ComSpec: Med 2 – you are being requested right now. Going to the scene. It is near Montfort, in Livingston. I will get you the coordinates momentarily.

ComSpec: Med 2 – this is not the car accident we thought it was. This is a 9-year old male who was trampled by cows. He is unresponsive. Initially he was going in and out of consciousness. Tons of bruising, bleeding from the mouth and nose. Now he is fully unresponsive. They are going to meet us in the Iowa Grant School parking lot.
MF Doc: Med Base, this is Med 2 – just want to confirm that this is a 9-year old Pediatric patient?

ComSpec: That is affirmative. A 9-year old male pediatric patient – trauma.

MF Doc: Okay, understood. Thank you.
Initial Impressions

• Trevor

• Drew
Cardiac Arrest

• Traumatic
  • Penetrating
  • Blunt
• Medical
PULSLESS ARREST
- BLS Algorithm: Call for help, give CPR
- Give oxygen when available
- Attach monitor/defibrillator when available

1. Shockable

2. Check rhythm

3. Shockable rhythm?

4. Give 1 shock
   • Manual biphasic: device specific (typically 120 to 200 J)
   • AED: device specific
   • Monophasic: 360 J

5. Resume CPR immediately

6. Check rhythm

7. Shockable rhythm?

8. Check rhythm

9. Not Shockable

10. Asystole/PEA

11. Give 5 cycles of CPR∗

12. Check rhythm

13. Ifystride, go to Box 10

During CPR
- Push hard and fast (100mm)
- Ensure full chest recoil
- Minimize interruptions in chest compressions
- One cycle of CPR: 30 compressions then 2 breaths, 5 cycles = 4 min
- Avoid hyperventilation
- Secure airway and confirm placement
- After an advanced airway is placed, measure no longer deliver "cycles" of CPR. Give continuous chest compressions without pauses for breaths. Give 8 to 10 breaths/minute. Check rhythm every 2 minutes

* Consider atropine 1 mg IV/IO for asystole or slow PEA rate, Repeat every 3 to 5 min (up to 5 doses)

During CPR
- Potate compressors every 2 minutes with rhythm checks
- Search for and treat possible contributing factors:
  - Hypovolemia
  - Hypoxia
  - Reversing ion (acidosis)
  - Hypo-hyperkalemia
  - Hypocalcemia
  - Hypothermia
  - Tetany
  - Tension pneumothorax
  - Thoracostomy (coronary or pulmonary)
  - Trauma
Traumatic Arrest

- Leading cause of death up to age 45
- Most often PEA/Asystolic
- Penetrating trauma has much better outcomes than blunt
- Reversible causes of traumatic arrest:
  - Hypovolemia
  - Hypoxia
  - Obstruction
Airway
Breathing Circulation
Initial Actions

• Drew:
  • L humeral IO
  • Bilateral finger thoracostomies
  • Endotracheal Intubation

• Trevor
  • L AC 18-gauge IV
  • Medications – Epinephrine, HTS, Atropine
  • Monitor, End-Tidal Capnography
Benefits to Upland Hills

• More medical staff
• Access to more blood products if needed
• Access to ultrasound to help guide management
• Additional social resources
• Better able to continue resuscitation en-route
Med 2 Pilot: Med 2 took off at 1528 with 4 souls.
Philosophy

- Absence of nihilism
- Chest compressions de-emphasized
- Use evidence to support starting and stopping resuscitation
- Application of aggressive, necessary interventions in the prehospital setting
- Aggressive hemorrhage control measures
- Early resuscitation with blood products and adjuncts such as TXA and Calcium
- Open/finger thoracostomy as opposed to needle or tube thoracostomy
“In extreme disease, extreme methods of cure are most suitable” - Hippocrates
H = Hypovolemia

O = Oxygenation

T = Tamponade
HYPOVOLEMIA
TAKE-HOME MESSAGE
Hypertonic solutions offer no survival benefit compared with isotonic solutions in traumatic hemorrhagic shock.

METHODS

DATA SOURCES
Authors searched Cochrane Central Register of Controlled Trials, MEDLINE (through PubMed), and EMBASE from inception through June 2014.

Does Administration of Hypertonic Solutions Improve Mortality in Hemorrhagic Shock Compared With Isotonic Solutions?

EBEM Commentators
Brit Long, MD
Michael D. April, MD, DPhil
Department of Emergency Medicine
San Antonio Uniformed Services Health Education Consortium
Fort Sam Houston, TX

original meta-analysis authors stated that hypertonic solutions and hypertonic saline with dextran are feasible resuscitation options in trauma patients with hemorrhagic shock in the out-of-hospital setting. Blood products likely remain the optimal fluid to resuscitate patients in hemorrhagic shock, including tranexamic acid if provided within 3 hours of injury. There remains a need for further study of the safety and efficacy of hypertonic solutions in alternative patient populations such as those with head trauma.
OXYGENATION
The Bougie and First-Pass Success in the Emergency Department

Brian Driver, MD, Kenneth Dodd, MD, Lauren R. Klein, MD, Ryan Buckley, MD, Aaron Robinson, MD, John W. McGill, MD, Robert F. Reardon, MD, Matthew E. Prekker, MD

DOI: https://doi.org/10.1016/j.annemergmed.2017.04.033 | Check for updates

Article Info
"Pre-hospital care is about rapid, meaningful, interventions with honorable intentions"
Initial Actions

• Drew:
  • L humeral IO
  • Bilateral finger thoracostomies
  • Endotracheal Intubation

• Trevor
  • L AC 18-gauge IV
  • Medications – Epinephrine, HTS, Atropine
  • Monitor, End-Tidal Capnography
Aggregation of Marginal Gains

- 1% Improvement
- 1% Decline

Time
Improvements

• Avoid premature closure
• Balanced product resuscitation – including plasma
• Improved logistics
• Prehospital Ultrasound to help guide managements
• Pediatric TXA protocol
• System for Improved Ventilator Use
ER Charge RN: This is UW – go ahead Med Flight

MF Doc: We are currently 14 minutes out with a Pediatric Level 1 Trauma. It is a 9-year old male who was trampled by cows. Patient was in traumatic cardiac arrest on our arrival. He currently does have ROSC. He has signs of head injury with dilated pupils and trauma to his head. He also has a positive FAST exam in the right upper quadrant. He has received bilateral finger thoracostomies. He has received Hypertonic Saline. He is also currently receiving PRBC’s. Last set of vital signs are a heart rate of 100, difficulty obtaining a blood pressure but he has an end-tidal of 25. He is unresponsive but making spontaneous respiratory efforts. Do you have any questions at this time?