



Keeping a Cool Head After Resuscitation

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-and-

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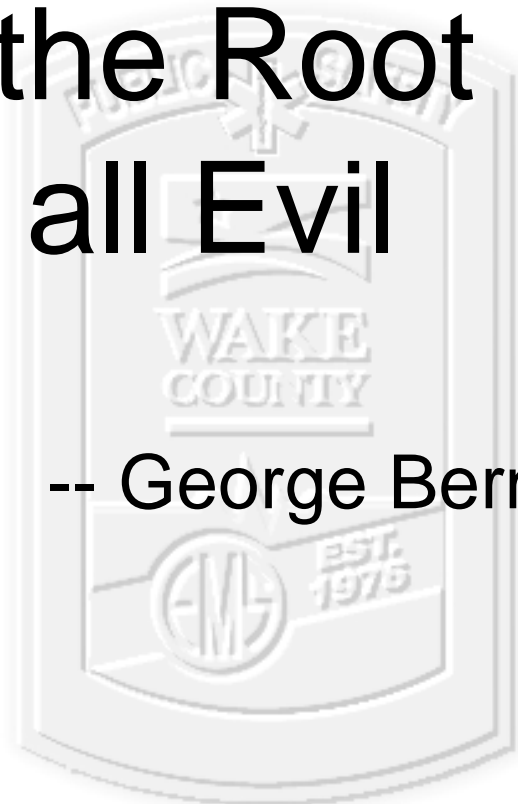
**“Although we await further studies
With great interest,
We recommend the use of mild
Induced hypothermia
In survivors of cardiac arrest –
As early as possible and for
At least 12 hours”**

-- Peter Safar and Patrick Kochanek, NEJM 2002;346(8):612-3



Lack of Money Is the Root Of all Evil

-- George Bernard Shaw





Our Program: **ICE**

Induced

Cooling by

EMS





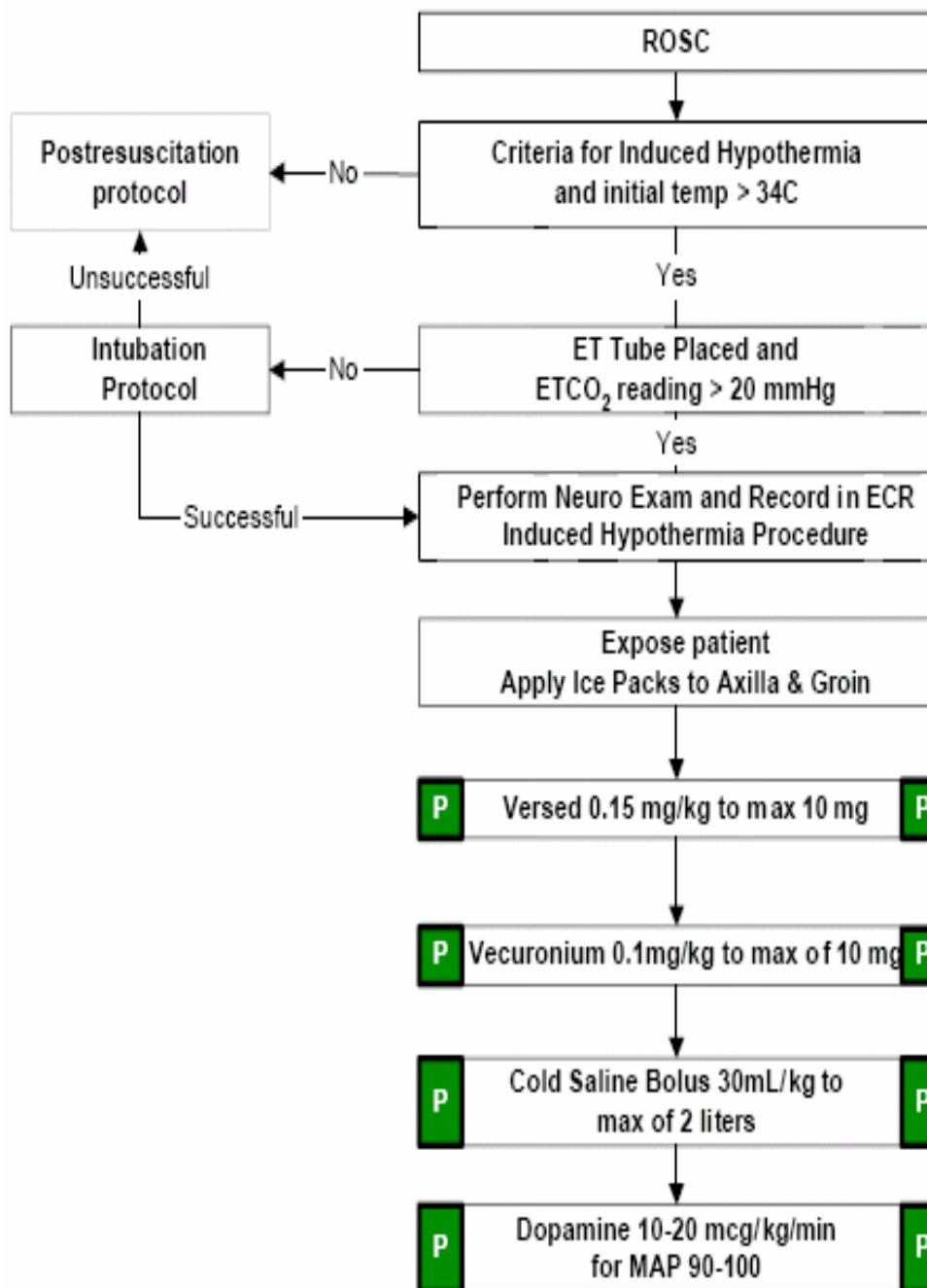
Elements of Prehospital Hypothermia

- ROSC
 - Uninterrupted compressions, timely defibrillation, controlled ventilations, efficient dispatch
- Method of cooling
 - \$\$ vs. ease of use
- Hospital coordination
 - Selective destination
 - Continuation of cooling

Pearls:

• **Criteria for Induced Hypothermia:**

- ROSC after cardiac arrest not related to trauma or hemorrhage.
- Age greater than 16
- Female without obviously gravid uterus
- Initial temperature > 34C
- Patient is intubated and remains comatose (no purposeful response to pain)
- If patient meets other criteria for induced hypothermia and is not intubated, then intubate according to protocol before inducing cooling. If unable to intubate DO **NOT** initiate induced hypothermia.
- When exposing patient for purpose of cooling undergarments may remain in place. Be mindful of your environment and take steps to preserve the patients modesty.
- Do not delay transport for the purpose of cooling.
- Reassess airway frequently and with every patient move.
- Patients develop metabolic alkalosis with cooling. Do not hyperventilate.
- **If there is loss of ROSC after cooling is initiated or any other complication as the result of this protocol please complete hypothermia unusual event reporting form and contact a Medical Director on completion of the call.**



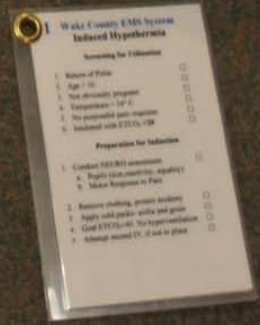
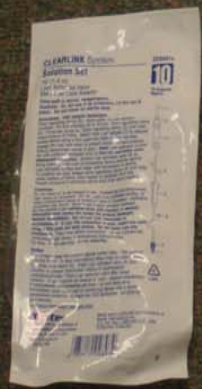
Legend		
	EMT	
I	EMT- I	I
P	EMT- P	P
M	MC Order	M

AT ANY TIME
Loss of Spontaneous
Circulation:
Discontinue cooling and
go to
appropriate protocol

Monitor ETCO₂ Target
40 mmHg
DO NOT
HYPERVENTILATE







- WAVE Connect EMS System Induced Hypertension**
 Screening for Evaluation
- 1. Return of Pulse
 - 2. Right ILE
 - 3. Not clinically pregnant
 - 4. Temperature < 101.6
 - 5. No abnormal vital signs
 - 6. Sealed with ECG, ECG, ECG
- Preparation for Induction
- 1. Conduct ECG with annotations
 - a. Apply V4a, V5a, V6a, V4b, V5b, V6b
 - b. Make Response to Pads
 - 2. Ensure checking, patient location
 - a. Apply and pad on chest and arms
 - b. Lead ECG to do. This hyper ventilation
 - c. Always record ECG, if not in place



Midazolam
10 mg/mL
10 mg/mL
10 mg/mL
10 mg/mL
10 mg/mL
10 mg/mL
10 mg/mL
10 mg/mL

Vecuronium Bromide
10 mg/mL
10 mg/mL
10 mg/mL

EXEL
HYPODERMIC NEEDLE
STERILE
NON-TOXIC
PYROGEN FREE
SINGLE USE ONLY, DESTROY AFTER USE
EXEL INT'L, CA 90608 U.S.A.
19G

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Miltac, Inc. - Chicago, IL 60611
LOT/EXP
5062457 MAY 08
Solution is in Portway are Sterile

10 mL
10 mL
10 mL
10 mL

1 Wake County EMS System Induced Hypothermia

Screening for Utilization

1. Return of Pulse
2. Age > 16
3. Not obviously pregnant
4. Temperature > 34° C
5. No purposeful pain response
6. Intubated with ETCO₂ >20

Preparation for Induction

1. Conduct NEURO assessment:
 - a. Pupils (size, reactivity, equality)
 - b. Motor Response to Pain
2. Remove clothing, protect modesty
3. Apply cold packs- axilla and groin
4. Goal ETCO₂=40. No hyperventilation
5. Attempt second IV, if not in place



Hospital Destination

- High volume cardiac catheterization center
- Post-arrest care may include PCI and transfer while in the 24 hour window is cumbersome



Key Representatives

- Nursing and Physicians from:
 - Emergency
 - CCU
 - ICU
 - NICU
- Nurses are the key representatives
 - Choose device, write standing orders, etc.



In Hospital Maintenance

- Continuing cooling
- Maintain sedation / paralysis
- Maintain MAP >90mmHg
- Close monitoring of glucose, potassium, volume status, temp
- Skincare if cooling blanket/ice
- Acetaminophen / GI prophylaxis
- Maintain for period of 24 hrs



Passive Rewarming

- Rewarm at 0.5-1°C/hr
- Takes approx 6-8 hrs
- Paralysis maintained until 36°C
- Monitor for electrolyte and fluid status during re-warming
- Strict normothermia for 48 hrs



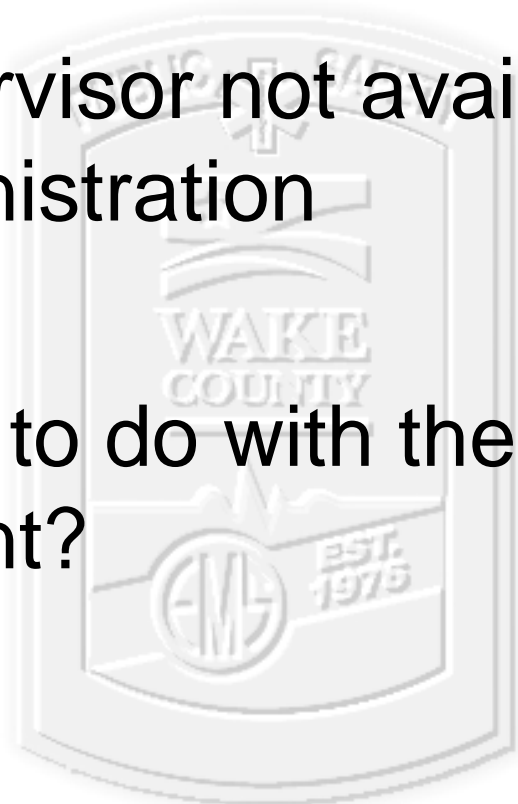
Pitfalls

- Study criteria as exclusion criteria
 - Non VF/VT arrests
 - Unclear “down time”
- EMS personnel timid with fluid administration
 - Full bolus = 1.5 – 2 degree decrease
 - <500 ml = minimal temperature change



Pitfalls

- Supervisor not available for fluid administration
- What to do with the re-arrest patient?





Results So Far

- ~27 patients considered for IH
 - 8 excluded
 - 4 contraindicated
 - 2 no supervisor/arrest en route
 - 2 re-arrest
- 19 patients induced pre-hospital +
2 patients induced in-hospital =
21 total patients with some
hypothermia



Why May This Work?

- Stated hypothermia mechanism to preserve neuro tissue
- MAP improvements due to cold fluid
- Marshal Isaac's "we don't *&^% with them" theory



Summary

- Induced hypothermia is a simple and safe intervention in the pre-hospital setting
- The hospital, departmental, and physician interactions create most of the pitfalls



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Citations

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