MEMORIAL HOSPITAL AT GULFPORT

PROCEDURE # 335.1

AREA: ICU, Cardiac Cath Lab

PAGE: 1 OF 4

EFFECTIVE DATE: August 2009

UNIT MANUAL

POLICY:

Purpose: Hypothermia post cardiac arrest is utilized to slow the metabolism and preserve neurological function.

Text: 1. Inclusion criteria include: Witnessed cardiac arrest with return of spontaneous circulation within 60 minutes; unresponsive or not following commands following cardiac arrest; stable hemodynamics with or without external means (IABP or pressors).
2. Exclusion criteria include: Pregnancy; age equal to or less than 18 and greater than or equal to 85; Existing DNR status; End stage terminal illness; sustained refractory ventricular arrhythmias despite appropriate therapy; severe bradycardia without a temporary pacemaker; active bleeding, GI bleeding, intracerebral hemorrhage; or know coagulopathy; traumatic full arrest; comatose state or severe neurological dysfunction prior to arrest; platelet count less than 50,000; and a relative exclusion of septic shock.
3. IVs should be mixed in Normal Saline when possible due to patient’s insensitivity to insulin during hypothermia therapy.

Scope: This procedure applies to staff in the ICU, Emergency Department and Cardiac Cath Lab.

CONTENT:

Procedure Steps:

1. Screen patient for inclusion and exclusion criteria
2. Assist with sedation, intubation, paralysis, and line insertion. Apply BIS monitor; insert Foley catheter with temperature probe, and OG tube. Obtain baseline Train of Four threshold prior to administration of paralytic agent.
3. Ventilator settings will be as ordered. No ventilator weaning parameters should be initiated during hypothermia protocol.
4. Assess clinical status prior to initiation of hypothermia therapy to include (but not limited to): vital signs, SPO2, pulse, rhythm, QTc obtained from 12 lead EKG tracing; respiratory function, skin assessment, Glasgow Coma Score and neurological assessment (to include baseline prior to event per family/significant others).
5. Obtain baseline labs, EKG, ABG, echocardiogram and EEG.

Key Points:

1. See TEXT above or order set
2. Patient’s undergoing hypothermia treatment need central venous access (preferably a Precept catheter or PA catheter) and an arterial line. A rectal probe can be used when a Foley catheter cannot be placed, but should not be chosen as the primary temperature source otherwise.
3. Turn off ventilator heater until rewarming; HME filters are acceptable for use during induction and maintenance phases.
4. Report a QTc of greater than 450 milliseconds as this predisposes the patient to dysrhythmias.
5. Do not delay initiation of hypothermia therapy while awaiting EEG.
MEMORIAL HOSPITAL AT GULFPORT

Procedure

SUBJECT: Adult Induced Hypothermia Post Cardiac Arrest

PROCEDURE # 335.1

AREA: ICU, Cardiac Cath Lab

PAGE: 2 OF 4

EFFECTIVE DATE: August 2009

UNIT MANUAL

Procedure Steps:

6. Apply Arctic Sun pads being careful not to place over bony spinous processes. Connect Foley catheter to Arctic Sun.

7. Set temperature on Arctic Sun to 33 degrees Celsius in auto mode and initiate therapy. Record time of initiation of therapy.

8. Once therapy has begun, assess/document vital signs, SPO2, ETCO2, and presence of shivering every 15 minutes until goal temp is achieved. Obtain labs and treat per hypothermia order set.

9. Continue BIS monitoring, and document every 30 minutes during induction phase. Once goal temp is achieved, document BIS every hour. Sedation should be titrated to a goal of 40-60 on the BIS monitor. After baseline EEG performed, start paralytic per hypothermia order set.

10. Analgesia should be administered per PCA pump at a continuous basal rate per hypothermia order set

11. Expect hypotension. Infuse fluids per hypothermia order set.

12. Monitor blood glucose and treat per insulin infusion orders.

13. Start vasopressors per hypothermia order set as needed to maintain MAP between 80mmHg and 100mmHg or as ordered.

Key Points:

6. Pads should cover 40% of body surface for effective cooling.

7. 33-34 Degrees Celsius has been determined to be the optimum temperature range for hypothermia therapy. Lower temps predispose the patient to ventricular dysrhythmias.

8. Shivering may present as palpable vibrations on the face, neck, or chest wall. Hypothermia causes fluid diuresis and electrolyte shifts and requires constant surveillance to prevent hypotension.

9. Ocular lubricant ointment should be applied every 8 hours while patient is receiving paralytic. The goal for paralysis is a TOF of 1-2 of 4 stimulations. If shivering is present, a TOF of 1 may be needed.

10. Morphine should be used first. Fentanyl should be considered if the patient is allergic to morphine. Fentanyl may also be considered for refractory shivering but will need a separate order and may be administered as IV push bolus for shivering.

11. Hypothermia therapy causes a cold diuresis depleting both volume and electrolytes. Euvolemia should be maintained. Target a CVP of 6-10 mmHg or PCWP of 8-12 mmHg (if PA catheter utilized). Hemodynamically unstable patients may require Versed rather than Diprivan for sedation.

12. Hypothermia makes patients insensitive to insulin, so hyperglycemia should be anticipated and treated.

13. For patients with ACS or CHF use lower range for MAP. If patient does not have ACS or CHF the higher range for MAP may be more appropriate.
MEMORIAL HOSPITAL AT GULFPORT

PROCEDURE # 335.1

SUBJECT: Adult Induced Hypothermia Post Cardiac Arrest

AREA: ICU, Cardiac Cath Lab

PAGE: 3 OF 4

EFFECTIVE DATE: August 2009

UNIT MANUAL

Procedure Steps:

14. Document time patient reaches goal temperature. Once goal temperature is reached assess/document vital signs, SPO2, ETCO2, and presence of shivering every 30 minutes for 2 hours and then every hour. Monitor and document Arctic Sun water temp hourly and patient's core temp hourly. Obtain labs and treat per hypothermia order set.

15. 12 lead EKG should be obtained every 8 hours, and prn for dysrhythmia during hypothermia protocol. Document QTc interval.

16. Maintain goal temperature for 24 hours.

17. Begin rewarming after patient has been at goal temp for 24 hours.

18. Using automatic mode, set Arctic Sun to rewarm at a rate of 0.25 degree Celsius every hour until temp reaches 37.0 degrees Celsius.

19. Discontinue sedation and paralytic once patient reaches core temperature of 36.0 degrees.

20. Maintain temperature at 37.0-37.5 degrees Celsius for 12 hours using the Arctic Sun.

21. While rewarming assess/document vital signs, SPO2, ETCO2, and presence of shivering every 30 minutes. Obtain labs per order set. Hyperkalemia may develop during rewarming.

22. Continue to maintain euvoolemia during rewarming and maintenance phases.

23. Once patient is rewarmed, call physician for complete order set.

24. Once rewarming temp is reached monitor core temp every 2 hours for an additional 48 hours.

Key Points:

14. If patient does not reach goal temperature within 6 hours notify physician. Younger patients respond to cooling with greater intensity than older patients (monitor closely for shivering). Obese patients take longer to cool.


16. Follow hypothermia order set for stress ulcer, DVT, arrhythmia, and seizure prophylaxis.

17. Rewarming may occur at the end of 24 hours, or as physician orders for platelet count less than 50,000, persistent hemodynamic instability or persistent arrhythmias.

18. Goal for rewarming is 1.0 degree Celsius every 4 hours. Rewarming at a faster rate increases the risk of reperfusion injury.

20. Monitor for rebound hyperthermia. Hyperthermia is associated with poorer outcomes.

21. Expect vasodilation and hypotension. Hyperkalemia may develop during rewarming. Hyperkalemia may warrant decreasing the Arctic Sun temp by 0.5 degrees C. Usual potassium lowering strategies (Kayexalate or insulin and D50) may not be effective in these patients and a renal consult may be necessary for dialysis to remove the potassium.

22. Monitor for hypovolemia, and treat according to hypothermia order set.
<table>
<thead>
<tr>
<th>SUBJECT:</th>
<th>Adult Induced Hypothermia Post Cardiac Arrest</th>
</tr>
</thead>
<tbody>
<tr>
<td>AREA:</td>
<td>ICU, Cardiac Cath Lab</td>
</tr>
<tr>
<td>PAGE:</td>
<td>4 OF 4</td>
</tr>
<tr>
<td>EFFECTIVE DATE:</td>
<td>August 2009</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APPROVED</th>
<th>DATE: August 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Development Team Representative</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APPROVED</th>
<th>DATE: August 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APPROVED</th>
<th>DATE: August 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Director</td>
<td></td>
</tr>
</tbody>
</table>