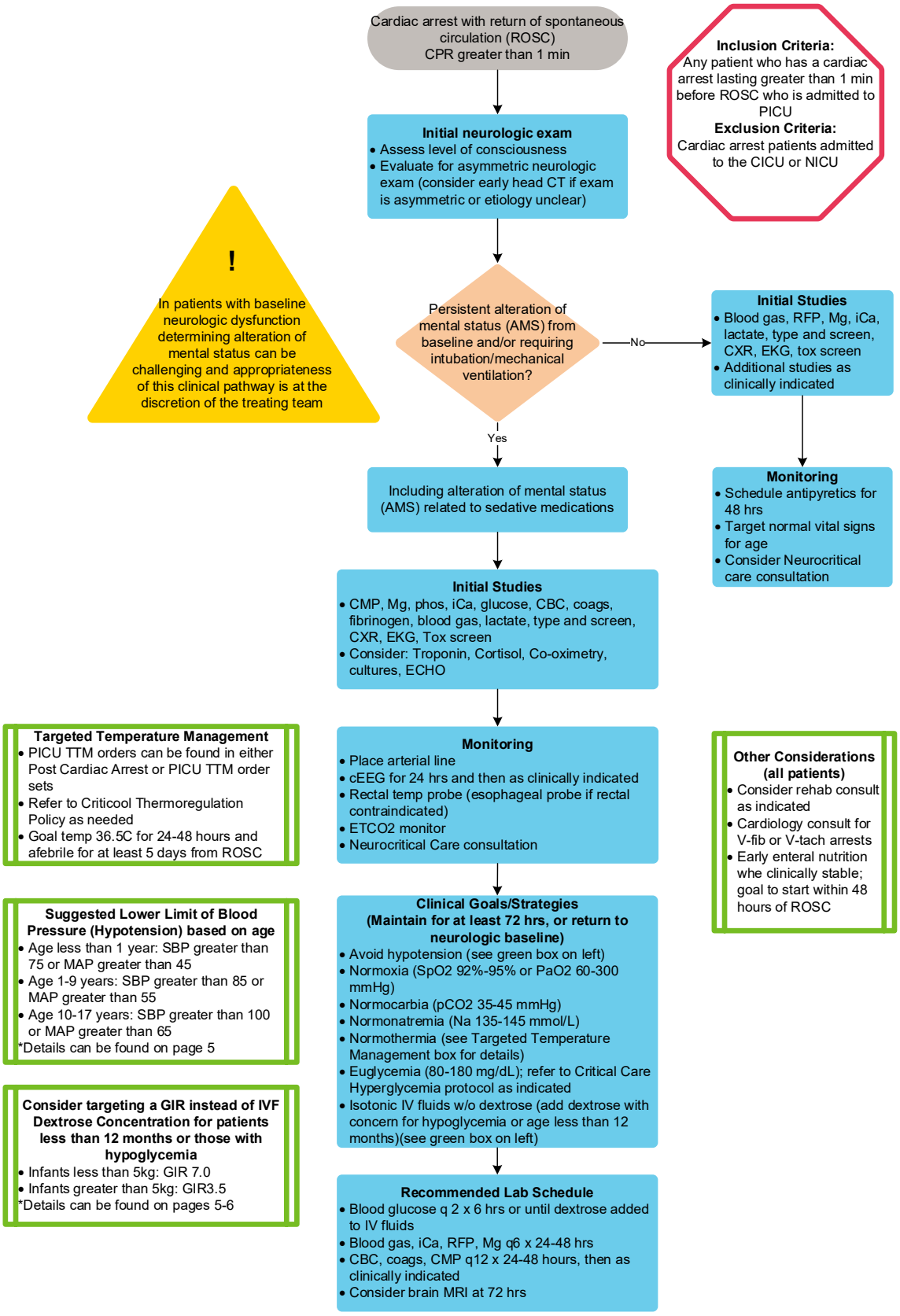
PEDIATRIC POST CARDIAC ARREST

ALGORITHM



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TARGET POPULATION

Inclusion Criteria

- All patients admitted to the PICU after out-of-hospital cardiac arrest or in-hospital cardiac arrest who:
    - Regain spontaneous circulation after CPR lasting greater than or equal to 1 minute, OR
    - Undergo eCPR (CPR with cannulation to ECMO)
- Patients must:
    - Exhibit persistence of alteration of mental status from their baseline, AND/OR
    - Require Intubation and/or mechanical ventilation

Exclusion Criteria

- Admitted to the CICU or NICU

BACKGROUND

Each year in the United States, children suffer approximately 5000 out-of-hospital cardiac arrests and 6000 in-hospital cardiac arrests. Many of the children who suffer cardiac arrest and obtain return of spontaneous circulation (ROSC) will develop post cardiac arrest syndrome (PCAS). PCAS is a pathophysiologic inflammatory response that results in brain injury, myocardial dysfunction, systemic ischemia/reperfusion injury and persistent precipitating pathophysiology. The goal of post cardiac arrest care is to increase survival to hospital discharge with favorable neurologic outcome by supporting organ function by adequately supplying tissues with appropriate oxygen and substrate to meet metabolic demand, evaluate for and reverse etiologies of cardiac arrest, and reduce secondary neurologic injury.

DEFINITIONS

- Cardiac arrest: The cessation of cardiac mechanical activity as confirmed by the absence of signs of circulation
- Respiratory arrest: The cessation of spontaneous respiratory effort such that there is ineffective ventilation and/or oxygenation
- Return of spontaneous circulation (ROSC): The restoration of a spontaneous perfusing rhythm that results in more than spontaneous gasp, fleeting palpable pulse or arterial waveform

- Altered mental status (AMS):
    - Persistently diminished ability to maintain alertness and cognition
    - Including AMS resulting from sedative medications and inability to fully assess mental status as a result of endotracheal intubation or other therapies which might prohibit a full neurologic exam
    - In patients with baseline neurologic dysfunction, determining alteration of mental status can be challenging and appropriateness of this clinical pathway is at the discretion of the treatment team

INITIAL EVALUATION

Initial Evaluation in the PICU

- Comprehensive physical exam including comprehensive neurologic exam
- Specific attention to certain aspects of the neurologic exam:
    - Assess cranial nerves, Glasgow Coma Scale, level of consciousness (careful consideration given to pre-arrest neurologic baseline, as patients who have had short in-hospital cardiac arrest with no change in neurologic status from baseline proceed down the algorithm differently than those with change in neurologic functioning)
- For patients who **DO NOT** exhibit an alteration of mental status from baseline (ie arousable, attentive, follow commands, localize painful stimuli, not intubated), the following studies are recommended:
    - Arterial or Venous Blood Gas with ionized Calicum
    - Renal function panel
    - Magnesium
    - Ionized calcium
    - Lactate
    - Toxicology screen
    - Type and screen
    - Chest radiograph
    - EKG
    - Other labs to be obtained at the discretion of the attending based on clinical scenario
- For patients who **DO** exhibit a persistence of altered mental status from baseline (unconscious and/or requiring intubation), the following studies are recommended:
    - Complete metabolic panel
    - Magnesium
    - Phosphorus
    - Ionized calcium
    - Complete Blood Count
    - Coagulation Panel
    - Fibrinogen
    - Lactate
    - Arterial Blood Gas
    - Type and Screen
    - Chest radiograph
    - EKG

- Additional studies to be obtained for selected patients at the discretion of the attending physician:
  - Echocardiogram
  - Troponin
  - Urine toxicology screen
  - Co-oximetry
  - Blood culture
  - Urine cultures
  - Cortisol
  - Non-contrast computed tomography (CT) of the head to evaluate for acute pathology and/or aid in determining etiology of cardiac arrest
    - Also strongly consider early head CT if neurologic exam demonstrates asymmetry
    - Early head CT findings can also potentially provide limited information on prognosis

CLINICAL MANAGEMENT

For patients who DO NOT exhibit an alteration of mental status from baseline (arousable, attentive, follow commands, localize painful stimuli, not intubated)

Monitoring

- Routine PICU monitoring

Clinical Goals and Strategies

- Avoidance of fever: schedule antipyretics for 48 hours
- Target normal vital signs for age
- Consider Neurocritical care team consultation

For patients who DO exhibit a persistence of altered mental status from baseline (unconscious and/or requiring intubation)

Monitoring

- Routine PICU monitoring
- Continuous invasive blood pressure monitoring via arterial catheter
- Continuous EEG for 24 hours
  - Prolonged monitoring may be indicated based on clinical scenario
- Rectal temperature probe, esophageal probe if rectal contraindicated (refer to Targeted Temperature Management Policy)
- Continuous end-tidal CO_2 monitor while intubated

Clinical Goals and Strategies

*****These strategies should be provided for 72 hours to 5 days, with the ultimate duration determined by improved neurologic status and extubation readiness*****

- Controlled normothermia: Goal Temperature 36.5°C

- Use Criticool Thermoregulation Device (See PICU Post Cardiac Arrest Order Set and/or Targeted Temperature Management Policy)
- For patients presenting with core temperature below 33°C, use Normothermia Mode to rapidly warm to 33°C, then transition to Controlled Rewarming Mode with Goal Core Temp 36.5°C
- For patients presenting with core temperature between 33°C and 35°C, use Controlled Rewarming Mode with Goal Core Temp 36.5°C
- For patients presenting with core temperature greater than 35°C, use Targeted Temperature Management Mode with Goal Core Temp 36.5°C

- Normotension:
  - Hypotension, as defined as a mean arterial blood pressure less than the 5th percentile for age, gender and height, is associated with worsened outcomes following pediatric cardiac arrest
  - Aggressive treatment of blood pressures nearing hypotension is advised. Treatment strategies are to be determined by the clinical team as indicated by the patient's clinical state.
  - Suggested **lower limit** of blood pressures at which treatment should be initated to prevent systemic hypotension:

Age < 1 year: SBP 75 or MAP 45
Age 1-9 years: SBP 85 or MAP 55
Age 10-17: SBP 100 or MAP 65

  - Table of blood pressures at the **5th percentile for age** in years and gender (50th percentile for height)

Age	Boys	Girls
1	71/23 (39)	72/31 (45)
2	73/27 (43)	74/33 (47)
3	75/31 (46)	75/35 (49)
4	77/34 (49)	77/36 (50)
5	78/37 (51)	78/37 (51)
6	80/39 (53)	80/38 (52)
7	82/40 (54)	81/38 (53)
8	84/40 (55)	82/40 (54)
9	85/40 (55)	83/41 (55)
10	86/42 (57)	85/41 (56)
11	88/43 (58)	88/41 (57)
12	89/41 (57)	90/42 (58)
13	92/40 (58)	91/44 (59)
14	94/43 (60)	92/46 (62)
15	96/46 (63)	92/48 (63)
16	97/48 (65)	93/50 (65)
17	99/49 (66)	94/51 (66)

- Normoxia (SpO2 92%-95% or PaO2 60-300 mmHg)
- Normocarbia (pCO_2 35-45 mmHg; can target normal pH if the patient has evidence of chronic CO2 retention)
- Normal serum sodium (135-145 mmol/L)
- Normoglycemia (80-180 mg/dL)
  - If the patient develops hypoglycemia, treat urgently, and recheck glucose quickly and frequently
  - For patients with persistent hyperglycemia, refer to the Critical Care Hyperglycemia policy/order set
- Intravenous (IV) fluids:
  - If greater than 12 months of age: For maintenance intravenous fluids (IVF), use isotonic fluids without dextrose initially

        - Add dextrose to IV fluids at 24 hours post-resuscitation or if serum glucose falls below 80 mg/dl
    - If less than 12 months of age and greater than 5kg: For maintenance IVF, use isotonic fluids with 5% dextrose.
        - Because many patients require large volumes of IV medications in addition to their maintenance IVF, and have total fluids orders which reduce the total amount of maintenance IVF the patient is receiving, the medical team could consider targeting a glucose infusion rate (GIR) instead of a total rate of maintenance IVF. Patients greater than 5kg who are receiving maintenance IVF with 5% dextrose would be receiving a GIR of 3.5, thus a GIR of 3.5 could be targeted if IVF rate being delivered to the patient is less than maintenance rate as determined by the 4-2-1 rule.
    - If less than 12 months of age and less than or equal to 5kg: For maintenance IVF, use isotonic fluids with 10% dextrose.
        - Because many patients require large volumes of IV medications in addition to their maintenance IVF, and have total fluids orders which reduce the total amount of maintenance IVF the patient is receiving, the medical team could consider targeting a glucose infusion rate (GIR) instead of a total rate of maintenance IVF. Patients Less than or equal to 5kg who are receiving maintenance IVF with 10% dextrose would be receiving a GIR of 7.0, thus a GIR of 7.0 could be targeted if IVF rate being delivered to the patient is less than maintenance rate as determined by the 4-2-1 rule.
    - Target euvolemia/even fluid balance once hemodynamically stable (defined as no fluid boluses and/or no escalation of vasoactive medications for at least 6 hours)
- Early enteral nutrition: recommend placing nasoenteric tube when the patient is clinically stable with a goal of initiating enteral feeding within 48 hours of admission
- Recommended lab schedule:
    - Arterial blood gas, iCa, renal function panel, magnesium every 6 hours for 24-48 hours, and then as clinically indicated
    - CBC, coagulation panel, CMP every 12 hours for 24-48 hours, and then as clinically indicated
- Consult Neurocritical care team at admission

Other Considerations (all patients)

- For patients with documented or suspected ventricular fibrillation or ventricular tachycardia as initial arrest rhythm, strongly consider cardiology consultation to rule out arrhythmia syndrome
- Rehabilitation Medicine: consider consultation for assistance with optimal rehabilitation (timing, modalities, location, etc), tone management, prognostication and/or efficient transition of care out of the PICU

IMAGING

- Early head CT is recommended if etiology of cardiac arrest is unknown or if there is an asymmetric neurologic exam.
    - If obtained for a clinical indication, early head CT can also be combined with other clinical and historical data to aid in understanding of degree of acute neurologic injury
- CT of the neck should be considered in cases of trauma, asphyxiation/hanging and/or drowning to evaluate for cervical spine injury and/or vascular injury.
- If assistance with prognosis is desired, brain MRI can be helpful in providing information related to extent of acute brain injury. This information should be added to the rest of the clinical picture.
    - If MRI brain is desired, do not obtain earlier than 72 hours after admission (wait an additional 48-72 hours if hypothermic arrest and/or if patient has undergone therapeutic hypothermia)

RELATED DOCUMENTS AND LINKS

- Severe Traumatic Brain Injury Guideline
- Glycemic Guidelines: Patients 6 months of age and older in Critical Care Units
- Therapeutic Hypothermia in the PICU and CICU Policy
- Thermoregulation: Targeted Temperature Management PICU Policy

REFERENCES

General

Topjian AA, et al. Pediatric Post–Cardiac Arrest Care: A Scientific Statement From the American Heart Association. 2019. *Circulation, 140*(6): e194-e233.

Background

1. Neumar, RW, et al. Post-cardiac arrest syndrome: epidemiology, pathophysiology, treatment, and prognostication: a consensus statement from the International Liaison Committee on Resuscitation (American Heart Association, Australian and New Zealand Council on Resuscitation, European Resuscitation Council,
2. Heart and Stroke Foundation of Canada, InterAmerican Heart Foundation, Resuscitation Council of Asia, and the Resuscitation Council of Southern Africa); the American Heart Association Emergency Cardiovascular Care Committee; the Council on Cardiovascular Surgery and Anesthesia; the Council on Cardiopulmonary, Perioperative, and Critical Care; the Council on Clinical Cardiology; and the Stroke Council. Circulation.
3. 2008;118:2452–2483.
4. Atkins DL, et al; Resuscitation Outcomes Consortium Investigators. Epidemiology and outcomes from out-of-hospital cardiac arrest in children: the Resuscitation Outcomes Consortium Epistry-Cardiac Arrest. Circulation. 2009;119:1484–1491.
5. Topjian AA, Berg RA. Pediatric out-of-hospital cardiac arrest. Circulation. 2012;125:2374–2378.
6. Berg RA, et al; Eunice Kennedy Shriver National Institute of Child Health and Human Development Collaborative Pediatric Critical Care Research Network and for the American Heart Association's Get With the Guidelines-Resuscitation (formerly the National Registry of Cardiopulmonary Resuscitation) Investigators. Ratio of PICU versus ward cardiopulmonary resuscitation events is increasing. Crit Care Med. 2013;41:2292–2297.
7. Knudson JD, et al. Prevalence and outcomes of pediatric in-hospital cardiopulmonary resuscitation in the United States: an analysis of the Kids' Inpatient Database. Crit Care Med. 2012;40:2940–2944.

Clinical Goals and Strategies

1. Topjian AA, French B, Sutton RM, Conlon T, Nadkarni VM, Moler FW, Dean JM, Berg RA. Early postresuscitation hypotension is associated with increased mortality following pediatric cardiac arrest. Crit Care Med. 2014;42:1518–1523.
2. Topjian AA, Telford R, Holubkov R, Nadkarni VM, Berg RA, Dean JM, Moler FW; Therapeutic Hypothermia After Pediatric Cardiac Arrest (THAPCA) Trial Investigators. Association of early postresuscitation hypotension with survival to discharge after targeted temperature management for pediatric out-of-hospital cardiac arrest: secondary analysis of a randomized clinical trial. JAMA Pediatr. 2018;172:143–153.
3. Lopez-Herce J, del Castillo J, Matamoros M, Canadas S, Rodriguez-Calvo A, Cecchetti C, Rodr.guez-N.nez A, Carrillo .; Iberoamerican Pediatric Cardiac Arrest Study Network RIBEPCI. Post return of spontaneous circulation factors associated with mortality in pediatric in-hospital cardiac arrest: a prospective multicenter multinational observational study. Crit Care. 2014;18:607
4. Ameloot K, et al. Early Goal-directed hemodynamic optimization of cerebral oxygenation in comatose survivors after cardiac arrest: the neuroprotect post-cardiac arrest trial. European Heart Journal. 2019; 40(22): 1804-1814.
5. Russo J, et al. Optimal mean arterial pressure in comatose survivors of out-of-hospital cardiac arrest: An analysis of area below blood pressure thresholds. Resuscitation. 2018; 218: 175-180.
6. https://sites.google.com/a/channing.harvard.edu/bernardrosner/pediatric-blood-press/boys-percentiles-of-blood-perssure-by-percentile-of-height/17-years-old. Accessed on 11/2/2020.
7. Ferguson L, et al. Relationship between arterial partial oxygen pressure after resuscitation from cardiac arrest and mortality in children. Circulation. 2012;126(3): 335-42.
8. Kleinman ME, et al. Part 14: pediatric advanced life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation. 2010;122(suppl 3):S876–S908.
9. De Caen A, et al. Part 12: pediatric advanced life support: 2015 American Heart Association guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care. Circulation. 2015; 132(supp 2): S526-S542.
10. Moler F, et al. Therapeutic Hypothermia after in-hospital cardiac arrest in children. New England Journal of Medicine. 2017; 379: 318-329.
11. Moler F. et al. Therapeutic Hypothermia after out-of-hospital cardiac arrest in children. New England Journal of Medicine. 2015; 372: 1898-1908.

12. Buick J, et al. Paediatric targeted temperature management post cardiac arrest: A systematic review and meta-analysis. Resuscitation. 2019; 139: 65-75.
13. Castillo J, et al. Iberoamerican Pediatric Cardiac Arrest Study Network RIBEPCI. Hyperoxia, hypocapnia an hypercapnia as outcome factors after cardiac arrest in children. Resusciation. 2012; 83(12): 1456-61.
14. Roberts B, et al. Association between postresuscitation partial pressure of arterial carbon dioxide and neurological outcome in patients with post-cardiac arrest syndrome. Circulation. 2013; 127(21):2107-13.
15. Wang H, et al. Post-resuscitation arterial oxygen and carbon dioxide and outcomes after out-of-hospital cardiac arrest. Resuscitation. 2017; 120: 113-118.
16. Godoy D, et al. Glucose Control in Acute Brain Injury: does it matter?. Current Opinion in Critical Care. 2016; 22(2): 120-127.
17. Beiser DG, et al. Derangements in blood glucose following initial resuscitation from in-hospital cardiac arrest: A report from the national registry of cardiopulmonary resuscitation. Resuscitation. 2009; 80: 624-630.
18. Peng TJ, et al. The administration of dextrose during in-hospital cardiac arrest is associated with increased mortality and neurologic morbidity. Critical Care. 2015; 19 (160): 1-11.
19. Losert, Heidrun, et al. "Strict normoglycaemic blood glucose levels in the therapeutic management of patients within 12 h after cardiac arrest might not be necessary." Resuscitation 76.2 (2008): 214-220.
20. Beiser, David G., et al. "Derangements in blood glucose following initial resuscitation from in-hospital cardiac arrest: a report from the national registry of cardiopulmonary resuscitation." Resuscitation 80.6 (2009): 624-630.
21. Checchia, Paul A., et al. "Myocardial injury in children following resuscitation after cardiac arrest." Resuscitation 57.2 (2003): 131-137.
22. Wang, Henry E., et al. "Post-resuscitation arterial oxygen and carbon dioxide and outcomes after out-of-hospital cardiac arrest." Resuscitation 120 (2017): 113-118.
23. Roberts, Brian W., et al. "Association between postresuscitation partial pressure of arterial carbon dioxide and neurological outcome in patients with post–cardiac arrest syndrome." Circulation 127.21 (2013): 2107-2113.
24. Helmerhorst, Hendrik JF, et al. "Associations of arterial carbon dioxide and arterial oxygen concentrations with hospital mortality after resuscitation from cardiac arrest." Critical Care 19.1 (2015): 348.
25. Kilgannon, J. Hope, et al. "Association between arterial hyperoxia following resuscitation from cardiac arrest and in-hospital mortality." Jama 303.21 (2010): 2165-2171.
26. López-Herce, Jesús, et al. "Post return of spontaneous circulation factors associated with mortality in pediatric in-hospital cardiac arrest: a prospective multicenter multinational observational study." Critical Care 18.6 (2014): 607.
27. Ferguson, Lee P., Andrew Durward, and Shane M. Tibby. "Relationship between arterial partial oxygen pressure after resuscitation from cardiac arrest and mortality in children." Circulation 126.3 (2012): 335-342.
28. del Castillo, Jimena, et al. "Hyperoxia, hypocapnia and hypercapnia as outcome factors after cardiac arrest in children." Resuscitation 83.12 (2012): 1456-1461.
29. Kuisma, Markku, et al. "Comparison of 30 and the 100% inspired oxygen concentrations during early post-resuscitation period: a randomised controlled pilot study." Resuscitation 69.2 (2006): 199-206.
30. Guerra-Wallace, Melissa M., et al. "Hyperoxia and hypoxia in children resuscitated from cardiac arrest." Pediatric critical care medicine: a journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies 14.3 (2013): e143.
31. Bennett, Kimberly Statler, et al. "Early oxygenation and ventilation measurements after pediatric cardiac arrest: lack of association with outcome." Critical care medicine 41.6 (2013): 1534.
32. Bellomo, Rinaldo, et al. "Arterial hyperoxia and in-hospital mortality after resuscitation from cardiac arrest." Critical care 15.2 (2011): R90.

Monitoring

1. Herman ST, et al. Consensus Statement on Continuous EEG in Critically Ill Adults and Children, Part 1: Indications.
2. Journal of Clinical Neurophysiology. 2015; 32: 87-95.
3. Maayke H, et al. A Systematic Review of Neuromonitoring Modalities in Children Beyond Neonatal Period After Cardiac Arrest. Pediatric Critical Care Medicine. 2020; 21(10): e927-933.
4. Hunfeld M, Ketharanathan N, Catsman C, Straver DCG, Dremmen MHG, Bramer W, Wildschut E, Tibboel D, Buysse C. A Systematic Review of Neuromonitoring Modalities in Children Beyond Neonatal Period After Cardiac

Arrest. Pediatr Crit Care Med. 2020 Oct;21(10):e927-e933. doi: 10.1097/PCC.0000000000002415. PMID: 32541373.

5. Smith AE, Friess SH. Neurological Prognostication in Children After Cardiac Arrest. Pediatr Neurol. 2020 Jul;108:13-22. doi: 10.1016/j.pediatrneurol.2020.03.010. Epub 2020 Mar 15. PMID: 32381279; PMCID: PMC7354677.

Nutrition

1. Joo WJ, Ide K, Kawasaki Y, Takeda C, Seki T, Usui T, Kawakami K. Effectiveness and safety of early enteral nutrition for patients who received targeted temperature management after out-of-hospital cardiac arrest. Resuscitation. 2019 Feb;135:191-196.
2. Lee HK, Lee H, No JM, Jeon YT, Hwang JW, Lim YJ, Park HP. Factors influencing outcome in patients with cardiac arrest in the ICU. Acta Anaesthesiol Scand. 2013 Jul;57(6):784-92.
3. Williams ML, Nolan JP. Is enteral feeding tolerated during therapeutic hypothermia? Resuscitation. 2014 Nov;85(11):1469-72.
4. Martin M, Reignier J, Le Thuaut A, Lacherade JC, Martin-Lefèvre L, Fiancette M, Vinatier I, Lebert C, Bachoumas K, Yehia A, Henry Lagarrigue M, Colin G, Lascarrou JB. Nutrition During Targeted Temperature Management After Cardiac Arrest: Observational Study of Neurological Outcomes and Nutrition Tolerance. JPEN J Parenter Enteral Nutr. 2020 Jan;44(1):138-145.

Imaging

1. Topjian AA, et al. Pediatric Post–Cardiac Arrest Care: A Scientific Statement From the American Heart Association. 2019. *Circulation, 140*(6): e194-e233.
2. Yang D, Ha SG, Ryoo E, Choi JY, Kim HJ. Multimodal assessment using early brain CT and blood pH improve prediction of neurologic outcomes after pediatric cardiac arrest. **Resuscitation.** 2019;137:7-13. doi:10.1016/j.resuscitation.2019.01.033
3. Starling RM, Shekdar K, Licht D, Nadkarni VM, Berg RA, Topjian AA. Early head CT findings are associated with outcomes after pediatric out-of-hospital cardiac arrest.**Pediatr Crit Care Med**. 2015; 16:542–548. doi: 10.1097/PCC.0000000000000404
4. Manchester LC, Lee V, Schmithorst V, Kochanek PM, Panigrahy A, Fink EL. Global and regional derangements of cerebral blood flow and diffusion magnetic resonance imaging after pediatric cardiac arrest.**J Pediatr**. 2016; 169:28–35.e1. doi: 10.1016/j.jpeds.2015.10.003
5. Rafaat KT, Spear RM, Kuelbs C, Parsapour K, Peterson B. Cranial computed tomographic findings in a large group of children with drowning: diagnostic, prognostic, and forensic implications. **Pediatr Crit Care Med**. 2008; 9:567–572. doi: 10.1097/PCC.0b013e31818c8955
6. Messina, S. A., Poretti, A., Tekes, A., Robertson, C., Johnston, M. V., & Huisman, T. A. (2013). Early Predictive Value of Susceptibility Weighted Imaging (SWI) in Pediatric Hypoxic-Ischemic Injury. **Journal of Neuroimaging**, *24*(5), 528-530. doi:10.1111/jon.12043
7. Fink EL, Panigrahy A, Clark RS, et al. Regional brain injury on conventional and diffusion weighted MRI is associated with outcome after pediatric cardiac arrest. **Neurocrit Care**. 2013;19(1):31-40. doi:10.1007/s12028-012-9706-0
8. Inamasu J, Nakatsukasa M, Hirose Y. Computed tomography evaluation of the brain and upper cervical spine in patients with traumatic cardiac arrest who achieved return of spontaneous circulation. **Neurol Med Chir** *(Tokyo)*. 2013;53(9):585-589. doi:10.2176/nmc.oa2012-0252

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Neurocritical Care Group – 12/2020
Pharmacy & Therapeutics Committee – 6/2021
Clinical Pathways and Measures Committee – 5/24/2021

MANUAL/DEPARTMENT	Clinical Pathways/Quality
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LAST DATE OF REVIEW OR REVISION	June 15, 2021
COLORADO SPRINGS REVIEW BY	 Michael DiStefano, MD Chief Medical Officer, Colorado Springs
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REVIEW REVISION SCHEDULE

Scheduled for full review on June 15, 2025

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注意事項：日本語を話される場合、無料の言語支援をご利用いただけます。1-720-777-9800 まで、お電話にてご連絡ください。

Ntị: Ọ bụrụ na asụ Ibo, asụsụ aka ọasụ n'efu, defu, aka. Call 1-720-777-9800.