TARGETED TEMPERATURE MANAGEMENT (TTM) FOR MICU

TTM IN THE MICU

- HFH MICU will start TTM for patients after PEA and asystolic (nonshockable) arrests who otherwise meet criteria on July 15, 2019
- Initially, this will apply to inhouse arrests and out of house arrests that reach the MICU within the TTM window; The ED will start TTM for out of hospital nonshockable rhythms in the near future
- These patients will be cared for in the MICU (no expected increase in patient number as these patients would go to MICU anyway)
- Patients with vfib/pulseless vtach arrests who meet criteria will continue to receive TTM; these patients should have a cardiology consult and provider discussion regarding transfer to P5 (CVICU)
- Patients with seizures s/p arrest should have a neuro critical care consult and be transferred to the 6W (neuroICU) if beds are available

HFHS TTM INCLUSION CRITERIA

Adult (age 15 and above) inpatient or out of hospital resuscitated patients from cardiopulmonary arrest regardless of arrest etiology with successful return of spontaneous circulation (ROSC) and cardiac rhythm who lack a meaningful response to verbal commands and remain in an unresponsive state (Glascow Coma Scale $\leq$ 8)

HFHS TTM EXCLUSION CRITERIA

- Patient awake/able to purposely follow commands
- Do Not Attempt Resuscitation (DNAR) Advance Directive or code status
- The appropriate surrogate decision maker plans to stop resuscitative efforts and cardiopulmonary support
- Time following ROSC > 8 hours
- Body Temperature < 30° C at time of arrest or following ROSC. (Refer to Environmental Hypothermia rewarming policy)
- Known coagulopathy or active bleeding
- Traumatic hemorrhagic arrest
- Serious existing medical condition with expected survival < 1 year, metastatic neoplasm, or hospice enrollment

HFH MICU TTM

- For the MICU, we will use an external cooling device – Arctic Sun ®
- This device requires placement of a device-specific temperature probe to measure core body temperature
- All TTM patients need an a-line placed for hemodynamic monitoring and ABGs

ARTIC SUN®

- The Artic Sun console, Artic Sun pads, temp sensing foley or esophageal / rectal probe is available from MICU charge
- Click link to watch the video on how to use the Artic Sun:

https://www.bing.com/videos/search?view=detail&mid=8D56AA0F50FA3FD4D0288D56AA0F50FA3FD4D028&shtp=OutlookCom&shid=84c1f37b-d180-4ed1-8d03-5d070976baa9&shtk=QXJjdGljIFN1bsKuIDUwMDA%3D&shdk=VGhpcyBpcyAiQXJjdGljIFN1bsKuIDUwMDAiIGJ5IEJhcmQgQ29ycCBNYXJrZXRpbmcgb24gVmltZW8sIHRoZSBob21lIGZvciBoaWdoIHF1YWxpdHkgdmlkZW9zIGFuZCB0aGUgcGVvcGxlIHdobyBsb3ZlIHRoZW0u&shhk=IcfhIxyw7ZmGyFLmVP%2B7XRNP4MC39rHI2Ow51PSHfMQ%3D&form=VDSHOT&shth=OSH.85hR1LRSNAFf2pjtvFO2Xg

Temp Sensing Foley

Esophageal / rectal probe

For use in the esophagus: measure from the ear lobe to mid chest with the probe. You do not want the probe to be in the stomach. Confirm placement with xray.

TTM SEDATION AND NEUROMUSCULAR BLOCKADE (NMB)

- If Fentanyl and Propofol infusions do not control shivering, add NMB using the NMB order set and follow as per administration instructions. Ensure patient RASS is -4 or -5 prior to initiating NMB.
- Continuous NMB infusions are usually not required during the TTM maintenance period after the goal temperature is achieved.

TTM TEMPERATURE GOALS

- Select a specific goal temperature between 32°-36°C
- This temperature should be achieved as early as possible following ROSC and maintained for 24 hours prior to gradual rewarming
- The goal is to reach target temperature within 4 hours of initiation of TTM.

TTM ELECTROLYTE MONITORING

- Discontinue electrolyte replacement protocol
- Do not use “fingerstick” or capillary blood glucose measurements in patients receiving TTM. Samples should be drawn from arterial line and tested on the standard glucometers.
- Hypothermia initiation/maintenance may cause hypokalemia while rewarming may cause hyperkalemia. Supranormal magnesium levels (2.5-3.5 mg/dL) may be useful during TTM for shivering prevention.
- Standard ICU Electrolyte Replacement protocols should be not be utilized in TTM patients
- Once rewarmed ICU Electrolyte Replacement Protocols may be initiated

TTM FEEDING

- Place large bore gastric tube to low intermittent suction
- Patients are NPO without enteral feeding while on the TTM protocol
- Once rewarmed and bowel sounds are present, tube feeding may be started

TTM REWARMING PHASE

- Discontinue all NMB agents
- Following 24 hours of TTM at goal temperature, rewarming should be done at controlled rate of 0.25° C/ hour to a recommended goal temperature of 37°C
- Once a core temperature of 36°C degrees is reached, sedation may be discontinued and reordered using the Pain, Agitation and Delirium Protocol (PAD Protocol).
- Once a core temperature of 36°C degrees is reached, ICU Electrolyte Replacement Protocol should be re-ordered in appropriate patients.
- The TTM device should remain in place after active rewarming for an additional 24 hours with core temperature maintained at 37°C
- .

AHA 2015 POST-CARDIAC ARREST TTM RECOMMENDATIONS

- We recommend that comatose (ie, lack of meaningful response to verbal commands) adult patients with ROSC after cardiac arrest have TTM (Class I, LOE B-R for VF/pVT OHCA; for non-VF/pVT (ie, “nonshockable”) and in-hospital cardiac arrest)
- We recommend selecting and maintaining a constant temperature between 32°C and 36°C during TTM
- It is reasonable that TTM be maintained for at least 24 hours after achieving target temperature

AHA ACLS POST-CARDIAC ARREST CARE 2015 EVIDENCE/RECOMMENDATIONS FOR TTM

https://eccguidelines.heart.org/index.php/circulation/cpr-ecc-guidelines-2/part-8-post-cardiac-arrest-care/