

Post Cardiac Arrest Management Pathway

Evidence Based Outcome Center

EXCLUSION CRITERIA

Neonates at birth

GUIDELINE INCLUSION CRITERIA

All patients with cardiac arrest and ROSC who receive >2 minutes of CPR or ECPR

Definitions

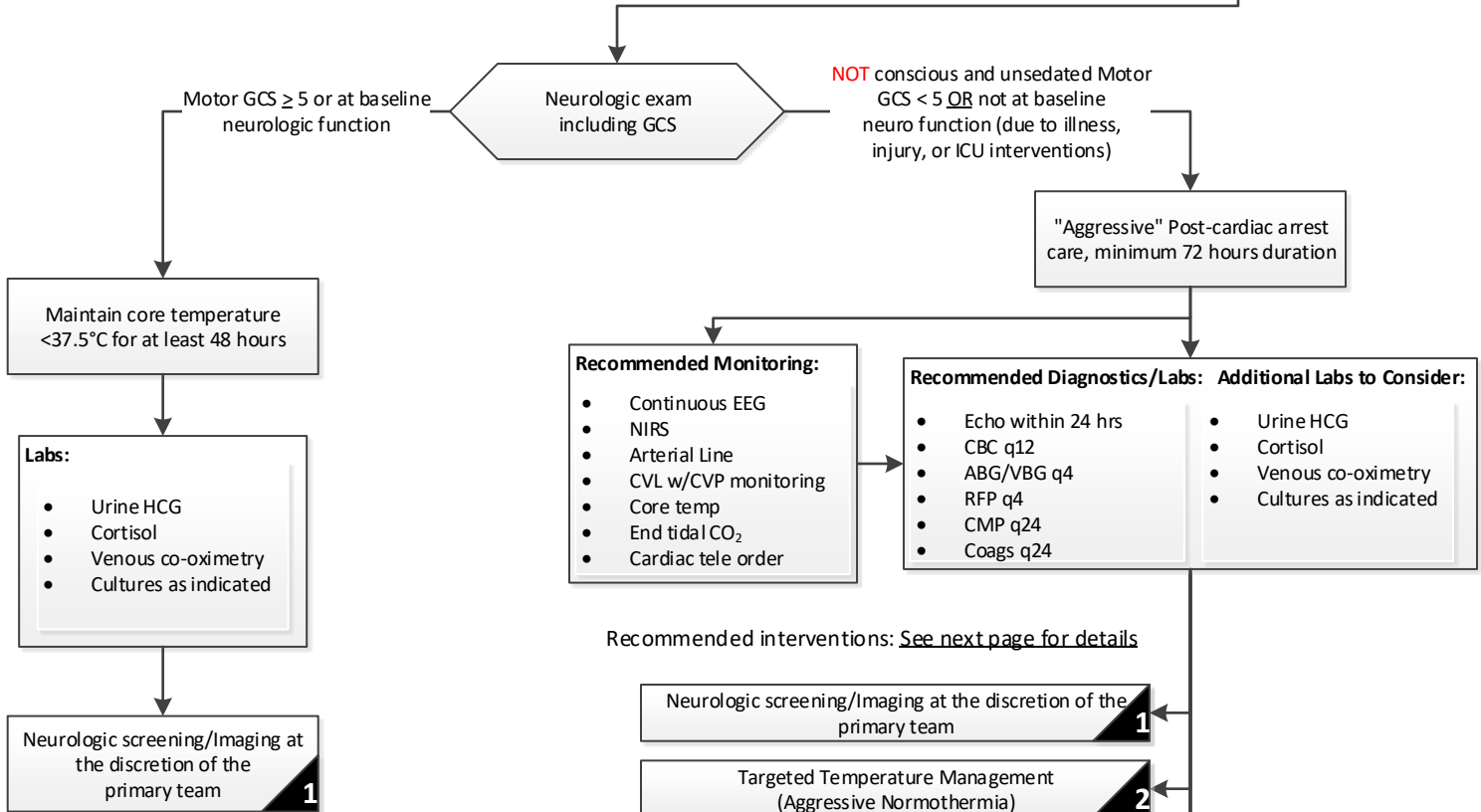
GCS - Glasgow Coma Scale (GCS)
ECPR - extracorporeal cardiopulmonary resuscitation
CVP - central venous pressure
NIRS - near-infrared spectroscopy (NIRS) is a portable method for measuring regional oxygen levels in the brain
ROSC - (the return of spontaneous circulation) is the resumption of sustained perfusing cardiac activity associated with significant respiratory effort after cardiac arrest.

Evaluate and treat arrest etiology (H&T's)

- Hypoxemia
- Hypovolemia
- Hyper & Hypokalemia
- H (Acidosis)
- Hypothermia
- Hypoglycemia
- Tension Pneumothorax
- Tamponade, Cardiac
- Toxins
- Thrombosis, Pulmonary
- Thrombosis, Coronary
- Trauma

Recommended initial immediate post-arrest studies for all patients:

- CBC
- CMP
- VBG/ABG
- Type and Screen
- Troponin
- Amylase, Lipase
- Urine tox
- Serum tox
- EKG
- Chest X-Ray
- BNP
- Head CT (if cause of arrest is uncertain)



ROSC Criteria Defined:

- Have a history of receiving chest compressions/CPR for at least 1 minute
- Have sustained return of spontaneous circulation (ROSC for ≥ 20 minutes) or return of circulation (ROC) with ECMO

In-hospital Arrest
 Occurs within the walls of the hospital
 Includes cardiac arrest that originates in patients within the ED (DCMC or referring)

Out-of-hospital Arrest
 Occurs outside of the walls of the hospital or the ED

Recommended interventions: See next page for details

- 1 Neurologic screening/Imaging at the discretion of the primary team
- 2 Targeted Temperature Management (Aggressive Normothermia)
- 3 Targeted electrolytes/Glucose
- 4 Multimodal neurologic monitoring
- 5 Targeted oxygenation/Ventilation
- 6 Guidance/Considerations regarding prognostication after cardiac arrest
- 7 Targeted blood pressure management

Imaging:

- Non-urgent MRI Brain is recommended for all patients after cardiac arrest within 5 days of the arrest event
- If acute neurological change is detected/concern for hemorrhage or herniation, emergent CT scan of the head without contrast should be performed
- For infants with an open fontanelle, cranial ultrasound may be helpful in evaluating for intracranial hemorrhage, but has low sensitivity for detecting ischemia or cerebral edema

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Targeted Temperature Management (Aggressive Normothermia)

- Core Temp Goal: 35-37C
- Minimum duration 72 hours
- Prevent fever and shivering. Consider increased sedation, counterwarming, and/or paralytic to prevent shivering
- Strongly consider using Arctic Sun temperature control device
Please refer to [Normothermia Protocol \(Blanketrol\) ICU Pedi](#) or [Normothermia Protocol \(Arctic Sun\) ICU Pedi](#)

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Electrolytes/Glucose targets

- Glucose: 80 - 180; for hyperglycemia, consider insulin infusion using [Hyperglycemia \(Non-Diabetic, Non-DKA\) Protocol Pedi](#)
- Sodium: >140 - 145
- Potassium (K): 4-5
- Magnesium: 2-2.5
- Ionized Calcium (iCal): 1.1 – 1.4

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Multimodal Neurologic Monitoring:

- cEEG is recommended for at least 24- 48 hours following cardiac arrest. Neuro consult should be placed prior to EEG order.
[EEG monitoring guideline](#)
- NIRS should be strongly considered, especially for children with complex congenital heart disease
- Treat seizures aggressively (see status epilepticus protocol)

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Oxygenation/Ventilation Goals:

- Normoxia: SpO₂ 94-98%
- Normocapnia: PCO₂ 35-45 mmHg
- Special Considerations for patients with congenital heart defects:
 - 2 ventricle patients with R to L shunt: goal SpO₂ 80-97% (e.g., PFO after TET repair)
 - Complete venous mixing: goal SpO₂ 75-85% or +/- 5% from baseline (e.g., single ventricle, shunt dependent, banded pulmonary blood flow)

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Blood Pressure Targets:

- Minimum BP Target > 5th %ile for age, though there is evidence to support improved outcomes with MAP at least 50thile for age in the first 24-48 hrs.
- DBP should be >30 for coronary artery perfusion
- BP targets may need to be adjusted for patients with congenital heart disease

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Prognostication after cardiac arrest:

- At this time, no single factor reliably predicts recovery after cardiac arrest in children
- Discussions with patient's regarding prognosis should be done with the utmost care, only after careful review of all factors (including, but not limited to: neurologic exam, EEG, imaging AND with involvement of the primary team)
- Repeat MRI approximately 2 weeks post arrest may be beneficial
- Early Neurology consultation is recommended

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Table 1. Reference Table for Mean Arterial Blood Pressure Percentiles by Age Group

Age Group	1%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	99%
37 wk post-menstrual age to 30 d	32	39	42	47	50	53	56	59	63	67	73	79	91
1–3 mo	34	41	44	49	52	55	59	62	65	70	76	82	93
3–6 mo	37	44	47	52	56	59	62	66	69	74	80	86	96
6–12 mo	41	48	52	57	61	64	67	71	75	80	86	92	101
1–2 yr	45	52	56	62	66	69	72	76	80	84	91	96	105
2–3 yr	45	53	56	61	65	68	71	74	78	82	88	94	103
3–4 yr	45	52	55	60	63	66	69	72	75	78	84	90	100
4–5 yr	45	52	55	60	63	66	69	71	74	77	83	88	98
5–6 yr	46	53	56	61	64	67	69	72	75	78	83	88	99
6–7 yr	47	54	58	62	65	68	71	73	76	79	85	89	99
7–8 yr	48	55	59	63	66	69	72	74	77	81	86	90	100
8–9 yr	49	55	59	64	67	70	72	75	78	81	86	91	101
9–10 yr	49	56	59	64	67	70	73	76	78	82	87	92	101
10–11 yr	49	56	59	64	67	70	73	76	79	82	87	92	102
11–12 yr	49	56	59	64	67	70	73	76	79	82	87	92	102
12–13 yr	49	56	59	64	67	70	73	76	79	82	88	92	103
13–14 yr	49	56	59	64	68	71	74	76	79	83	88	93	103
14–15 yr	49	56	60	65	68	71	74	77	80	83	89	94	104
15–16 yr	49	56	60	65	69	72	75	77	80	84	90	94	105
16–17 yr	49	57	61	66	69	72	75	78	81	85	90	95	106
17–18 yr	49	57	62	66	70	73	76	79	82	86	91	96	107

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Table 2. Modified Glasgow coma score for children

	Score	Infant/nonverbal child	Verbal child
Eye Opening:	4	Spontaneous	Spontaneous
	3	To speech	To speech
	2	To pain	To pain
	1	None	None
Verbal:	5	Babbles and coos normally	Oriented
	4	Spontaneous irritable cries	Confused
	3	Cries to pain	Inappropriate words
	2	Moans to pain	Incomprehensible sounds
	1	No response	No response
Best motor response:	6	Normal spontaneous movement	Obeys command
	5	Withdraws to touch	Localizes pain
	4	Withdraws to pain	Flexion withdrawal
	3	Abnormal flexion to pain	Abnormal flexion
	2	Extension to pain	Extension to pain
	1	No response	No response

Source: World Federation of Societies of Anaesthesiologist - ATOTW



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Revision History

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