# Hypothermia after Cardiac Arrest Protocol

***Inclusion Criteria:***

1. Age 18 years or older
2. Women must be over 50, have a negative pregnancy test or documented hysterectomy
3. Cardiac arrest with return of normal rhythm (initial rhythm VF or pulseless VT; PEA and Asystole can be considered if returned to normal rhythm and other criteria met)
4. Persistent coma as evidenced by no eye opening to pain after resuscitation or GCS of <12 (no waiting period required)
5. Blood pressure can be maintained at least 90 mm Hg systolic either spontaneously or with fluid and pressors (not aortic balloon pump)
6. Modified Rankin Score 0-3 prior to cardiac arrest (this is to be used as a guideline only):

| Score | Description |
|---|---|
| 0 | No symptoms at all |
| 1 | No significant disability; able to carry out all duties and activities. |
| 2 | Slight disability; unable to carry out all previous activities, but able to look after own affairs without assistance. |
| 3 | Moderate disability; requires some help, but able to walk without assistance. |
| 4 | Moderate severe disability; unable to walk with assistance and unable to attend to own bodily needs without assistance. |
| 5 | Severe disability; bedridden, incontinent and requires constant care and attention. |
| 6 | Dead |

***Exclusions:***

1. Another reason to be comatose (e.g. drug overdose, head trauma, stroke, status epilepticus)
2. Pregnancy
3. A known terminal illness preceding the arrest or moderate to severe disability prior to arrest
4. Known, pre-existing coagulopathy or bleeding
5. No limit on duration of resuscitation effort; however “down time” of less than 1 hour most desirable
6. Pre-existing DO NOT RESUSCITATE OR DO NOT INTUBATE code status and patient not intubated as part of resuscitation efforts
7. Temperature less than 91.0 $^{O}$ F prior to cooling.

## I. PROCEDURE FOR COOLING:

Protocol (goal temperature $33^{O}$ C as to be achieved as soon as possible):

1. Patients should be enrolled as quickly as possible. For out-of-hospital arrests, ED attending will make decision to implement protocol.
2. Do not delay initiation of hypothermia pending their assessment.
3. Immediately place ice packs under the armpits, next to the neck, on the torso and the limbs.
4. Temperature sensing esophageal is preferred but may not be available. Foley catheter should be placed if available, otherwise rectal temperatures should be used (in that order). [**rationale:** rectal probes may render false temperatures during cooling. Also, Foley catheter may have false temperatures if poor urine output.]
5. Two cooling blankets should be used, placed under the patient and one over the patient.
6. The ventilator humidifier should be turned off and a Heat Moisture Exchanger (HME) should be used.
7. The room thermostat should be turned off.
8. Sedation with versed or Ativan or Propofol and Fentanyl or Morphine.
9. Once sedation is started, give vecuronium 0.1-mg/kg bolus, then start a drip of 1 mg/hour. Titrate the drip 0-5 mg/hr to keep 1/4 twitches
10. Patients should be on daily aspirin, on pressors and or nitrates to maintain blood pressure, and any anti-arrythmics as necessary.
11. Patients may receive other cardiac interventions including systemic thrombolysis, anticoagulation, and urgent cardiac cath interventions as needed. Hypothermia should proceed concurrently with these interventions.
12. Once the patient reaches $33^{O}$ C (bladder or rectal), keep patient at $33^{O}$ C by removing ice packs and top cooling blanket if necessary.
13. Close monitoring and control of glucose.
14. GI Prophylaxis
15. Follow BMP and magnesium Q4h. [**rationale:** hypokalemia may occur during the cooling phase and with continuous insulin therapy.]
16. Follow PT/PTT BID every 12 hours x 36 hours [**rationale**: cooling may interfere with the clotting cascade and prolong bleeding times.]
17. Critical Care Panel every 12 hours x 36 hours
18. Send 2 sets of surveillance blood cultures 12 hours from start of cooling [**rationale:** induced hypothermia may mask an underlying infectious process.]
19. Discontinue hypothermia if the patient becomes unstable.

## II. PROCEDURE FOR RE-WARMING

1. Begin passive rewarming 24 hours after the beginning of cooling (not 24 hours after target temperature is reached):
    a. Turn room thermostat up to normal.
    b. Turn on heater on ventilator.
    c. May use regular blankets.
    d. Do not use warm air blanket unless temp not $36^{O}$ C after twelve hours of passive rewarming
2. Paralysis, then sedation, may be discontinued after rewarming, based on shivering and other critical care issues.

**Note:** Rewarming in less than 8.0 hours may result in hypotension and electrolyte shifts due to vasodilation. Hyperkalemia and hyperglycemia may occur during rewarming.

## III. NURSING CONSIDERATIONS FOR INDUCED HYPOTHERMIA

1. Patients can be defibrillated .
2. Shivering is inevitable during cooling and must be avoided through the use of pharmacologic agents.
3. Skin integrity may be compromised due to vasoconstriction from cooling andmust be monitored frequently. Appropriate interventions to prevent skin breakdown should continue.
4. Bladder temperature may be inaccurate if the patient is oliguric or anuric.
5. Strict Monitoring of I & O's
6. Document the following on Neurological Exam: Pupillary response, Motor response to pain, Occulocephalic response, corneal reflex and babinski's

## IV. DOCUMENTATION

On the Critical Care Flowsheet document:

1. Start time of cooling.
2. Initial patient temperature prior to start of cooling then Q 1 hour after start of cooling.
3. Verification of temperature through secondary source (oral, rectal) Q8 hours.
4. Time target temperature is achieved
5. Time of rewarming.
6. Time of termination of treatment.
7. Skin integrity Q2 hours