

POST-CARDIAC ARREST CARE PATHWAY

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EQUIPMENT LIST

All equipment is available in ED, MICU & CCU.

If protocol initiated in MICU, have all equipment available and assembled at bedside before transfer to unit.

1. Arterial line kits (both radial and femoral)
2. Presep central venous catheter
3. Two one liter bags of cold 0.9% saline (stored in ED and ICU refrigerators)
4. Gaymar III external cooling system (available in ED and ICU)
 - a. One Gaymar torso and two thigh cooling pads with torso and leg pads
5. Temperature probe foley catheter with appropriate adapter for cooling device
(Gaymar requires 1/8 inch to 1/4 inch converter)
6. Neuromuscular blockade equipment (not required for ED)
 - a. Twitch monitor
 - b. BIS monitor and sensor
7. Ensure fluid warmer is available in case need arises after cooling

LOGISTICAL PEARLS REGARDING THERAPEUTIC HYPOTHERMIA

1. Ensure appropriate supervisory staff are notified:
 - Dave Gaieski MD (ED) 215-312-4560 or 302-588-7083
 - Barry Fuchs MD (MICU) 215-314-2920 or 215-460-2680
 - Cheryl Maguire RN (MICU) 215-319-7742 or 610-574-3530
2. If the patient is appropriate for MICU, then MICU will make a bed for hypothermia patient as opposed to admitting these patients to a ready-bed on another unit
3. ED personnel should continue to implement hypothermia protocol until MICU or CCU bed is available and all equipment is ready for patient
 - (If platelets < 30,000 or INR > 3, correct prior to initiating hypothermia)
4. Place arterial line before initiating cooling
5. Do not infuse cold saline until cooling blanket equipment is assembled
6. Paralyze (after sedation) patient before cooling. Initiation of paralysis may not be necessary if patient's temperature is already below 34 °C before active cooling, unless they start to rewarm or shiver. Maintain paralysis until after re-warming is complete (36°C)
 - Set the Gaymar III device to automatic (rapid cool) with target temp 34°C. (Goal is target temp within 4 hours). Change to gradual cool mode at 33°C as patient approaches 34°C
 - Rewarming is begun 24 hours after initiating hypothermia. Increase Gaymar temperature setting to 0.25°C Q 1 hour until temperature 36°C. Maintain sedation and paralysis until temperature reaches 36 °C to avoid shivering and rapid rewarming.
 - Use order set and protocol to guide therapy
 - Call appropriate supervisory staff for guidance!
7. Notify epilepsy fellow ASAP, page 404-6771, to arrange for continuous EEG monitoring within 6 hrs and no later than 12 hrs (EEG techs not available between midnight and 7:30 am).
8. Once cooled, maintain cooling for duration of treatment, even if patient becomes hemodynamically unstable

PURPOSE: To provide a guideline to optimize the care of comatose cardiac arrest survivors.

BACKGROUND

A. Therapeutic Hypothermia

Brain temperature during the first 24 hours after resuscitation from cardiac arrest has a significant effect on survival and neurological recovery.

Fever (Tmax) during the first 48 hours is associated with a decreased chance of good neurological recovery (OR 2.26 [1.24, 4.12] for each 1°C over 37°C)¹. Cooling to 32-34°C for 24 hours decreases chance of death (OR 0.74 [0.58, 0.95]) and increases chance of good neurological recovery (OR 1.40 [1.08,1.81])².

Cooling to 32-34°C for 12 hours increases chance of good neurological recovery (OR 2.65 [1.02, 6.88])³.

B. Early Coronary Revascularization

Out-of-hospital cardiac arrest patients have a high incidence of acute coronary syndrome and early coronary revascularization has been demonstrated to improve survival. (OR 5.2 [1.1, 24.5])⁴.

C. Early Goal-Directed Therapy

Post-resuscitation syndrome has many pathophysiological features in common with acute sepsis⁵. Early goal directed therapy has been demonstrated to decrease mortality of patients suffering from acute sepsis (OR for in-hospital mortality (OR 0.58 [0.38-0.87])⁶. A similar approach is likely to have the same beneficial effects in post-resuscitation syndrome.

D. Glycemic Control

Tight glycemic control (maintaining serum glucose 80 to 110 mg/dl) has been demonstrated to improve survival in critically ill patients in the ICU setting^{7,8}. This approach is likely to have the same beneficial effects in patients suffering from post-resuscitation syndrome.

E. Management of Adrenal Insufficiency

Acute adrenal insufficiency is a well-documented component of post-resuscitation syndrome. In patients with acute sepsis, treatment of acute adrenal insufficiency significantly reduces mortality (OR 0.67 [0.47-0.95])⁹. Diagnosis and treatment of acute adrenal insufficiency will improve hemodynamic stability and potentially improve survival of patients after cardiac arrest.

F. Prognosis

The neurologic prognosis of the majority of comatose cardiac arrest survivors cannot be reliably predicted until at least 72 hours after resuscitation¹⁰. Furthermore, the reliability of these parameters has not been evaluated in the face of effective interventions such as therapeutic hypothermia. Therefore DNR status should not be established and care should not be withdrawn **based on neurologic prognosis** before 72 hours after return of spontaneous circulation (ROSC).

EFFECTS OF THERAPEUTIC HYPOTHERMIA¹¹

- Hypothermia activates the sympathetic nervous system causing vasoconstriction and shivering. Shivering increases O₂ consumption by 40-100%. Sedatives, opiates, and neuromuscular blockers can counteract these responses and enhance the effectiveness of active cooling. However, initiating paralysis in a patient that is already hypothermic should be avoided because it can result in a precipitous drop in core body temperature. Elderly patients will cool more quickly than younger or obese patients.
- Hypothermia shifts the oxyhemoglobin curve to the left may result in decreased O₂ delivery. However, the metabolic rate is also lowered, decreasing O₂ consumption/CO₂ production, cardiac output and cerebral blood flow. Ventilator settings may need to be adjusted due to decreased CO₂ production, using temperature corrected blood gases.
- Hypothermia initially causes sinus tachycardia, then bradycardia. With temp <30° C there is an increased risk for arrhythmias. With temp <28° C there is an increased risk for ventricular fibrillation. The severely hypothermic myocardium (<30°C) is less responsive to defibrillation and medications. Therefore it is extremely important to keep temp >30°C.
- Hypothermia can induce coagulopathy which is treatable with platelets and FFP.
- Hypothermia-induced diuresis is to be expected and should be treated aggressively with fluid and electrolyte repletion. Magnesium, phosphorus and potassium should be monitored closely and maintained in the normal (because it will rebound to very high) range.
- Decreased insulin secretion and sensitivity leads to hyperglycemia, which should be treated aggressively.
- Re-warming too rapidly can cause vasodilation, hypotension, and rapid electrolyte shifts.

Temperature Conversion Table

Celsius	Fahrenheit
38.0	100.4
37.0	98.6
36.0	96.8
35.0	95.0
34.0	93.2
33.0	91.4
32.0	89.6
31.0	87.8
30.0	86.0

POTENTIAL LABORATORY ABNORMALITIES ASSOCIATED WITH HYPOTHERMIA:

Potential Lab Abnormality	Treatment
Increased amylase	No intervention unless persistent after rewarming
Increased LFTs	No intervention unless persistent after rewarming
Increased serum glucose	Follow Insulin protocol
Decreased K ⁺ , Mg, Phos, Ca	Correct as needed
Increased lactate	Optimize oxygen delivery
Metabolic acidosis	Optimize oxygen delivery
Thrombocytopenia	Correct if < 30,000 or to > 50,000 if active bleeding
Leukopenia	No intervention unless persistent after rewarming
Increased PT/PTT	Correct if > 2.0 or active bleeding

ELIGIBILITY CRITERIA FOR POST-CARDIAC ARREST CARE PATHWAY

Post-cardiac arrest, defined as absence of pulses requiring chest compressions, regardless of location or presenting rhythm

Return of spontaneous circulation (ROSC) to a SBP>90 mmHg (with or without vasoactive meds) for at least 30 minutes

Not DNR or DNI status

Pre-arrest cognitive status not severely impaired (i.e. performed ADL independently)

ELIGIBILITY CRITERIA FOR POST-CARDIAC ARREST THERAPEUTIC HYPOTHERMIA

Meets eligibility criteria for Post-Cardiac Arrest Care Pathway

Comatose at enrollment with a Glasgow Coma Motor Score <6 pre-sedation (i.e., doesn't follow commands)

No other obvious reasons for coma

No uncontrolled bleeding

Hemodynamically stable with no evidence of:

- Uncontrollable dysrhythmias
- Severe cardiogenic shock
- Refractory hypotension (MAP <60 mm Hg) despite preload optimization and use of vasoactive meds

No existing, multi-organ dysfunction syndrome, severe sepsis, or comorbidities with minimal chance of meaningful survival independent of neurological status

RELATIVE CONTRAINDICATIONS FOR THERAPEUTIC HYPOTHERMIA:

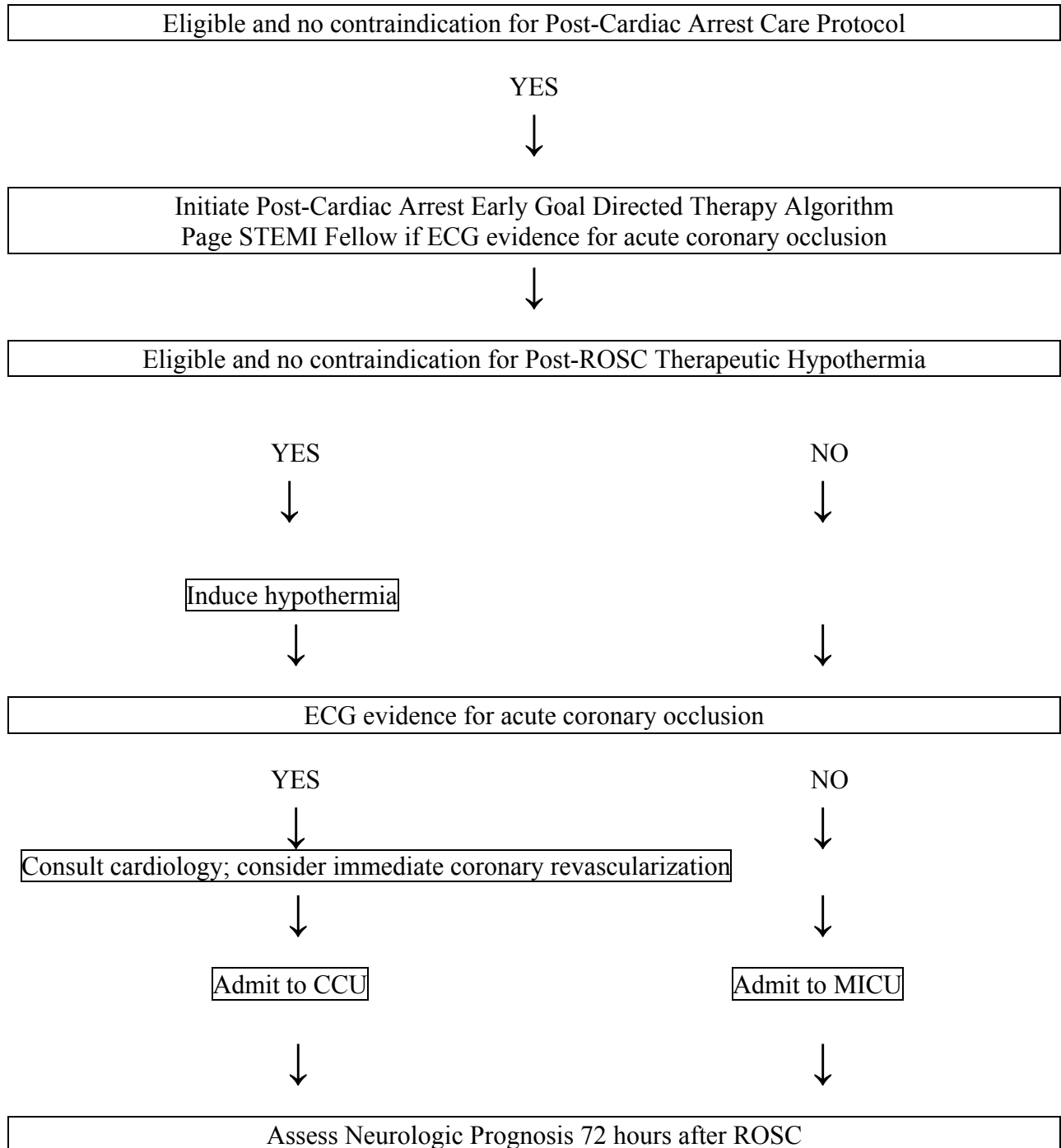
Prolonged arrest time (> 60 minutes)

Thrombocytopenia or other coagulopathy

Pregnancy (Can potentially be performed on pregnant female in consultation with OB/Gyn)

- Consult OB service if pregnant

Post-Cardiac Arrest Care Flow Chart



POST-CARDIAC ARREST CARE PATHWAY

NOTE: *Data Gathering (Section A), Monitoring (Section B), and Interventions (Section C) are all initiated immediately and carried out simultaneously when feasible.*

A. Initial Data Gathering (after ABC's are stabilized)

1. History:

- a. Review eligibility, contraindications, advance directives and overall prognosis
- b. Discuss issues with health care proxy, if available

2. Physical: Baseline Neurological Evaluation

- a. Exclude other causes of coma (mass lesions, metabolic coma, seizures etc)
- b. Document Glasgow Motor Score

3. Initial laboratories:

- a. ABG
- b. CBC/ platelets / PT / PTT
- c. P7, plus Ca / Mg / Phos
- d. Lactate, CPK-MB, Troponin
- e. Cortisol level
- f. Pan-culture
- g. Toxicology screen if appropriate

4. Serial laboratories:

- a. $S_{cv}O_2$ q 6 if PreSEP catheter not used
- b. Glucose, K⁺, and lactate q 6 hrs x 2 days
- c. Repeat CPK-MB, Troponin at 6 hrs
- d. CBC/ platelets / PT / PTT, P7 / BUN / Cr, Ca / Mg / Phos q 12 hr x 4

5. CXR

6. **Head CT:** To rule out intracranial hemorrhage

7. **Consult:** Cardiology in all cases. **Note:** If cardiac cath is indicated, hypothermia should not be delayed.

8. **Echocardiogram:** To r/o regional wall motion abnormality and severe contractile dysfunction.

B. Establish Appropriate Monitoring Immediately:

1. Cardiovascular:

- a. ECG after initial stabilization and repeat q 8 hours x 2 and prn to r/o acute coronary syndrome
- b. Arterial-line for continuous arterial blood pressure monitoring (essential prior to initiating hypothermia). Attempt radial artery x 1 and then proceed to femoral artery if necessary.
- c. Temperature monitoring Foley for continuous urine output and temperature monitoring. If no urine output, use an alternative site for temperature measurement – (esophageal)
- d. Presep catheter or other CVC (MAC) for CVP & $S_{cv}O_2$ (subclavian site preferred) though don't delay hypothermia to perform this.

2. **Pulmonary:** Continuous SaO₂ probe, frequent ABG's (use temperature correction)
3. **Temperature:** Foley with temperature probe (use alternative site if no urine output)
4. **Neurologic:**
 - a. Continuous EEG monitoring beginning within 6-12 hrs while paralyzed.
 - b. Once in ICU, use BIS monitor to titrate sedation (40-60)
 - c. Neuro checks q 2 hour (while paralyzed follow pupils and titrate paralysis per NMB Nursing Policy)

5. Additional monitoring and follow-up studies

- a. If net fluid balance is > 5 liters in 24 hrs, monitor intrabdominal pressure (IAP) via Foley catheter after cooling device has been discontinued (call medical resident if IAP is ≥ 20 mmHg).
- b. Consider repeat echocardiogram 24-48 hours after ROSC
- c. Repeat CXR in AM and after 72 hours to rule out aspiration PNA

C. Initiate Appropriate Interventions

NOTE: Interventions should be carried out simultaneously when appropriate and feasible

1. **Post-Cardiac Arrest Early Goal-Directed Therapy**
2. **Therapeutic hypothermia (if indicated)**
3. **Treat acute coronary syndrome**
4. **Treat hyperglycemia**
5. **Antibiotic prophylaxis**
6. **Fever prophylaxis**
7. **Other ICU protocols**

1. Post-Cardiac Arrest Early Goal-Directed Therapy (See appendix or laminated algorithm)

- a. Use NSS for first two liters (use 4°C saline if initiating hypothermia) of IVF then change to LR unless hyperkalemia or hepatic insufficiency. Change IVF back to NS immediately prior to rewarming (to avoid rebound hyperkalemia).
- b. IVF Resuscitation and CVP goals: Titrate IVF to ensure volume repletion using CVP as a guide. A minimum of 8 mm Hg is a reasonable target goal to exceed in most patients. Continue fluid boluses to reach MAP target, unless CHF, CVP>15, or >5 liters; then consider RHC. If MAP target is reached, but shock is present (↓ScvO₂, particularly if oliguric or acidotic (lactate), bolus IVF to CVP of 15-20, providing no CHF. If CHF, CVP>15, high dose vasopressors, or >5 liters, consider RHC. If no hypotension or shock, no need to give fluid regardless of the CVP (i.e. even if < 8).
- c. Vasoactive Drug Use in the Volume Repleted Patient:
 1. HTN: If MAP > 100 mm Hg, titrate IV nitroglycerine to MAP < 100. If acute coronary syndrome, maintain MAP at low end of range. (See algorithm for additional detail). If tachycardic or acute ischemia/MI without significant LV dysfunction (based on Echo, absence of CHF, or venous desaturation) consider Esmalol drip.

2. Hypotension: Goal MAP is 80-100. Use upper range, if no evidence of ACS, CHF, or shock. If ACS, CHF, or shock, use lower range and may require goal as low as 65, depending on degree of myocardial ischemia/dysfunction.

a. If EF is normal, use NE to MAP>80.

b. If EF is reduced:

- MAP Titration: Use dobutamine (2.5-20 mcg/kg/min) to reach MAP goal. If MAP falls, add Dopa or Epinephrine, or IABP if severe.
- ScvO₂ Titration: Regardless of MAP, if S_{cv}O₂ is low (< 65%), particularly if other signs of shock are present, consider PRBC to HgB >10 and ↑Dobutamine. **NOTE**: When rewarming, anticipate vasodilation and volume depletion (↓CVP and ↓ScvO₂+/- ↓MAP), and treat with IVF boluses based on same algorithm.

c. Institute appropriate critical care protocols for sepsis, GI /DVT/ VAP prophylaxis, low stretch protocol, etc.

2. Initiate therapeutic hypothermia if indicated

a. *Goal* Achieve target temp of 32° to 34 °C within 4 hrs and maintain for 24 hours from time cooling initiated.

b. *Induction*: Sedative and paralytic medications are begun prior to inducing hypothermia and are continued for 24 hours until patient is rewarmed to 36°. However, if patient arrives cold and is not shivering, don't give paralytic unless patients starts to rewarm; maintain target temp with cooling blanket only.

1. Use an HME for vent humidification
2. Initiate sedation and analgesia with fentanyl (50 to 100 mcg IV bolus followed by 50 mcg/hour infusion) and propofol (5-10 mcg/kg/min infusion). Titrate using BIS monitor (ICU) to 40-60. (lorazepam can be used as alternative to propofol)
3. Initiate paralysis with Cisatracurium (0.15-0.2 mg/kg IV bolus followed by 1-3 mcg/kg/min IV drip). Paralysis guided by vital signs, pupillary exam, TOF monitor to ¼ and patient movement as per RN policy.
4. Infuse 1 to 2 liters (or 30 ml/kg) of 4° C saline over 30 minutes (stored in ED and ICU refrigerator); A peripheral catheter is preferred but not mandatory.
5. Initiate active external cooling.
6. If patients temp is ≤ 34° on presentation, maintain temp at 32-34° with cooling blanket. Hold paralysis unless temp rises to > 34° despite cooling measures.

Gaymar III Cooling Unit
Keep device plugged in at all times
Apply circumferential torso pad and connect to first cooling hose Apply circumferential thigh cooling pads to both thighs, pads connect in series and then connect free ends to second cooling hose
Connect temperature monitoring foley to temperature monitoring port on cooling device. If urine output less than 4 cc/hr switch to esophageal probe
Initially set to rapid cooling automatic mode with target time of 34° C. Once patient reaches 34° C, set to gradual cooling automatic mode at 33° C.

7. If target temperature not achieved within 4 hours:
 - a. Contact house officer
 - b. Add ice packs to groin and axilla (wrapped in sheet or pillow case)
 - c. Consider additional 500 cc boluses of 4° C IVF
8. If target overshoot:
 - a. Contact house officer
 - b. Cooling device will actively warm patient in automatic mode
 - c. If temp < 31 C, consider infusing 250 ml boluses of warm 40° C IV NSS or LR until temperature > 32° C

c. Maintenance (Once core temp of 33 °C is achieved)

1. Maintain cooling device at gradual automatic setting with set point 33° C.

Gaymar III Cooling Unit
Set to gradual cooling automatic mode with target temperature of 33° C.

2. Continue sedation, analgesia, and paralysis for 24 hours, even if patient becomes hemodynamically unstable

d. Rewarming (24 hrs after initiating cooling):

1. Important Considerations
 - a. Anticipate reduction in venous return (cardiac output) and BP (with ↓CVP) as cooler blood shifts from core to extremities. K+ shifts to extracellular compartment.
 - b. Vitals signs q 1 hour until temp reaches 36° C.
2. Prior to rewarming

- a. Volume load aggressively with NS to compensate for reductions in BP/ScvO₂ (&CVP).
 - b. D/C all K⁺ containing fluids but always correct hypokalemia, and other electrolytes, to the normal range.
 - c. Follow K⁺ closely q 4 hours and prn
 - d. Follow ABG q 1-2 hours and prn (temperature corrected- must order in SCM or inform the laboratory)
3. Rewarm gradually (**no faster than 0.25 ° C/hour** or 1° C per 4 hours)
- a. Maintain paralysis until patient reaches 36° C
 - b. Program cooling unit to rewarm patient.

Gaymar III Cooling Unit
In the gradual automatic mode, increase the patient target temperature setting by 0.5° C every 2 hours until patient temperature reaches 36° C, then discontinue cooling system

4. When TOF is 4/4 discontinue BIS monitor and titrate Propofol and Fentanyl to comfort/vent synchrony.
5. Meperidine 12.5-25 mg q4-6 hrs IVP (but not to exceed 100 mg) can be used to treat shivering once NMBs have been stopped (if renal failure or oliguria isn't present and patient not taking an MAO inhibitor, Buspirone, or SSRI.)

4. Treat acute coronary syndrome

- a. Treat everyone with single dose ASA per rectum (325 mg suppository) or OG, unless contraindicated (allergy or active bleeding).
- b. If ST segment MI or new LBBB, and no prolonged arrest time, cardiology may perform early cath. NOTE: Patients may receive cardiac interventions as needed while hypothermic.

5. Treat hyperglycemia Use Glucose Management Protocol

6. Antibiotic prophylaxis

- a. Administer Unasyn 1.5 grams IV q 6 (for PCN allergic use Clindamycin 300 mg IV q 8 hours) within one hour to prevent aspiration PNA^{11,12}. Treat for three days and then reassess need based on CXR and/or presence of sepsis.
- b. For inpatient arrest, use nosocomial pneumonia treatment per hospital guidelines.

7. Fever prophylaxis Acetaminophen 1 gram per rectum or per NGT, then 500 mg q 6 hours

8. ICU protocols

- a. If bilateral pulmonary infiltrates, use low stretch protocol based on PBW (obtain pt height)¹³.
- b. Pneumonia prevention with mouth care protocol and HOB > 30° at all times (unless hypotensive).
- c. GI and DVT prophylaxis with ranitidine and SQ Heparin.
- d. NPO

D. Assessment of Neurological Prognosis (Determined 72 hours after ROSC)

1. Determination of neurological prognosis is unreliable before 72 hours after ROSC.
2. Recommended criteria for initiating DNR status and/or withdrawal of care¹⁰:

Brain Region	Test 72 hours POST-ROSC	Specificity for poor outcome	95% CI
Cortical and brainstem	HUP Brain Death Protocol	100%	
Brain stem	Absence of pupillary light reflex	100%	88 to 100%
Cortical	Absence of motor response to pain	100%	93 to 100%
Cortical	Bilateral absence of early cortical SSEPs	100%	98 to 100%

E. References:

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Post-Cardiac Arrest Care / Induced Hypothermia Pathway Order set

Admission

- ❑ MICU admission order set
- ❑ Post Cardiac Arrest Early Goal Directed Therapy
- ❑ Therapeutic Hypothermia

Code Status:

- ❑ Full Code

Post Cardiac Arrest Early Goal Directed Therapy

IV Fluids

- ❑ Patient with MAP < 80 mmHg: 0.9% NaCl IV x 2 liters – titrate to CVP > 8 mmHg, MAP > 80 mmHg
 - Switch to Lactated Ringers after 2 liters 0.9% NaCl infused - titrate to CVP > 8 mmHg, MAP > 80 mmHg
- ❑ Patient with ScVO₂ < .65 and shock, with no CHF: continue IV fluids until CVP 15-20 mmHg to achieve goals
- ❑ Patient with hyperkalemia or hepatic insufficiency, with MAP < 80 mmHg:: use 0.9% NaCl only - titrate to CVP > 8 mmHg, MAP > 80 mmHg

Vasoactive Agents

- ❑ Hypotension, normal EF
 - Norepinephrine infusion: Begin at 2-4 mcg/min, titrate to maintain MAP > 80 mmHg. (call HO if >64 mcg/min required)
- ❑ Hypotension, decreased EF
 - Begin dobutamine infusion at 2.5 mcg/kg/min to maintain SvO₂ >65%.. (max infusion rate 20 mcg/kg/min).
 - If MAP < 70 begin Dopamine at 2.5 mcg/kg/min and titrate up to maintain MAP > 70-80
- ❑ ScVO₂ < .65 with evidence of shock and CVP at least 8 mm Hg:
 - Transfuse 2 units PRBCs to keep Hgb > 10
 - Begin dobutamine infusion at 2.5 mcg/kg/min to maintain SvO₂ >65% (max infusion rate 20 mcg/kg/min).
- ❑ Hypertension
 - ❑ MAP > 100 mmHg: Begin Nitroglycerine infusion at 10 mcg/min (max 200 mcg/min) for MAP >100 mmHg. (titrate to MAP 80-100 mmHg).
 - ❑ Tachycardia or acute ischemia/MI without LV dysfunction: Titrate Esmolol infusion to MAP 80-100

Therapeutic Hypothermia

Sedation

- ❑ Fentanyl mcg IV admin use MICU protocol
- ❑ Propofol mcg/kg/min IV infusion titrate to deep sedation (RASS-4)
- ❑ Lorazepam mg IV admin use MICU protocol (If Propofol contraindicated)
- ❑ Cisatracurium mcg IV administration use ICU policy **initiate NMB before initiating cooling.

Nursing

- ❑ Cooling
 - Infuse 2 liters NaCl (0.9%) at 4° C over 30 minutes (if no evidence of CHF)
 - Insert foley with temperature probe
 - Cool to temperature of 32-34° C over 4 hours using Automatic Mode of Gaymar III cooling device (or Arctic Sun)

- ❑ Rewarming
 - Ensure adequate volume repletion per GDT algorithm
 - Hold all K+ containing fluids immediately before and during rewarming but maintain [K+] and all other [electrolyte] in normal range
 - Change IV fluids to 0.9% NaCl, titrate to CVP >8 mmHg, maintaining a MAP > 80 mmHg, and no evidence of shock (by exam, urine output, lactate, and ScVO2).
 - Begin rewarming 20 hrs after target temperature reached (total 24 hrs cooling)
 - Re-warm on automatic at rate of 0.25° C/hr. Discontinue active re-warming when patient reaches 36° C.
 - Stop NMB infusion after temperature reaches 36° C.
 - D/C BIS monitoring when TOF 4/4. Meperidine 12.5-25 mg q4-6 hrs IVP (but not to exceed 100 mg) can be used to treat shivering once NMBs have been stopped (if renal failure or oliguria isn't present and patient not taking an MAO inhibitor or Buspirone).

Initial Laboratories

- ❑ Beta HCG on all women of childbearing age
- ❑ ABG
- ❑ CBC/ platelets / PT / PTT
- ❑ Electrolyte "panel 7", plus Ca / Mg / Phos
- ❑ Lactate, CPK-MB, Troponin
- ❑ Cortisol level
- ❑ Pan-culture
- ❑ Toxicology screen if appropriate
- ❑ ScVO2

Serial laboratories:

- ❑ ABG q 8 hrs and prn (use temperature correction-order in SCM or call lab)
- ❑ ScVO₂ q 6 if PreSEP catheter not used.
- ❑ Glucose, K⁺, and lactate q 6 hrs x 2 days
- ❑ Repeat CPK-MB, Troponin at 6 hrs
- ❑ CBC/ platelets / PT / PTT, Lytes / BUN / Cr, Ca / Mag / Phos q 12 hr x 4

Monitoring:

- ❑ Continuous cardiac monitoring
- ❑ Continuous pulse oximetry
- ❑ Continuous EEG monitoring-page EEG fellow at 404-6771 before MN if at all possible
- ❑ Temperature q30 minutes
- ❑ Intraabdominal pressure q 8 hrs if net fluid balance is > 5 liters in 24 hrs, (call HO if IAP is ≥ 20 mmHg).
- ❑ Use BIS monitor to titrate sedation while patient is paralyzed only (goal BIS 40-60).
 - Nutrition - NPO

Electrolytes

- ❑ KCl 40 mEq IV for K⁺ < 3.4
- ❑ MagSO₄ 2 gms IV for Mag < 1.8
- ❑ CaCl 1 gm IV for ionized Ca⁺⁺ < 0.9

Blood Products

- ❑ Platelet count < 30K or < 50K with active bleeding: Platelets 6 units
- ❑ INR > 2.0: FFP 4 units
- ❑ Hgb < 10 if ACS or until ACS is ruled out, or any evidence of shock despite CVP>8 mm Hg: 2 units PRBC

Insulin Therapy

- ❑ Initiate MICU Insulin Infusion Protocol for Glucose > 150.

Respiratory

- ❑ Ventilator Modes – Low stretch protocol:
Use patient height to calculate TV and gradually reduce TV to 6 ml/Kg/PBW.

Radiology

- ❑ CXR now
- ❑ Repeat CXR in AM and after 72 hours
- ❑ Head CT to rule out intracranial hemorrhage

Cardiology

- ECG STAT
- ECG q 8 hours x 2
- Stat echocardiogram (if not already performed in ED)
- Repeat echocardiogram 24-48 hours
- ASA _325___mg Per rectum STAT

Neurology

- Continuous EEG within 6-12 hrs, once continuously paralyzed
- Once in MICU, use BIS monitor to titrate sedation to 40-60 range.
- Neuro checks q 2 hour

DVT Prophylaxis

- Heparin 5000 units SubQ q12hrs
- Intermittent Compression Stockings

GI Prophylaxis

- ranitidine ____mg per NG/IV q____hrs

Antibiotics

- Unasyn 1.5 gms IV STAT and q 6 hrs
- Clindamycin 300 mg IV STAT and q 8 hrs (if PCN allergy)

Consults

- Cardiology consult (all post-arrest cases)
- Neurology
- Nutrition Support Services on day 3.
- Maternal-Fetal Medicine if + HCG (prior to hypothermia)