Allergies: __________________________________________________________________________

Date and Time of Arrest: __________________________

Date and Time CPR Started: _______________________

Time of Return of Spontaneous Circulation: _______________

Time of Hypothermia after Cardiac Arrest initiated:
- Admit to ICU 2:1 nursing care until stabilized then 1:1 until re-warmed.
- Consult Pulmonology, Cardiology in ED.
- Consult ______________________ for arterial line placement.
- ☐ Consider CT scan head prior to ICU admission.

Labs:
- STAT labs (if not done in ED):
  - CBC, CMP, Mg**, Phos, PT/INR, PTT, fibrinogen, D-dimer, troponin, CK, CKMB, lactate, procalcitonin, ionized calcium, drug screen ua, ABG, type and screen, ua HCG - pregnancy test on woman of child bearing age (<50 years of age)
- STAT (if not done in ED): PCXR, EKG
- CBC, BMP, Mg**, Phos, PT/INR, PTT (discontinue if on unfractionated heparin monitor with Factor Xa), lactate, Ionized calcium. ABG Q6 hours x 48 hours
- CK, CKMB, troponin, Q 8 hours x 24 hours
- At 12 hours after initiation of cooling: Blood cultures x 2 sources
- Daily x3 days: PCXR, ABG, EKG
  (Send all ABG’s to the lab- measurements must be analyzed at the patient’s actual body temp, write temp on label.)

Cooling Phase:
Goal is to initiate cooling as soon as possible after return of spontaneous circulation but within 6 hours. Goal is to get core temp to 33°C (91.4°F) with ZOLL Thermogard XP or 32-34 °C (89.6-93.2 °F) with Gaymar Surface cooling for 24 hours from initiation of cooling. (ZOLL Intravascular temperature management (IVTM) is the preferred therapy for HACA.)
- Begin Hypothermia After Cardiac Arrest Protocol if not started in ED.
- Insert temperature probe foley catheter if not done in ED.
- Connect foley catheter temperature probe cord to ZOLL Thermogard or Gaymar Cooling System.
- Insert large bore peripheral IV’s if not done in ED.
- If core temperature is > 34°C infuse up to 30 ml/kg of 4°C (about 36-46°F) NSS over 30 min for a total of 2 L. Do not use central-line for cold infusion, use large bore peripheral IV’s or femoral line only.
- Use temperature probe foley to monitor temp. Follow HACA Protocol for details on selected cooling therapy. ZOLL Thermogard therapy with Quattro catheter is the preferred cooling method.

- Vent settings: Rate: ______ FIO2: ______ TV: ______peep:_______ ps:_______
  - No warm humidified air
  - Continuous ETCO2 monitoring
  - Maintain PaCO₂ 35-45 – call MD if out of range
- Vital signs: BP, MAP, HR, O2 sat, Q 15 min x 4 then Q 30 min x 2 then hourly and prn
- Record foley temperature Q 15 min until 33°C (91.4 °F) is achieved and then Q 30 minutes. DO NOT cool less than 32°C.
  Document all temps in VS/I&O crv under the HACA section with temperature source. Use DAS Vitals with Temp#2 for Celsius documentation.
Allergies: _______________________________________________________

Initial Sedative/Paralytic Medications:

- ☐ Midazolam (Versed)- Bolus 4mg, then 5-15mg/hr IV
  - Decrease drip by 50% when 36.5°C (97.7°F) goal reached with re-warming.
- ☐ Propofol (Diprivan) 5-50 mcg/kg/min IV (max of 80 mcg/kg/min)
  - Decrease drip by 50% when 36.5°C (97.7°F) goal reached with re-warming.
- ☐ Fentanyl -Bolus 50-100 mcg, then 1-2 mcg/kg/hr IV (approx 50-200mcg/hr)
  - Decrease drip by 50% when 36.5°C (97.7°F) goal reached with re-warming.
- ☐ Meperidine (Demerol) 25mg every 6 hours IV PRN for a total of 6 doses for BSAS ≥1 when shivering not controlled by buspirone and vecuronium. Not to exceed 150mg in 24 hours.
- ☐ Buspirone (Buspar) 20mg per NG every 8 hours (Discontinue when rewarming temp 36.5°C (97.7°F) reached
- ☐ Vecuronium (Norcuron) – (Reconstitute vial with 10ml NS for 1mg/ml final concentration). For shivering not controlled by buspirone. Bolus 0.1mg/kg (max dose = 10mg) Q1hr PRN shivering for BSAS ≥1.
  - Discontinue when re-warming goal temp of 36.5°C (97.7°F) reached.

IVs/Medications:

- ☐ Maintenance IV D5NS at 125ml/hr or __________ ml/hr
- ☐ Famotidine (Pepcid) 20 mg IV every 12 hours.
- ☐ Norepinephrine- Initiate at 0.01-0.05mcg/kg/min and increase at 0.01-0.05mcg/kg/min every 5 minutes to a max of 0.3mcg/kg/min as needed to keep MAP > 80. Maintain SBP > 100. Notify physician if ineffective and possibly consider adding inotrope.
- ☐ Nicardipine (Cardene) up to 15mg/hr as need to keep MAP < 110. Notify physician if ineffective.
- ☐ Lubricant eye ointment (Lacrilube) to both eyes every 4 hours.
- ☐ Artificial tears 2 drops to both eyes PRN dry eyes.
- ☐ Chlorhexidine gluconate (Peridex) 0.12% oral rinse 15ml swish & spit every 12 hours with oral care.

Blood Glucose/Electrolyte Replacement Protocols

- ☐ Begin insulin drip protocol for blood glucose >200 for two consecutive values
- ☐ Electrolyte Replacement Protocol- Use central line for all electrolyte replacements. Potassium replacements stop when re-warming begins. Magnesium, Phosphorus and Calcium replacements stop when goal temp of 36.5°C (97.7°F) reached. Order Potassium replacements via e-Orders all other electrolyte replacements order boluses with Electrolyte iForm in e-Orders.

  - Potassium IV replacement (Only replace up to 3.4, re-warming causes rebound hyperkalemia.)
    K’< 3 give 20 mEq in 50ml over 2 hrs
    K’≥ 3 but ≤ 3.4 give 10 mEq in 50ml over 1 hr
    - Redraw K’ level 30 minutes after infusion completed and then repeat as needed.

  - Magnesium IV Replacement
    Mag + 1.8-2 mEq/L give Magnesium sulfate 1 g IV over 1 hour
    Mag + 1.2-1.7 mEq/L give Magnesium sulfate 2 g IV over 2 hours
    Mag + <1.2 mEq/L give Magnesium sulfate 4 g IV over 4 hours (administered using 2 g bags x 2 doses)
    - Recheck serum magnesium level 2 hours after full dose infused and then repeat as needed.
Phosphorus IV Replacement Protocol

- Phos 2-2.5 mg/dL give Sodium phosphate 10 mmol IV over 2 hours
- Phos 1.6-1.9 mg/dL give Sodium phosphate 20 mmol IV over 4 hours if oral route not available (Administered as 10 mmol IV over 2 hours x 2 doses)
- Phos ≤1.5 mg/dL give IV: Sodium phosphate or potassium phosphate 30 mmol x 1 dose now (Administered as 15 mmol IV over 3 hours x 2 doses for a total of 30 mmol)
  - Redraw phosphorus level 2 hours after each full IV dose and 2 hours after completing the last dose of the PO regimen and then repeat as needed.

Calcium IV Replacement

- IV Push Administration (Administer CaCl no faster than 1ml/min)
  - Ionized Calcium > 0.9 but ≤ 1.2 give 1 gm CaCl (over 10 min)
  - Ionized Calcium > 0.9 give 2 gm CaCl (over 20 min)

- IV Piggyback
  - Ionized Calcium > 0.9 but ≤ 1.2 give 1 gm CaCl in 50ml D5W over 30 minutes
  - Ionized Calcium ≤ 0.9 give 2 gm CaCl in 100ml D5W over 60 minutes
  - Redraw Ionized Calcium 2 hours after dose – repeat as needed
Nursing Considerations:
- Urine output hourly and call if < 30ml/hr x 2 hrs
- Do Not bathe patient during cooling or re-warming phase
- NGT/OGT to LIWS
- ABG’s must be analyzed at the patient’s actual body temperature. Send blood gases to lab with core temp written on the label.
- If significant dysrhythmias, hemodynamic instability or bleeding develop active cooling should be discontinued and the patient rewarmed and notify physician.
- Donor alliance should be notified for HACA patients within one hour of HACA protocol initiation.
- It is important for nursing to consider that train of four may be difficult to obtain during hypothermia due to peripheral vasoconstriction.
- Shivering is acceptable as a clinical indicator for pharmacological and/or non-pharmacological interventions. Shivering should be assessed and documented hourly using the Bedside Shivering Assessment Scale (BSAS). Goal BSAS ≤ 1.
- Pharmacological treatment of shivering, see Sedative/Paralytic medications.
- Non-pharmacological treatment options for shivering include:
  - Localized warming of hands and feet using socks or hand warmers.
  - Use of blanket or warm blanket
  - Use of warming device to extremities, such as Bair Hugger.

Bedside Shivering Assessment Scale (BSAS)
- Palpate pectoralis muscle & neck/mandible region
- Humming or vibration is an early indication of shivering
- **Goal: BSAS ≤ 1**

Treat shivering as early as possible to prevent rigorous shivering!!

Bedside Shivering Assessment Scale (BSAS)
Palpate masseter, pectoralis, deltoids and quadriceps muscles
- 0 = No shivering
- 1 = Mild = shivering localized to neck and/or chest only
- 2 = Moderate = shivering involving gross movement of upper extremities, neck & chest.
- 3 = Severe = intermittent to constant generalized shivering involving gross movements of the trunk and all 4 extremities
Allergies: __________________________________________________________________________

D/C Protocol at any time if...
- Hemodynamic instability when patient adequately resuscitated
- Unstable arrhythmias resistant to medications
- Severe bleeding, or platelet drop < 50,000
- Withdrawal of care is ordered
- Goal temp reached after re-warming phase complete

Re-warming Phase: Date and time rewarming phase to begin ____________________________

Re-warming Medications:
- Acetaminophen (Tylenol) 650mg NGT/PR every 4 hours as needed for temp > 37°C (97.6°F).
- Enoxaparin (Lovenox) 40mg SubQ every 24 hours (pharmacy to adjust for renal impairment) and if patient not receiving heparin drip for another indication and if platelets > 100K. Initiate when Temp 36.5°C and notify pharmacy.

Re-warming phase General Considerations to be used in conjunction with appropriate therapy below:
- Stop potassium replacements and notify Pharmacy.
- Stop Buspiron when temperature reaches 36.5°C (97.7°F)
- Continue paralytic (vercuronium) until temperature reaches 36.5°C (97.7°F), then discontinue.
- Monitor and document temperature every 15 minutes until target temp reached. Monitor and document other vital signs every 30 minutes until target temp reached.
- Apply SCD’s once temperature reaches 36.5°C.
- Administer Tylenol as needed for temp > 37°C. Do not permit hyperthermia.
- Monitor for potential complications: arrhythmias, infection, coagulopathies, rebound hyperkalemia, rebound hyperthermia, status epilepticus and hypotension.

Re-warming phase for the ZOLL Thermogard XP IVTM Cooling system to be used in conjunction with the above general considerations:
The re-warming phase should begin 24 hours after the initiation of cooling. Not 24 hours after target temperature was reached.
- Goal temp in 36.5°C (97.7°F)
- Set Thermogard XP to “Controlled Rate” at 0.2°C per hour. The machine will automatically cease re-warming when goal temp is reached.
- Continue normothermia at 36.5°C with Thermogard XP for 24 hours. If the trending graph of the machine is essentially flat and the patient’s temp has not increased, discontinue IVTM therapy 24 hours after re-warming goal temp of 36.5°C reached.

Re-warming phase for the Gaymar Surface Cooling system to be used in conjunction with the above general considerations:
The re-warming phase should begin 24 hours after the initiation of cooling. NOT 24 hours after target temperature was reached.
- Goal temp is 36.5°C (97.7°F)
- Re-warm slowly at a rate of 0.2°C – 0.3°C (0.4°F - 0.5°F) every hour.
- If problems occur during re-warming process. (overshoot or undershoot) put Gaymar machine in automatic mode and rapid. Set your set point 0.5°C higher and increase every 3 hours for a total of 18 hours.
- Stop re-warming process when temperature reaches 36.5°C to prevent hyperthermia.
- Remove all cooling devices. May use warm blankets but not Bair Hugger blanket. Return room temperature to normal.

Physician Signature: ______________________ Date: ____________ Time: ___________