Who should be transported to a trauma center?

TRIAGE TRIAGE GUIDELINES

Today's Agenda

- Trauma triage guidelines
- CCR
- Therapeutic Hypothermia

Overview

- Released by CDC
  - MMWR 1/23/09
  - 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 > 10 ft 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

**Continuous Chest Compression**

CARDIOCEREBRAL RESUSCITATION

**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*

**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.”

Recommendations:

- American Heart 2005
  - Comatose Out of Hospital VF Arrest -> Class IIa
  - 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%

**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

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