological Monitoring

EEG:
- Continuous EEG for at least 48 hours
- If hypothermia, continue monitoring for at least 24 hours after normothermia
- Extend monitoring if ongoing risk for seizures

NIRS (cerebral near-infrared spectroscopy):
- Consider NIRS at provider discretion
- Intra-arrest NIRS may predict survival and neurologic outcome

[5]Clinical Targets And Treatment
- See Blood Pressure Target Table*
- Maintain normocapnia:
  - $PaCO_2$ Goal: CICU/PICU: 35-45 mmHg, NICU: 40-50mmHg
  - If history of chronic CO_2 retention, set goal to return to previous baseline
- Maintain normonatremia
- Maintain normoxia:
  - SpO_2 94-99%
  - Avoid PaO_2>300 mmHg
  - If <32 weeks CGA, keep SpO_2 >90% (if no history of pulmonary hypertension)
  - Two ventricle patients with R>L shunt: maintain SpO_2 80-99%
  - Congenital heart disease with complete venous admixture maintain SpO_2 75-85% (or +/- 5% from baseline)
- Maintain normoglycemia:
  - Glucose goal: 80-200 mg/dL

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