Methodist Healthcare

Date/ Time	PHYSICIAN ORDERS

FULL --Post-Cardiac Arrest Hypothermia Protocol

(For use only in the Adult population at University ONLY)

1. Inclusion Criteria (must have ALL of the following)

- ☐ Primary cardiac arrest V-tach/V-fib with return of spontaneous circulation (ROSC)
- ☐ Intubated with mechanical ventilation
- ☐ Treatment initiated within 6 hours of arrest
- ☐ Systolic BP greater than 90mmHg with or without vasopressors
- ☐ GCS less than 6

2. Exclusion Criteria (ANY of the following)

- ☐ Intracranial hemorrhage
- ☐ Known bleeding or ongoing active bleeding
- ☐ Major surgery within 14 days
- ☐ Temperature less than 30 degrees after cardiac arrest
- ☐ Systemic infection/sepsis
- ☐ Pregnancy
- ☐ DNR
- ☐ BMI greater than 40 **BMI = _____**
- ☐ Coma due to cause other than cardiac arrest

3. Consult ICU team for ICU admission

4. Stat lab work

●CBC with diff ● CMP ● Magnesium ●Troponin ●PT/APTT/INR ●Phosphorus ●CKMB
● ABG ●12 Lead EKG ●Portable chest x-ray (s/p intubation) ● Lactate level ●Whole blood glucose

5. At 6, 12, and 18 hours after reaching Goal Temperature

●K+ ●Glucose ●Troponin ●ABG

6. At hour 24 and 30 after reaching goal temperature

● CBC with Diff ●BMP ● Glucose ●Troponin ●ABG ●PT/APTT/INR

7. ☐ Place Arterial Line (optional)

8. Nursing

- **Elevate head of bed 30 degrees at all times.**
  (This is contraindicated for patients with recent spinal surgery or severe skin breakdown)
- Place 2 large bore Peripheral IV lines or CVC (One dedicated for cooling bolus)
- **Infuse Refrigerated Normal Saline (4˚ C) 30ml/kg IV over 30 minutes in a peripheral or femoral line. May repeat bolus infusion x1 if goal temperature not achieved.**
- Foley catheter with temp probe
- Obtain baseline Train of Four prior to bolus and drip. Label sites where TOF performed.
- Train of four testing q15 min x1hour then q 1hour while on paralytics
- Do not use heated ventilator circuit
- Decrease room temperature
- VS q 15 minutes
- NG/OG to LIS
- Water temp and bladder temp q30min.
- Document CVP q 1 hour
- Skin checks q2 hours
- **Call MD for K+ less than 2.8 (Do Not Replace K+ until less than 2.8)**

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9. Paralytics (REQUIRES NURSE DOUBLE-CHECK: order, drug, dose, adequate sedation)

- **Sedation and analgesia must be administered prior to and continuously during paralysis**
- Lacrilube ointment: Apply 1 inch topically to both eyes q2h while receiving paralytics

CHOOSE ONE BELOW

[ ] Atracurium Continuous Infusion:
400 mcg/kg IV bolus (Max 50 mg) over 3-5 min.
When 1/4 TOF achieved then start atracurium IV drip at 250 mcg/kg/hr (Max: 750 mcg/kg/hr) and titrate by 50 mcg/kg/hr to 1-2/4 TOF to suppress shivering. Test TOF q 15 min x 1 hr then q 1h while on paralytics.
Standard drip concentration of 250 mg / 250 ml of NS x 24 hrs. (Final concentration of 1000 mcg/ml).

OR

[ ] Atracurium Intermittent bolus doses PRN shivering:
400 mcg/kg IV bolus (Max 50 mg) over 3-5 min every 1 hour PRN shivering or inability to maintain target temperature of 33˚C

OR

[ ] Vecuronium Intermittent bolus doses PRN shivering:
100 mcg/kg IV bolus (Max 10 mg = 10,000 mcg) over 3-5 min every 2 hour PRN shivering or inability to maintain target temperature of 33˚C

10. Supportive Therapy

- IF CVP less than 8 or PAOP less than 12
  [ ] Normal Saline 500ml IV bolus over 30 minutes, may repeat x 1 if goal CVP not achieved. Then call MD if MAP less than 70mmHg.
- **Begin refrigerated Normal Saline IV infusion at 75 ml/hr**
- Maintain MAP greater than 70 **(CHOOSE ONE)**
  [ ] DOPamine 400mg/250ml: Initiate IV drip at 2.5 mcg/kg/min and titrate by 2.5 mcg/kg/min every 10 minutes to maintain mean arterial pressure (MAP) greater than 70mmHg. (Maximum dose = 20 mcg/kg/min)
  [ ] Norepinephrine 4mg/250ml: Initiate IV drip at 2 mcg/min and titrate by 2 mcg/min every 5-10 minutes to maintain a mean arterial pressure (MAP) greater than 70mmHg. (Maximum dose = 90 mcg/min)

11. Cooling Procedure

- Place ice packs on patient's axilla, sides of neck, and groin until cooling blankets started.
- Obtain the Medi-Therm III and Rapr●Round body wraps
- Select a Temperature of 33° C
- Assess skin and adhere to turning schedule as per hospital policy.
- *Do not readjust the machine temp based on patient temperature. The medi-therm III will continue to adjust the water temperature when necessary in order to achieve and maintain patient set point temperature*
- Stop all potassium administration 8 hours prior to rewarming
- **In order for patients to achieve and maintain target hypothermia of 33 ˚C, complete sedation AND/OR paralysis must be maintained.**

12. ReWarming

- After 24 hours at 33 degrees C, rewarm passively to 36.5 ˚C by setting the cooling unit to "Manual" mode and re-set unit by increasing target temp by 1 ˚C every 4 hours.
- If experiencing difficulty rewarming as above, use heated ventilator air to provide core rewarming.
- Discontinue paralytics for shiver suppression and **NOTIFY PHARMACY**.
- Continue Train of Four monitoring q 15 min until a 4/4 TOF is achieved, and then discontinue.
- Continue to provide sedation and analgesia according to ventilator bundle.
- Increase water temperature by 0.5 ˚C every 1 hour
- After reaching a stable patient temperature of 36 degrees for 1 hour remove the cooling blanket

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13. DVT Prophylaxis (CHOOSE ONE)

[ ] Heparin 5000 units Subcutaneous every 12 hrs
[ ] Enoxaparin 40 mg Subcutaneous QDay
[ ] Enoxaparin 30 mg Subcutaneous QDay (Use this dose for patients with a CrCl less than 30 ml/min)
[ ] Contraindication Present

14. Stress ulcer Prophylaxis (CHOOSE ONE)

[ ] Famotidine 20 mg IVPush BID
[ ] Famotidine 20 mg IVPush QDay (Use this dose for patients with a CrCl less than 50 ml/min)
[ ] Esomeprazole 40 mg IVPush QDay

15. Sedation and Analgesia

- **GOAL of 2 per Riker Scale**

Riker Sedation Agitation Scale(SAS)

[ ] **7: Dangerous Agitation:** Pulling ETT, trying to remove catheters, climbing over bed rails, thrashing side to side
[ ] **6: Very Agitated:** Does not calm despite frequent verbal reminding of limits, biting ET tube
[ ] **5: Agitated:** Anxious or mildly agitated, attempting to sit up, calms down to verbal stimuli
[ ] **4: Calm & Cooperative:** Calm, awakens easily, follows commands
[ ] **3: Sedated:** Difficult to arouse, awakens to verbal stimuli or gentle shaking, drifts off again, follows simple commands
[**x**] **2: Very Sedated:** Arouses to physical stimuli but does not communicate or follow commands, may move spontaneously
[ ] **1: Unarousable:** Minimal or no response to noxious stimuli, does not communicate or follow commands

Medications

Sedation (Choose one)

[ ] **Propofol**: Start IV infusion (prior to neuromuscular blockade) at 10 mcg/kg/min (Do not Bolus); maintain a **MINIMUM** propofol infusion of 10 mcg/kg/min throughout the induced hypothermia. If sedation not achieved then increase the infusion by 5 -10 mcg/kg/min every 5 min to reach a Riker SAS score of 2. (Maximum rate of 100 mcg/kg/min)

[ ] **Lorazepam** intermittent dosing:
- Give 1mg IV Q 5 min PRN agitation or to maintain SAS of 2 (Maximum of 12 mg in a 3-hr period—Call MD if this amount is reached)
- If patient is oversedated, hold the dose until appropriate SAS of 2 achieved.

[ ] **Midazolam** infusion IV:
- Infuse 1 mg per hour and titrate by 0.5 mg/hr as often as every 15 minutes to reach a Riker SAS goal of 2 (Maximum of 7 mg/hr—Call MD if higher doses required)

Analgesia (Choose one)

[ ] morPHINE 2 mg IVPush every 1 hour PRN pain

[ ] HYDROmorphone 0.5 mg IVPush every 1 hour PRN pain

16. Initiate the following IV Hypothermia/Insulin Protocol if blood glucose is greater than 150 mg/dl x 2 measurements. Notify pharmacy when infusion needed.

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Hypothermia/Insulin Protocol

RESTRICTION: To be utilized only for patients initiated on the Post Cardiac Arrest Hypothermia Protocol. Patient must be located in the Emergency Department or in an intensive care unit.

PHYSICIAN

1) All patients must have a blood glucose (BG) greater than or equal to 150 mg/dl x 2 measurements before initiation of insulin therapy.
2) This is **NOT** for the treatment of diabetic ketoacidosis (DKA) or hyperglycemic hyperosmolor syndrome (HHS).

PHARMACIST

1) Standard IV Insulin Infusion: 100 units Regular Human Insulin/100 ml NS (Final conc: 1 unit/ml)

NURSING

1) **NOTE: ALL blood glucose monitoring must be done via venous draw. Finger sticks should NOT be utilized.**
2) If K^+ is less than 2.8 call MD for K^+ replacement orders before starting insulin infusion.
3) Change insulin drip every 24 hours
4) Check bedside BG before starting infusion and Q1H
   Change to Q2H BG monitoring when BG has remained in the goal range for 4 hours.

   If BG remains within goal range for 4 consecutive Q2H monitoring (8 hours), may decrease BG monitoring to Q4H.
5) Resume Q1H BG monitoring any time the infusion is stopped & restarted, also for any infusion rate change.
6) Document infusion rate and BG values on flow sheet.
7) Call MD for Dextrose containing IV fluid orders when blood glucose falls below 200 mg/dl and continue until insulin infusion is discontinued.
8) HOLD insulin infusion if patient is out of the ICU for a procedure. Restart upon return to ICU.
9) Discontinue insulin therapy per Hypothermia Protocol when:
   - Post Cardiac Arrest Hypothermia Protocol is discontinued. If intensive insulin therapy still indicated by MD post Hypothermia Protocol, please refer to the Critical Care Intensive Insulin Therapy Protocol.
   - Patient is transferred from the ICU and initiate standard insulin sliding scale orders unless otherwise indicated by MD.
   - Patient is eating an oral diet, begin accuchecks q 4 hours w sliding scale

Target range: serum glucose from 100 to 150 mg/dl.

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Hypothermia/Insulin Protocol

Initiating the insulin infusion

Glucose:	151-190 mg/dl	191-240 mg/dl	241-300 mg/dl	301-400 mg/dl	>400mg/dl
IVP bolus:	2 units	4 units	6 units	10 units	14 units and call MD
Initial Rate:	1 unit/hr	2 units/hr	3 units/hr	4 units/hr	5 units/hr

Adjust insulin infusion rate as follows:

Glucose	Intervention
Less than 60 mg/dl	D/C infusion and give 50ml of D50 IVP: Call MD and recheck glucose in 15 min. • If glucose remains less than 60 mg/dl, repeat 25ml D50 IVP every 15 minutes until glucose greater than 80 mg/dl. • When glucose greater than 125 mg/dl, restart insulin infusion at 1/2 the previous rate (rounded to the nearest whole unit)
61-99 mg/dl	D/C infusion and recheck glucose in 1hr. • If glucose drops below or remains less than 80 mg/dl, give 25ml D50 IVP. Repeat blood glucose and give 25ml D50 IVP every 15 minutes until glucose greater than 80 mg/dl and call MD • When glucose greater than 125 mg/dl, restart insulin infusion at 1/2 the previous rate (rounded to the nearest whole unit).
Glucose	Target Range 100-150 mg/dl
Target Range: 100-150 mg/dl	**1**. No change **2.** If glucose continues to decrease greater than 20mg/dl within the goal range; decrease rate by 50 % (1/2 the previous rate rounded to the nearest whole unit)
Glucose	**Titration****
151-180 mg/dl	**Increase drip by 1 unit / hr**
181-210 mg/dl	**Increase drip by 2 units/hr**
211-250 mg/dl	**Increase drip by 3 units/hr**
251-290 mg/dl	**Increase drip by 4 units/hr**
291-340 mg/dl	**Increase drip by 5 units/hr**
341-400 mg/dl	**Increase drip by 6 units/hr**
Greater than 400 mg/dl*******	**Increase drip by 7 units/hr** ***** If greater than 400 mg/dl after 1 hour –CALL MD**

Special Considerations/Interventions**

- **If BG drops by more than 100 mg/dL from previous reading at any time, decrease rate by 50% (round to the nearest whole unit) and recheck BG in 1 hr.**
- **If BG drops by more than 50 mg/dl from the previous reading at any time, decrease rate by 25% (round to the nearest whole unit) and recheck BG in 1 hr.**

Physician Signature: **Physician Number:** **Date/Time**

RN Signature **Date/Time**