

# ***HYPOTHERMIA/CARDIAC ARREST SURFACE COOLING PROTOCOL***

*(equipment is located in \_\_\_\_\_)*

## **EVALUATION**

### *Inclusion criteria:*

- Age > 18 years
- witnessed arrest, VF or nonperfusing VT,
- Suspected primary cardiac origin for arrest
- Estimated time <20 minutes from collapse to initiation of CPR
- < 60 minutes from collapse to ROSC(return of spontaneous circulation)
- Post resuscitation GCS < 8
- Post-resuscitation SBP > 90 without use of high dose pressors
- Onset of cooling as soon as possible but within 6 hours of hospital arrival (target <1 hr)

### *Exclusion criteria:*

- Hypothermia (< 34 C) at baseline
- Comatose at baseline / Needing complete assistance for ADL's
- Known sepsis
- Continued seizure activity
- Terminal illness (life expectancy < 3 months for reasons other than arrest)
- Persistent hemodynamically significant dysrhythmia requiring pharmacologic/electrical intervention
- ESRD
- DNR
- Pregnancy/ Postivive  $\beta$ HCG test

### **Initial Assessment**

- Assess medical therapy. (Vasopressor and vasodilators may affect heat transfer, increase potential for skin injury, and contribute to adverse hemodynamic response).
- Obtain baseline tympanic temperature, vitals, and hemodynamic values.
- Placement of arterial line is required for BP monitoring.
- Monitor cardiac rhythm.
- Assess whether dedicated thermistor Foley catheter (YSI 400 compatible) is connected to Arctic Sun System.
- Assess baseline blood tests (BMP, CBC, Mg, Phos, PT/PTT, Ionized Ca, total CK, ABG, Lactate, Trop I, Amylase, Lipase)
- Assess baseline LOC and neuro status
- Assess ventilatory function. *Because of peripheral vasoconstriction, pulse oximetry can be unreliable.*
- Assess bowel sounds, abdomen and GI function.
- Assess skin integrity. (External cooling devices can cause or exacerbate skin injury in patients without intact skin integrity). *Arctic Sun Energy Transfer Pads™ are made with biocompatible hydrogel and must be placed directly on intact skin.*

**HYPOTHERMIA MUST BE APPROVED BY CCU OR STROKE NEUROLOGY  
ATTENDING**

## COOLING/REWARMING

### 1) SEDATION AND PREVENTION OF SHIVERING

In order for patients to achieve and maintain target hypothermia of 33<sup>0</sup>C complete sedation AND paralysis must be continued with continuous infusion of appropriate medications

- 1) Fentanyl 2mg/100ccNS IV (starting at 50-100 mcg/hr), titrate to quiet motionless state and/or to prevent shivering.

#### Alternatives

IV propofol initiated at 5 micrograms/kg/minute and titrated by 5 micrograms/kg/min every 10 minutes as needed to achieve sedation **OR**  
IV Midazolam initial dose 0.01-0.03mg/kg over 3-4 min, then 0.02mg/kg/hr titrate up to 0.1 mg/kg/hr to achieve sedation (if Midazolam is started in ER, switch to propofol once in CCU)

AND

- 2) Atracurium 0.4-0.5 mg/kg bolus and then 5-10 mcg/kg/min

Titrate to 1-2/4 TOF q1hr

### 1) INITIATION OF COOLING

**Cooling is begun by the infusion of 2 liters of saline chilled to 4 degrees by storage in medication refrigerator on 716. The 2 liters is infused over about 30 minutes.**

- Place a set of 5 energy transfer pads on the patient by “log rolling” patient
- Initiate cooling with the ARCTIC SUN. Activate automatic mode, set target temperature to 33 degrees C (it will take 1-2 hours to cool if shivering is controlled and patient has 5 pads in place)
- Keep the device on and in Automatic mode at 33C once patient temp of 33 is achieved

### 3) REWARMING

- Stop all potassium administration (in runs and IVF) 8 hours prior to rewarming.
- After 24 hours at 33<sup>0</sup> C, rewarm slowly to 36.5<sup>0</sup> C by setting the “time to target” setting at 36.5, then select 0.5 C/hr
- If experiencing difficulty rewarming as above, troubleshoot the device: check flow rates/tubes/connections
- Pads/unit may remain with the patient for 1-2 days to maintain normothermia unless needed for another patient.
- At the end of the procedure, wipe down the device with an approved disinfectant, dispose of pads, and return equipment to storage.

## MEDICAL AND NURSING MANGEMENT

### 1) Blood Pressure/Volume Management:

- Target systolic BP > 90, MAP >80 mmHg to maintain cerebral perfusion
- Goal CVP > 4-6 mmHg or PCWP > 8 mmHg (CVP or PCWP monitoring not mandatory)
- Volume replacement or Levophed 4 mg/250NS IV, titrate to SBP>90mmHg

### 2) DVT Prophylaxis (if not on anticoagulation) :

- Heparin 5000 units SQ Q8 hrs

### 3) GI prophylaxis

- Famotidine 20 mg IV/NG Q12 hrs OR Protonix 40mg IVSS qd

### 4) Blood Sugar Management

Fingersticks with sliding scale:

<80 mg/dL	call MD
80-180mg/dL	DO NOTHING
181-240mg/dL	4 Units of regular insulin subcutaneously
241-320mg/dL	6 Units of regular insulin subcutaneously
321-400 mg/dL	8 Units of regular insulin subcutaneously
>401 mg/dL	10 Units of regular insulin subcutaneously, call md

### 5) Labs

BMP, CBC, Mg, Phos, PT/PTT, Ionized Ca, ABG, Lactate, Trop I, total CK, Amylase, Lipase at admission, 12hours, 24 hours and 48 hours.

### 6) Miscellaneous:

**Coenzyme Q10 is administered via NG tube at an initial dose of 250 mg followed by 150 mg TID**

Keep HOB at 30 degrees while receiving paralytics

Lacrilube to eyes q8hr while on paralytics

Discontinue paralytics after patient is warmed to 36.5 C

### 7) NURSING DOCUMENTATION/ ASSESSMENT

Assessments Q 15 minutes

Vitals q 15 minutes x 4 and then q 1hour

Assessment Q1 hour

1) Vital Signs, temperature, hemodynamic parameters

2) Shivering. If shivering is detected, increase rate of fentanyl infusion

Administer vecuronium 0.1 mg/kg IV q1h PRN.

3) I and O

Assessment Q 2 hours

Skin integrity

Assessment Q 4hrs  
Cardiac rhythm

**8) CALL MD**

- 1)  $K^+ < 3.4$ ,  $Mg^{++} < 2.0$ , or abnormal lab values
- 2) Uncontrolled shivering
- 3) HR < 50 or > 110 BPM
- 4) SBP < 80 mmHg, or > 180 mmHg
- 5) Inadequate glucose control, BS > 180 for 3 values
- 6) Change in cardiac rhythm, new EKG changes
- 7) Urine output < 30 cc/hr
- 8) Loss of O<sub>2</sub> saturation signal
- 9) Deterioration in coma level
- 10) Loss of bowel sounds
- 11) If Arctic Sun water temperature drops below 10 degrees C after target temperature has been attained.
- 12) Inability to reach target temperature within 8 hours