The Science of BLS

And ALS

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Disclaimers

- No financial interests…….
- This material in no way gives you……

By The Numbers

- 460,000 deaths from CAD/year
- ½ die before reaching the hospital
- Only 60% of STEMIs called 911
- 1 in 300 POV have a cardiac arrest in route

Acute Coronary Syndrome

www.medscape.com

Statins in Acute Coronary Syndrome

Very Early Initiation and Benefits

Therapeutic Advances in Cardiovascular Disease

Fabio Angeli, MD, Gianpaolo Reboldi, MD, PhD, MSc, Giovanni Mazzotta, MD, Marta Garofoli, MD, Maria Francesca Cerasa, MD, Paolo Verdecchia, MD, FACC, FESH

Ther Adv Cardiovasc Dis. 2012;6(4):163-174.

- Statins in ACS
- Ischemic Remote Co
- ?Hypothermia before

SCA (Sudden Cardiac Arrest)

- 3 Phase model
  - Electrical (0-5 min)
  - Circulatory (5-15 min)
  - Metabolic
- ALS versus BLS

The impact of advanced life support for the out of hospital cardiac arrest patient remains unproven. The Ontario Prehospital Life Support (OPALS) study, which is the largest prospective prehospital study ever conducted, failed to show any survival advantage to cardiac arrest patients treated by EMT-Ds versus a tiered system with paramedics. This is despite a huge emphasis on early ALS for cardiac arrest patients, including advanced airways, a variety of medications, and intravenous and intraosseous access.

Get Ahead of the Curve

The Pit Crew Approach

2014

STEMI Centers

STEMI Center benefit

AIRWAY

- Airway
  - Advanced airways versus BLS

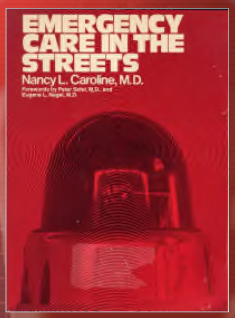
Introduction

- **Now that it mattered, it was found that paramedic ETI success rates were woefully low.**

Misplaced Endotracheal Tubes by Paramedics in an Urban Emergency Medical Services System

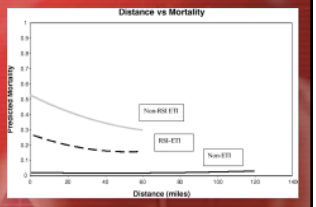
Gold Standard?

- "Endotracheal intubation is the most definitive means to achieve complete control of the airway."



Outcomes

- Oregon study:
  - 8,786 patients
  - 534 (6%)-OOH-ETI
    - 307 (57.5%)-OOH-RSI
    - 227 (42.5%)-OOH Only



Cudnick NT, Newgard CD, Wang H, Bangs C, Herrington IV R. Distance Impacts Mortality in Trauma Patients with an Intubation Attempt. *Prehosp Emerg Care. 2008;12:459-466*

Outcomes

- Pennsylvania Trauma Registry:
  - 4,098 trauma patients
    - 43.9% received prehospital ETI.
    - 56.1% received in-hospital ETI.
  - Adjusted rates of death higher for prehospital ETI (OR=3.99 [95% CI=3.21-4.93])
- Chances of poor neurologic outcome were worse for prehospital ETI (OR=1.61 (95% CI=1.15-2.26]).

Wang HE, Peitzman AB, Vassidy LD, Adelson PD, Yealey DM. Out-of-hospital endotracheal intubation and outcome after traumatic brain injury. *Ann Emerg Med*. 2004;44:439-450.

Outcomes

- New Orleans Study:
  - ETI was associated with similar or greater mortality than B-V-M ventilation alone.

Stockinger ZT, McSwain NE Jr. Prehospital endotracheal intubation for trauma does not improve survival over bag-valve-mask ventilation. *J Trauma. 2004;56:531-536*

Outcomes

- Australia:
  - "Overall current paramedic airway practice in most states of Australia is not supported by the evidence and is probably associated with worse patient outcomes after severe head injury. For road-based paramedics, rapid transport to hospital without intubation should be regarded as the standard of care."

Bernard SA. Paramedic intubation of patients with severe head injury: a review of current Australian practice and recommendations for change. *Emer Med Australas*. 2006;18:221-8.

BREATHING

- Breathing
  - Death by ventilation
    - Rate
    - volume
  - Is Oxygen really bad?

All Leading to….

  - Compression only CPR

Upstroke CPR

CIRCULATION

The Evolution of CPR

CPR → eCPR → SNPeCPR

- Adenosine
- **Preconditioning (stutter CPR)**
  - Ischemic Remote Conditioning
- **Progesterone**

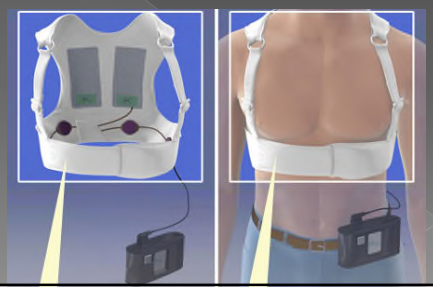
Heads Up CPR

Defibrillation

3 Phase model
Electrical (0-5 min)
Circulatory (5-15 min)
Metabolic

- Defibrillation
  - Timing of the first defibrillatory shock?
  - Monophasic versus Biphasic energy
  - To shock or not to shock
    - Smart defibrillators (read amplitude of fib waves)
  - Energy limits on your defibrillator

Zoll's Life Vest



Medication Use in SCA

- Medication use in Cardiac Arrest
  - Epinephrine has been shown not to improve outcomes

Intravenous Drug Administration During Out-of-Hospital Cardiac Arrest

A Randomized Trial

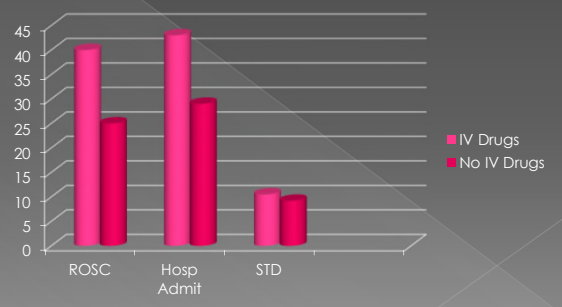
Theresa M. Olasveengen, MD; Kjetil Sunde, MD, PhD; Cathrine Brunborg, MSc; Jon Thowsen; Petter A. Steen, MD, PhD; Lars Wik, MD, PhD

JAMA. 2009;302(20):2222-2229.

Hold the Epi: No Advantage Seen With IV Drugs at Out-of-Hospital Cardiac Arrest

End point	IV drugs (%), n=418	No IV drugs (%), n=433	OR (95% CI)	p
Return of spontaneous circulation	40	25	1.99 (1.48-2.67)	0.001
Hospital admission	43	29	1.81 (1.36-2.40)	0.001
Survival to hospital discharge*	10.5	9.2	1.16 (0.74-1.82)	0.61

% of 400+ Patients



So No Drugs – Right?

Well Not So Fast….

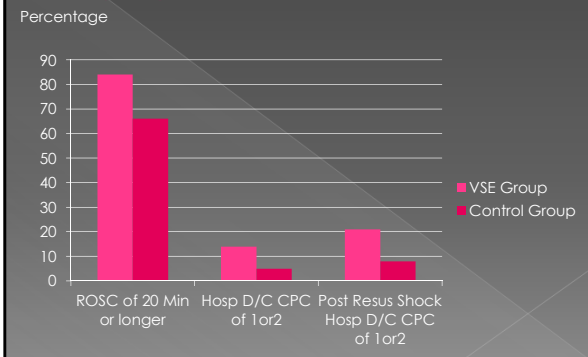
Vasopressin, Steroids, and Epinephrine and Neurologically Favorable Survival After In-Hospital Cardiac Arrest A Randomized Clinical Trial

Conclusion and Relevance Among patients with cardiac arrest requiring vasopressors, combined vasopressin-epinephrine and methylprednisolone during CPR and stress-dose hydrocortisone in postresuscitation shock, compared with epinephrine/saline placebo, resulted in improved survival to hospital discharge with favorable neurological status.

JAMA. 2013;310(3):270-279. doi:10.1001/jama.2013.7832.

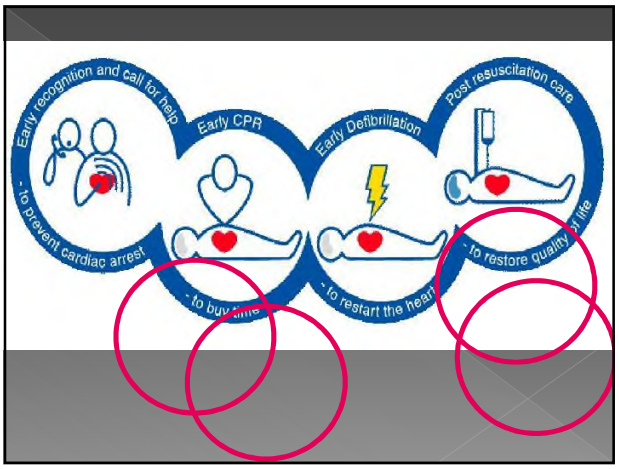
JAMA

VSE Outcomes



POST RESUSCITATION

- Post Resuscitation
  - Transport ROSC to a Resuscitation Center
  - Therapeutic Hypothermia
    - Selective head/neck cooling
      - Intranasal cooling
  - Stutter CPR
  - Hormones (Progesterone)
  - Adenosine
  - Post conditioning
    - Using inhaled anesthetics


Early recognition and call for help
- to prevent cardiac arrest
Early CPR
- to buy time
Early Defibrillation
- to restart the heart
Post resuscitation care
- to restore quality of life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ANY QUESTIONS??
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