

### Today's Agenda

- Trauma triage guidelines
- CCR
- Therapeutic Hypothermia

Who should be transported to a trauma center?  
**TRAUMA TRIAGE GUIDELINES**

### Overview

- Released by CDC
  - MMWR 1/23/09
  - [www.cdc.gov/mmwr](http://www.cdc.gov/mmwr)
- Reviewed evidence
  - Severity predictors
  - Criteria changes

### Overview

- 4 step triage process
- Recognized different systems
  - Transport to nearest appropriate trauma center
  - Not necessary to transport to Level I

### Step One: Physiologic Criteria

- Added:
  - RR < 20 in infants < 1 y/o
- Deleted:
  - RTS < 11

### Step Two: Anatomic Criteria

- Added:
  - Crushed, degloved, mangled extremity
- Modified:
  - Open or depressed skull fracture
- Moved:
  - Major burns

### Step Three: Mechanism Criteria

- Added:
  - Child (<15 y/o) fall > 10ft or 2 – 3 times height
  - Vehicle telemetry
- Deleted:
  - Rollover
  - Extrication > 20 min
- Modified:
  - > 12" intrusion by pt or > 18" anywhere

### Step Four: Special Considerations

- Added:
  - Time sensitive extremity injury
  - ESRD on dialysis
  - Provider judgment
- Deleted:
  - IDDM, CV, respiratory disease
  - Cirrhosis, immunosuppressed
  - Morbid obesity
- Modified:
  - Burns
  - Pregnancy > 20 weeks

### CCR

### CARDIOCEREBRAL RESUSCITATION

Continuous Chest Compression

### CPR = CARDIO-PULMONARY RESUSCITATION

*Why are we resuscitating the lungs???*



### Bystander Compressions

- Early Bystander Compressions essential
- Often delayed by gasping
  - Snoring / Gurgling
  - Noisy / heavy breathing
- Gasping viewed as breathing
- EMD questioning

### The Gasp

- Up to 50% cardiac arrest patients
- Still moving air
- Intrathoracic pressure changes

### Airway Management

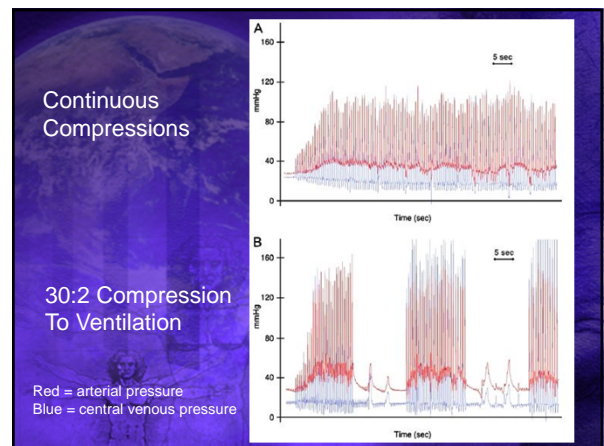
- Arterial oxygen content adequate
  - During gasp
  - During continuous compressions
- Lack of blood flow the problem, not lack of oxygen!
- Delay airway management until gasping stops

### Mouth to Mouth

- Inhibits bystander willingness
- Interrupts compressions = interrupts blood flow
- Increases regurgitation
- Increases intraabdominal pressure
  - Limits lung expansion

### Compressions

- Blood flow gradually increases first 7 – 8 compressions
- Faster = improved pressures
- Chest recoil improved filling
- Overinflation causes decreased cardiac filling!





### CCR Summary

- Maximize compressions
- Minimize interruptions
- Ventilate when gasping stops
- Brief stop for shocks only
- Airway management minimized
- Jeff's suggestion: supraglottic airway instead of intubation



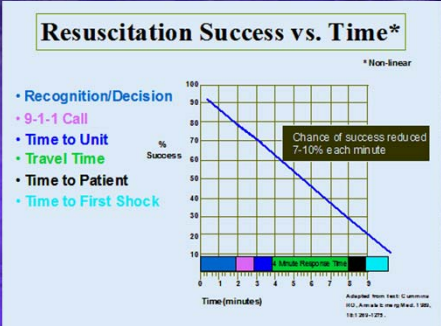
Next link in the chain of neurologically intact survival?

## THERAPEUTIC HYPOTHERMIA

### Resuscitation Success vs. Time\*

\* Non-linear

- Recognition/Decision
- 9-1-1 Call
- Time to Unit
- Travel Time
- Time to Patient
- Time to First Shock



Chance of success reduced 7-10% each minute

Time (minutes)

Adapted from: Bill C. Gattinoni, MD, Anesth & Crit Care Med, 1999, 18(12):201-205.

### What Is Therapeutic Hypothermia?


- Purposely decrease body temperature
- Used after Return of Spontaneous Circulation (ROSC)

### Death After ROSC

- 10% die due to recurrent dysrhythmias
- 30% die due to cardiovascular collapse
- 20% die due to other causes (sepsis, etc.)
- **40% die from neuro impairment**

### Recommendation:

“Unconscious adult patients with spontaneous circulation after out-of-hospital VF cardiac arrest should be cooled to 32-34°C. Cooling should be started as soon as possible and continued for at least 12-24 hours.”



Nolan JP, Deakin CD, Soar J, et al. European Resuscitation Council Guidelines for Resuscitation 2005 Section 4. Adult advanced life support. Resuscitation 2005; 67 (Suppl 1): S39-S86.



### Recommendations:



- American Heart 2005
  - Comatose Out of Hospital VF Arrest -> **Class Ila**
  - In hospital / other rhythms -> **Class Iib**

### Prehospital Therapeutic Hypothermia

- 2005 AHA / ILCOR Recommendations
- Multiple studies
- Number Needed to Treat (NNT) = 4 – 7
  - Better than some other proven therapies

### Why???

- Slow cell metabolism rate
  - But improves use of glucose
  - Improves cell processes
- Decrease secondary injury:
  - Reperfusion injury
  - Oxygen free radicals

### Why???

- Decrease inflammatory response
- Decrease coagulation
- Reduces intracranial pressure
- Reduce injury from seizure

### But what about....

- Defib effectiveness:
  - Improved first shock with mild hypothermia
- Medications:
  - Vasoconstriction from hypothermia
  - Increases body's own release
  - May need less
  - Only information moderate to severe hypothermia

### How do we do it?

- Surface cooling
  - Expose patient
  - Turn down heat
  - Ice packs in axillae & groin
- Infuse cold saline
  - Maintained at 4°C
  - 30 ml/kg up to 2 liters



### How do we do it?

- Vasopressors:
  - Improve blood pressure
  - Maintain perfusion
- Sedation / Paralysis
  - Stop shivering

### Wake County, North Carolina

- Staged implementation of 2005 guidelines
- Baseline neuro intact survival
  - All comers = 4.2%
  - VF/pVT = 13.8%
- After full implementation:
  - Neuro intact survival = 11.5% / 40.8%
  - When therapeutic hypothermia introduced:
    - 8.1% -> 11.5%
    - VF/pVT: 34.6% -> 40.8%



Of our potpourri of topics!

### REVIEW

### Review

- Updated field trauma triage scheme
  - Improved focus on physiologic and anatomic criteria
  - Needs study and improvement in MOI criteria
- CCR
  - Continuous compressions improve coronary & cerebral blood flow
  - Airway management deemphasized

### Review

- Therapeutic Hypothermia
  - Prevent secondary cell injury
  - Improves neurologic outcome

**J E F F M Y E R S , D O**



**G U I D I N G M E D I C A L E D U C A T I O N**

Jeff Myers, D.O., Ed.M., NREMT-P, FAEM  
Director, Behling Simulation Center  
Clinical Assistant Professor Emergency Medicine  
University at Buffalo Academic Health Center

myersj@photoemsdoc.com  
<http://www.photoemsdoc.com/>  
716.898.3525

Handout & Answer key can be downloaded from:  
<http://www.photoemsdoc.com/downloads.htm>

