E.M.S. Mythbusters

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BSN: December 2010
BA: English Literature, 1985
RN: staff nurse, emergency department
Saint Elizabeth Regional Medical Center
Lincoln, Nebraska
(original diploma 2003)
EMT-P: 1997
CEN: Certified Emergency Nurse since 2006
First CPR/First Aid Class, 1994

Saint Elizabeth Regional Medical Center
Lincoln, Nebraska

- 250-bed hospital
- 25-bed emergency department
- 30-35K E/R visits/year
  - Regional Burn Unit
  - NICU
  - Magnet Recognition
Bethesda-Chevy Chase (Maryland) Rescue Squad

Lincoln Fire & Rescue

Man burned in explosion at suspected meth lab

Lincoln meth labs 2001

Dallas and Mattie Nightly, owner and manager, have begun a small business making cosmetics with petroleum. The business is located in an old oil drum on the side of the street near the gas station. The business is called "Dallas and Mattie's Cosmetics" and the Nightlys are hoping to sell their products in the future.

Lincoln Nightly has been experimenting with the meth lab and has found that the product is very dangerous. The Nightlys have been warned by police that they must stop their business immediately.

Dallas Nightly said, "We didn't know what we were doing. We thought it was a good idea, but we didn't realize it could be so dangerous. We are going to have to shut down the business and find another way to make a living."
“Evidence-Based Practice in Prehospital Care”

(zzzzzzzzzzzz)

“Since when do nurses care about evidence-based practice?”
Look at the process of research.
Examine current practice in the light of the latest healthcare research.
Explore the uses of evidence based practice in EMS.
Discuss directions for change in EMS based on research.

EMS Mythbusters

“The case of CPR:

“Why do they keep changing this stuff?”
Safar 1954

Aortic pressures during traditional CPR
“Hands only” bystander CPR

...It was difficult to get this report published because, frankly, the results were too good to believe...

Ewy, 2009
How research is conducted

- “Effect of Out-of-Hospital Pediatric Endotracheal Intubation on Survival and Neurological Outcome”
- Gausche, et al. (JAMA, February 2000)
- Controlled trial
- 830 pediatric patients
- Alternated ETI/BVM with BVM-only
- No difference in survival
- No difference in neurological outcome
Who decides the protocols?
- ILCOR
- Class I: Benefit > Risk.
  - Treatment should be performed
- Class IIa: Additional study needed
  - It is reasonable to perform the treatment
- Class IIb: Benefit >/= Risk, additional study needed
  - Treatment may be considered
- Class III: Risk > Benefit
  - Should not be performed

How do YOU find the research?
Oxygen:
You’d think that **THIS** would be simple….

“MONA greets all chest pain patients.”

Oxygen is a MEDICATION

- Indications
- Side Effects
- Contraindications
Oxygen: Known Contraindications

- Paraquat poisoning
- COPD

COPD:

Oxygen for CO2 retainers:

Reducing stimulation of the hypoxic drive?

Not really....

- The Haldane Effect
- Ventilation/Perfusion mismatch
- Reduction of the hypoxic drive
The Haldane Effect

- Supplemental oxygen reduces the amount of deoxygenated hemoglobin.
- Reduces the capacity of blood to carry carbon dioxide.
- (Increased oxygen decreases production of bicarbonate.)

Ventilation/Perfusion Mismatch

- Under-ventilated lung usually has a low oxygen content which leads to localized vasoconstriction, limiting blood flow to that lung tissue.
- Supplemental oxygen reduces this constriction, leading to poor ventilation-perfusion

This redistribution of blood to areas of the lung with poor ventilation reduces the amount of carbon dioxide eliminated from the system.
Reduction of Hypoxic Drive

Central chemoreceptors:
Medulla: pH of CSF

Peripheral chemoreceptors:
O2 in blood

So...
How do we get oxygen into the system without increasing FiO2?
Looking ahead…

- **BIPAP**: Bi-level Positive Airway Pressure

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**ETCO2 detector/Capnography**

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**Supplemental Oxygen: What does the research show?**

“MONA greets all chest pain patients.”
Effects of supplemental oxygen

- Increased coronary vascular resistance
  - Reduced coronary blood flow
- Heart rate slowed, systolic BP increased
- Increased free radicals

American Heart Association
2010 guidelines
Acute Coronary Syndromes

- Oxygen should be administered to patients with breathlessness, signs of heart failure, shock, or an arterial oxyhemoglobin saturation <94% (Class I).

“In the absence of compelling evidence for established benefit in uncomplicated cases, ACC/AHA Guidelines have noted that there appeared to be little justification for continuing routine oxygen use beyond 6 hours. There is insufficient evidence to recommend the routine usage of oxygen therapy in patients suffering from an uncomplicated AMI or an ACS without signs of hypoxemia or heart failure.”
“Association between arterial hyperoxia following resuscitation from cardiac arrest and in-hospital mortality”

6326 patients over 5 years


The research continues….

Neonatal Resuscitation

- 2010 AHA Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science
  - Part 15: Neonatal Resuscitation

The Research

- Stroke
- Neonatal resuscitation
- COPD
- Asthma

The research continues….
“Two meta-analyses of several randomized controlled trials comparing neonatal resuscitation initiated with room air versus 100% oxygen showed increased survival when resuscitation was initiated with air.”

If the baby is bradycardic (HR <60 per minute) after 90 seconds of resuscitation with a lower concentration of oxygen, oxygen concentration should be increased to 100% until recovery of a normal heart rate (Class IIb).

Strokes and Oxygen
- Ronning, O. & Guldvog, B. (1999)
- 310 patients
- 3 LPM per NC v. room air
- No benefit / no significant difference.
Bleeding control

- AHA gets into the First Aid business

American Red Cross

Bleeding Control:
The American Red Cross version

- Direct Pressure
- Elevation of bleeding extremity
- Dressing
- Pressure Points
- T-T-T-T
Bleeding Control
The AHA version

- Direct Pressure…
- We HAVE the evidence.
Cardiac Catheterization

- The groin approach

Bleeding Control

- Elevation: We DON’T have the evidence.
Bleeding Control

- Pressure Points…still thinking….

Bleeding Control

- Tourniquets

Combat tourniquets
WARNING: Nasty Photo Ahead (Isn’t that why you came?)

Shock:
- Trendelenberg: Common Sense
  v.
  the Evidence
“The general slant of the available data seems to indicate that the Trendelenburg position is probably not a good position for resuscitation of patients who are hypotensive.”

• Bridges, Jarquin-Valdivia (2005)
Cervical Spine Immobilization
• …still thinking about this….

Nexus criteria
(National Emergency X-Radiography Utilization Study)
• There is no posterior midline cervical tenderness
• There is no evidence of intoxication
• The patient is alert and oriented
• There is no focal neurological deficit
• There are no painful distracting injuries (e.g., long bone fracture)

Disadvantages of C-Spine Precautions
(anecdotal & otherwise)
Increases aspiration risk
Makes airway management more difficult
Increases intracranial pressure
Increases the incidence of pressure sores
Is expensive
Increases combativeness in drunk patients
Is time consuming to put people in.
Is difficult to remove without lumbar movement.
Frequently fails to achieve a neutral alignment.
The Research

- Baylor study (2010): Cadavers
- Washington University study (2008): Motion-capture cameras

Baylor

Motion-capture
“Cervical Spine Motion During Extrication: A Pilot Study”

“…least motion of the cervical spine in subjects who had a cervical collar applied and were allowed to simply get out of the car and lie down on a stretcher…”

MORE c-spine motion

• To long spine board with and without KED
Buck’s Traction

EMS Myths: Our Final Chapter
Drowning and “Near-Drowning”
Quiz: True or False?
- A significant number of drownings are “dry drownings”: The victim’s glottis closes when water contacts it and no water enters the lungs.

Quiz: True or False?
- Rescuers should do abdominal thrusts on drowning patients to expel aspirated and swallowed water.

Quiz: True or False?
- Cervical spine immobilization is essential for all drowning patients.
Quiz: True or False?

Unresponsive, hypothermic/cold water drowning patients should be rewarmed to normal temperature as quickly as possible.

FALSE
FALSE
FALSE
FALSE
FALSE
FALSE
FALSE
FALSE
FALSE

MYTHS!

Quiz: True or False?

A significant number of drownings are “dry drownings”: The victim’s glottis closes when water contacts it and no water enters the lungs.

FALSE!
Why this misconception?

- Cardiac arrest
- Respiratory arrest
- Into the water without respiratory effort
  ...and
  No water in the lungs!

...also...Immersion syndrome

A (surprise) fall into water 40 degrees F or colder.
Immediate VFib or Aysystole

Quiz: True or False?

- Rescuers should do abdominal thrusts on drowning patients to expel aspirated and swallowed water.

FALSE!
NO ABDOMINAL THRUSTS

- This is a class III recommendation
  - (remember this?)
Quiz: True or False?

- Cervical spine immobilization is essential for all drowning patients.

FALSE!

C-Spine immobilization is a class III recommendation UNLESS THERE IS A CLEAR HISTORY OF TRAUMA

- Airway, Breathing, Circulation are your priorities!
- Trauma indications:
  - Boating/Jet Ski
  - Diving accident
  - MVC
  - Fall from height


- 11 (0.5%) had cervical spine injuries:
- All 11 had:
  - Clinical signs of injury
  - History of trauma
Quiz: True or False?

- Unresponsive, hypothermic/cold water drowning patients should be rewarmed to normal temperature as quickly as possible.

**FALSE!**

Therapeutic Hypothermia

- Unresponsive, post-arrest patients
- Neuroprotective post ischemia
- Cool to 90 degrees F
- Another Myth: “They aren’t dead until they are warm and dead.”

I hope that I got you thinking, BUT...

- **Always follow your current, local protocols!**
THIS is not the time to discuss protocols….  

What do you do next?  
- Research.  
- Discuss your protocols.  
  meanwhile  
FOLLOW YOUR LOCAL PROTOCOLS

Questions? Comments?  
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