

## Therapeutic Hypothermia Protocol

**Inclusion Criteria/Patient Selection:**

- Witnessed cardiac arrest due to VT/VF/PEA or Asystole.
- Est. interval from collapse to first attempt at resuscitation (downtime) less than 15 minutes. Not sure where this comes from.
- SB/P > 90 with return of spontaneous circulation (ROSC) with or without vasopressors, not by IABP. ROSC within 60 minutes of collapse.
- Posturing/fixed pupils are not contraindications for receiving hypothermia. (No level of coma short of brain death precludes cooling)
- 18 years or older. Why?

**Exclusion Criteria:** According to others, some of these are not EXCLUSION criteria, but only CAUTIONS, as noted below. Nobody will qualify if the exclusions are too tight.

- Another reason to be comatose (e.g. drugs, head trauma, stroke, status epilepticus.) EXCLUSION
- Pregnancy. CAUTION, consult OB
- Systemic infection / sepsis (-hypothermia therapy inhibits an immune response.). CAUTION
- Greater than 6 hours since arrest. EXCLUSION
- Temperature < 30°C after arrest. EXCLUSION
- A known terminal illness preceding arrest. EXCLUSION
- Recent major surgery within 14 days. CAUTION
- Known pre-existing coagulopathy or bleeding. CAUTION
- Responds to verbal stimuli after ROSC, patients not intubated as a part of the resuscitation efforts or DNR /DNI. EXCLUSION

This will often be initiated in ER. So there should be an algorithm for admission location built in to it somewhere. I suggest if ST elevations or new LBBB, stat consult for CCU admission. Otherwise, stat consult for MICU admission. Ask Lawson.

	Therapeutic Hypothermia Orders	MD initial
1.	One to One Nursing Care during Therapeutic Hypothermia Protocol	1. <input type="checkbox"/>
2.	Document brain stem reflexes: pupil & oculoccephalic response [passively rotate the head, look for evidence that the eyes turn together, conjugately in the opposite direction from head movement]. Reassess at 24h, 3 days & 7 days.	2. <input type="checkbox"/>
3.	Use a rectal probe for continuous temperature monitoring.	3. <input type="checkbox"/>
4.	Vitals: a) Record vitals on a frequent vital sheet; q15 minutes for one hour, than q 1 hour, include assessments for shivering.	4. <input type="checkbox"/>
5.	Continuous EKG monitoring, on admission obtain an EKG q 8 hours x 3 then q day. (Moderate hypothermia is associated with the presence of J (Osborn) waves in the inferior and lateral leads, an increase in the PR and QT intervals, an	5. <input type="checkbox"/>

	increase in the QRS complex duration, a decrease in the amplitude of P and T waves and frequent supraventricular arrhythmias (particularly Afib, occasionally Vfib.)	
6.	<p>Labs:</p> <p>a) On admission obtain: Chem 8, CBC, Mg, Phos, PT/PTT, UA, Troponin every 4 hours x 2, Amylase, Lipase, ABG, blood cultures, lactic acid, ammonia &amp; BNP.</p> <p>b) Every eight hours obtain: Chem 8, (Replace serum potassium up to 3.4- Rewarming causes hyperkalemia.) CBC, PT/PTT &amp; ABG (Warm ABG to room temperature before reading.)</p>	<p>6a <input type="checkbox"/></p> <p>6b <input type="checkbox"/></p>
7.	<p>Blood Glucoses:</p> <p>a) Maintain blood glucoses &lt; 150mg/dL using the Adult Rapid Acting Insulin Order-Set. (Use Power Orders.)</p> <p>b) Use the Adult ICU Regular Insulin Infusion Orders if blood sugars trend over 150mg/dL. [MI2C155(4/05)]</p>	<p>7a <input type="checkbox"/></p> <p>7b <input type="checkbox"/></p>
8.	<p>Consider obtaining prior to cooling. Do not delay cooling &gt;30 min for this- should not delay; a-line and central lines can be obtained during cooling as well as performing cardiac cath/PCI:</p> <p>a) A-line;</p> <p>b) Central line</p>	<p>8a <input type="checkbox"/></p> <p>8b <input type="checkbox"/></p>
9.	<p>Consider obtaining within 24 hours:</p> <p>a) Neurology consult. Mandatory</p> <p>b) EEG (Once the patient is paralyzed it is not possible to detect seizure activity.). <b>This is mandatory (not “consider”) during the hypothermia phase.</b></p> <p>c) Echo</p>	<p>9a <input type="checkbox"/></p> <p>9b <input type="checkbox"/></p> <p>9c <input type="checkbox"/></p>
10.	Maintain a MAP > 80mmHg.	10. <input type="checkbox"/>
11.	<p>Place:</p> <p>a) Foley catheter</p> <p>b) NG tube.</p>	<p>11a <input type="checkbox"/></p> <p>11b <input type="checkbox"/></p>
12.	Cool patients within 6 hours to a goal of 32°C. Once the goal temperature is reached, cool for 18 hours, but no longer than 24 hours from the <u>initiation</u> of cooling. Start surface cooling immediately.	12. <input type="checkbox"/>
13.	<p>Perform all of the following to attain goal temperature:</p> <p>a) Place patient between 2 cooling blankets (sandwich), with sheets between the patient and the blanket. [Hypothermia cooling blankets are housed in the ED]</p> <p>b) Use ice packs to the groin, axilla &amp; sides of neck.</p> <p>c) NG tube lavage with ice cold water. (Volumes of 250ml every 15-30 minutes) until target temp is reached</p> <p>d) Bladder lavage with ice cold saline. (Volumes of 200ml every 15 minutes). This is very demanding of nursing and may be unnecessary. <b>CONSIDER</b> adding this as an option if cooling is too</p>	<p>13a <input type="checkbox"/></p> <p>13b <input type="checkbox"/></p> <p>13c <input type="checkbox"/></p> <p>13d <input type="checkbox"/></p> <p>13e <input type="checkbox"/></p>

	<p>slow</p> <p>e) Infuse boluses of 30 ml/kg IV ice cold normal saline, (Avoid Use Internal jugular or subclavian Line. Femoral line is OK.) Chilled normal saline is located in ICU med refrigerators. Do not begin this until external cooling devices are assembled</p> <p>f) Turn off the heater on the ventilator's humidifier. (Turn back on during rewarming phase.) This is a bad idea. It's effect will be minimal (air has a very low specific heat) and cool air damages airways within 12 hours.</p>	13f <input type="checkbox"/>
14.	Check skin surfaces every 1 hour for cold burns.	14. <input type="checkbox"/>
15.	<p>Comfort Measures:</p> <p>a) Fentanyl: Loading dose; 1-2mcg/kg, continuous dose; start at 25 mcg/hour. Titrate by 10mcg/hr to achieve comfort.</p>	15a <input type="checkbox"/>
16.	<p>Sedate: Administer sedatives using the Richmond Agitation Scale (RASS) goal: (-4) Deep Sedation.</p> <p>a) Midazolam (Versed): Loading dose 2-6mg; continuous dose 1-2mg/hour.</p> <p>b) Propofol (Diprovan): Start at 5 mcg/kg/min. Titrate by 5mcg/kg/min every 5 minutes PRN to obtain a RASS of (-4)</p>	16a <input type="checkbox"/> 16b <input type="checkbox"/>
17.	<p>Eliminate Shivering:</p> <p>a) Sedate; as directed above.</p> <p>b) Warm hands and feet.</p> <p>c) Neuromuscular blockade, see 'Administer Paralytic'.</p>	17a <input type="checkbox"/> 17b <input type="checkbox"/> 17c <input type="checkbox"/>
18.	<p>Administer Paralytic: Do NOT paralyze a patient that is not intubated &amp; adequately sedated. Maintain train of four (TOF) monitoring every hour with a goal TOF of 1-2/4. Others are not using TOF. Recommend clinical observation only for this. Do not use paralytic if patient is hypothermia and not shivering on admission.</p> <p>a) Vecuronium: Loading dose: 0.1mg/kg; continuous dose 1mcg/kg/min. (Use PowerOrders)</p> <p>b) Cistatracurium: (Nimbex): Loading dose: 0.15mg/kg, continuous drip 0.03- 0.06 mg/kg/hour. (Use PowerOrders)</p>	18a <input type="checkbox"/> 18b <input type="checkbox"/>
19.	Venous thromboembolism prophylaxis (use VTE Prophylaxis PowerPlan [Adult]).	19. <input type="checkbox"/>

MD Signature: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
RN Signature: \_\_\_\_\_ Date/Time: \_\_\_\_\_

	Rewarming Orders:	MD initial
1.	Stop cooling therapy and passively rewarm to a temperature of 35.6°C	
2.	Rewarm at a rate of approximately 0.3°C / hour (1°C over three hours.)	
3.	Monitor for rebound hyperthermia (avoid temperature >37.5°C): treat with Tylenol and external cooling.	
4.	Warm Ventilator air. Erase this	
5.	Do not use warming devices unless the temperature has not reached 36°C after twelve hours of passive rewarming.	
6.	Rehydrate aggressively as the expected fall in blood pressure occurs. Routine ICU vital signs – Call MD for SBP =<90, HR<40, potassium =>5.	
7.	Continue to monitor for: a.)arrhythmias b.)coagulopathies c.)infection d.)hypotension – avoid ‘afterdrop’ as patient vasodilates e.)hyperkalemia during rewarming.	
8.	Stop neuromuscular blocking agents.	
9.	Titrate analgesics and sedatives for patient comfort, RASS to -2.	
10.	Call Dr. _____ for assistance.	

MD Signature: \_\_\_\_\_ Date: \_\_\_\_\_

RN Signature: \_\_\_\_\_ Date: \_\_\_\_\_

CICU/JW/3-09

Future considerations:

- Maintenance of normothermia for head injured patients.
- Central Nervous System lesion causing malignant cerebral edema.
- Cerebral edema / increased ICP and where conventional therapeutic options are contraindicated.