## THERAPEUTIC HYPOTHERMIA

### PHYSICIAN’S ORDERS

**Patient Label**

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### ALLERGIES:

### DIAGNOSIS:

**Therapeutic Hypothermia After Cardiac Arrest Protocol**

Check Eligibility for Therapeutic Hypothermia Protocol (ALL boxes must be checked):

- [ ] Cardiac Arrest (any initial rhythm, any patient location)
- [ ] Return of Spontaneous Circulation within 60 minutes (ROSC)
  - [ ] Less than 6 hours since ROSC
- [ ] Comatose with a GCS less than or equal to 6 pre-sedation
- [ ] Age greater than or equal to 18 years old
- [ ] Confirm that none of the exclusion criteria apply:
  - Refractory shock
  - SBP less than 90 mmHg despite fluids & pressers
  - Refractory ventricular arrhythmias
  - Coma clearly unrelated to arrest:
    - Overdose, intoxication, stroke, hypoglycemia, infection, seizure, head trauma, or new / presumed new asymmetry in neurological clinical exam
  - Significant, severe pre-existing neurological impairment
  - Active severe bleeding or thrombocytopenia
  - DNR status or end-stage terminal illness

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TREATMENT STUDIES, DIET, VITAL SIGNS, AMBULATORY PRIVILEGES, MEDICATIONS AND IV’S

ALLERGIES:

DIAGNOSIS:

Therapeutic Hypothermia After Cardiac Arrest Protocol

PRE-COOLING ORDERS

1. Baseline Nursing Assessment (Document prior to cooling):
   - Oral temperature
   - Neurological exam, documented on flow sheet, including:
     ○ Glasgow Coma Scale Score
     ○ Limb movement
     ○ Pupil diameter and response to light
     ○ Notify physician if patient no longer fits inclusion criteria on previous page

2. Draw labs, if not already done
   - Serum Beta HCG on all women of childbearing age
   - ABG
   - Ionized CA
   - CBC with platelets
   - PT
   - PTT
   - Electrolytes
   - BUN
   - Creatinine
   - Magnesium
   - Phosphorus
   - Lactate
   - CPK
   - Troponin
   - Cortisol Level
   - Blood Cultures
   - Sputum culture/gram stain
   - UA
   - Urine culture
   - Urine drug screen

3. CT Head stat □ Yes □ No

4. Insert A-line & CVP (should not hold up cooling patient)

5. Admit to CVU or MICU (protocol should be started in ER, if at all] possible. Do not delay therapeutic hypothermia. The sooner, the better).
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HYPOTHERMIA INDUCTION PHASE ORDERS:

6. Decrease patient temperature to 33°C. Goal: Achieve pt temp of 33°C within 1-4 hours of resuscitation. "Use the cooling methods indicated below:

- **Chilled 0.9% Normal Saline IV Bolus**
  - Infuse two liters of 0.9% Normal Saline IV at ~ 4°C over 30 minutes
    - Chilled NS is available in ER refrigerator & CVU medication refrigerator
    - OR chill two 0.9% Normal saline 1 Liter bags for 15 minutes in an ice water basin
  - Stop infusion and notify service for SaO2 less than 90
  - NOTE: In 70 kg pt, 1 liter of - 4°C chilled saline induces about 1-1.2°C of cooling. Actual results will vary directly with rate of infusion.
  - Document volume infusion

- **Cooling vest and Leg Wraps**
  - Get Gaymar III cooling machine (stored in CVU)
  - Insert a Foley catheter with temperature probe
  - Apply cooling vest directly to patient's chest
  - Small/Medium or Large sizes
  - Apply cooling leg wraps to patient's legs (one size fits all)
  - Connect temperature monitoring foley to temperature monitoring port on cooling device. If urine output less than 4 ml/hr, switch to an esophageal probe.
  - Set in "AUTO" mode with "Rapid" control option
  - Adjust SET POINT to 33 °C
  - See instruction card on cooling machine for further details.
  - Machine will automatically switch to "Gradual" mode as you get close to your target temperature

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HYPOTHERMIA INDUCTION PHASE ORDERS (Cont.):

7. Document VS every 30 minutes until Temperature equal to 33°C then hourly.

8. Medications:
   Pick one Acetaminophen order:
   - Acetaminophen 650 mg per OGT/NGT every 4 hours x 48 hours
   - Acetaminophen 650 mg per rectally every 4 hours x 48 hours
   - Buspirone (Buspar) 30 mg per OGT/NGT Q8 hours x 48 hours
   - Magnesium 4gm/100ml sterile water IV x 1 at 25 ml/hr followed immediately by magnesium 2gm/50ml sterile water IV x 1 at 25 ml/hr (total dose magnesium 6 gm)

   - at time = 6 hours, draw magnesium level per page 5, #17 labs. If magnesium is less than 3 mg/dl, give magnesium 4 gm/100ml IV x 1 at 25 ml/hr.

   If shivering develops, begin the following medications:
   - Meperidine (Demerol) 25 mg IV Q2 hours prn shivering (if normal renal function)
   - Meperidine (Demerol) 12.5 mg IV Q2 hours prn shivering (if CrCl less than 30 ml/min)
   - If shivering occurs 30 minutes following the first dose of meperidine (Demerol), then start neuromuscular blockade. (See Neuromuscular blockade order sheet)

9. Sedation
   Sedatives should be given during induction and continued until patient is rewarmed.
   *use order sheet attached*

10. Neuro checks every 2 hours
    - Notify service for: De-corticate or de-cerebrate posturing, change in symmetry of pupil exam, seizures

11. □ Neurologist on call to determine the need for continuous EEG. If continuous EEG is needed after 5 pm on weekdays or 4:30 pm on weekends, call the SMS service to have an EEG tech called in. Service should not be called in after 4 am.
    □ Routine EEG to be done when tech available (7:30-5:00 weekdays, 8:00-4:30 weekends).
    SMS service contact numbers: call 1-888-481-9185 until 5:30 pm. After 5:30 pm call 1-410-832-7054.

12. Consult Cardiology, if not already done. Reason; Cardiac Arrest

13. Consult Neurology, if not already done. Reason: Cardiac Arrest

14. Frequent skin checks while hypothermic pads in place

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15. Maintain patient temperature at 33°C for 24 hours using Gaymar MTA 7900 machine & wraps
   - Document start date and time of when pt temperature first reaches 33°C
   - Continue to use continuous foley/esophageal temperature measurement feedback

16. Document Vital signs every 1 hour once temperature reaches 33 °C
   - If patient is bradycardic/hypotensive, call physician and consider Dopamine drip (Pts may become bradycardic during cooling phase)

17. Labs:
   - Order the following tests when target temperature is reached:
     - Glucose
     - Potassium
   - Draw the following labs at 6 hours, 12 hours, 18 hours, and 24 hours from when target temperature reached
     - CBC with platelets
     - PTT
     - Electrolytes
     - BUN
     - Creatinine
     - Glucose
     - Ionized Calcium
     - Magnesium
     - Phosphorus
     - CPK
     - Troponin
     - Blood cultures at 12 hour lab draw (same time from above)
   - Notify service for K+ less than 3.4 or K+ greater than 5.2

18. Notify physician and consider re-warming if there is:
   - Development of significant arrhythmias
   - Coagulopathy or active bleeding
   - Cardiovascular Instability

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RE-WARMING PHASE ORDERS:

19. Maintain patient temperature at 33°C for 24 hours using Gaymar MTA 7900 machine & wraps and then begin to re-warm.

20. Set machine to Auto "Gradual" and reset temperature to 37.0°C. (this will increase patient target temperature by 1°C every 6 hrs and re-warm slowly)

21. Labs:
   - Discontinue all K+ replacements, including in maintenance fluids, at least 1 hour prior to re-warming.
   - Notify service for K. less than 3.4 or K greater than 5.2 prior to re-warming.
   - Blood glucose every 2 hours while re-warming if receiving insulin therapy.

22. Document vital signs every 30 minutes during the re-warming phase.

23. Maintain normothermia for at least 24 hours after temp reaches 37.0°C, use anti-pyretics and cooling blanket to actively maintain temperature less than or equal to 37.0°C.

24. Stop neuromuscular blockade infusion, if being utilized, when core temperature reaches 36°C.

25. 0.9% Normal Saline 500 ml boluses, if SBP less than 90 mmHg, or MAP less than 65 mmHg during re-warming.

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ALLERGIES:

WEIGHT:  
HEIGHT:  

Adult Critical Care Sedation and Analgesia Order Sheet- Hypothermia Protocol

1. Physician MUST review and discontinue ALL previously ordered sedation and analgesia orders. Discontinue the following medications:

2. Please choose fentanyl and either midazolam or Propofol below

3. Monitor pain/sedation until patient reaches desired level then monitor every 4 hours

4. Sedation Level based on Motor Activity Assessment Score EQ

   - [ ] Deep Sedation: MAAS 1-2 (not useful if paralyzed)

5. Analgesia

   Fentanyl*
   - Fentanyl continuous IV infusion (4 mcg/ml): Start at 50mcg/hr, may increase infusion by 25mcg/hr titrating every 1 hour to a designated MAAS sedation score. Maximum dose 150mcg/hr, if dose greater than maximum call physician.
   - Fentanyl________ mcg IV every________ hour as needed for designated MAAS sedation score. Administer as bolus prior to initiation of infusion and as needed.

   Midazolam* (Versed®) used for short-term sedation (less than 72 hours)
   - Midazolam continuous IV infusion (1 mg/ml) at 2mg/hr, increase infusion by 2mg/hr titrating every 1 hour to a goal of at least 4mg/hr or MAAS 1-2. Maximum dose 10mg/hr, if dose greater than maximum call physician.
   - Midazolam ________ mg every________ hours as needed for designated MAAS sedation score. Administer as bolus prior to initiation of infusion and as needed.

   OR

   Propofol (Diprivan®) used for short-term sedation (less than 72 hours)
   - BP at baseline & before each dosage increase during titration, then every 10 minutes during the first hour of maintenance infusion, then every 1 hour

   2. Add to today's labs: Triglycerides Lipase
   (Note: reorder in 72 hours if therapy is continued.)
   - Triglycerides Lipase

   3. Propofol 10 mg/mL, 100 mL infusion: Initiate propofol at 5 mcg/kg/min = ________ ml/hr
   (55 to 80 kg = 2 ml/hr, 85 to 110 kg = 3 ml/hr)
   - Increase propofol every 5 minutes by 5 mcg/kg/min until goal of at least 25 mcg/kg/min or MAAS 1-2
   *(max dose 80 mcg/kg/min due to risk of infusion syndrome)*

   4. Change propofol via] and tubing every 12 hours.

   5. Call MD for SBP less than ________ mmHg.

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