Key EMS Articles
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Corey M. Slovis, M.D.
Dept. of Emergency Medicine, Vanderbilt University
Metro Nashville Fire Department
and International Airport
Nashville, TN

- 506 VF/VT patients from ROC
- 51% got bystander CPR
- 23% survival

Does the chest compression fraction (% time pumping vs. interruptions) significantly influence survival?

Increasing Chest Compression Fraction in VF/VT Arrests is an Independent Prediction of Hospital Discharge

- Evaluated Compression Only CPR
- 886 patients, 62 Fire Depts, Phoenix and Tucson
- 200 uninterrupted chest compressions over 2 min
- No active ventilation: O₂ mask affixed only
- 1 mg epinephrine each 200 compressions cycles
Retrospective Study from 2005-2008
Evaluated 2 types of MICR
1019 patients studied

Is just a 100% O₂ by face mask better, worse or equal to 8 breaths/min?

Minimally Interrupted Cardiac Resuscitation
200 compressions then shock
3 cycles over six minutes
Compared two methods of ventilation
Face mask vs. 8 bag breaths/min
Not ETT for at least 6 min of MICR

Does modifying the 2005 AHA ACLS guidelines improve survival?
A retrospective study of VF 3 yrs before and 1 yr after implementing modified BCLS protocols
Study performed in Kansas City
Evaluated Vfib and pulseless V Tach

Modified BCLS Protocol
Compressions ↑ to 50:2 Ventilations
100% O₂ non rebreather mask on patients
Ventilation done “gently”
Shock Q 200 compressions/Q 2 min
No intubation until 3 cycles (600 compressions)
CPR

Take Home Points

Maximize Hands on Time!
Minimize Interruptions…
Even to intubate!

89% of Hospital Survivors of Modified CPR had Good Neurological Outcomes.

Enotracheal Intubation was associated with an increase in mortality.

Before and After Study of ACLS
- 17 cities, 5638 patients
- BCLS included rapid defibrillations
  - No difference in survival to discharge 5.0% vs. 5.1% survival
  - ACLS did NOT improve outcomes

Evaluated Epinephrine's effects on survival from cardiac arrest
- Before and after implementation study of 1,296 pts in Singapore
• No differences found if Arrest Witnessed
• No difference found if Bystander CPR
• No difference found if Response time < 8 min (though no Epi 0.8% vs. 2.1% with Epi)
• Subgroup analysis did show trend favoring Epi if:
  – Ventricular Fibrillation
  – Shorter Response Times (< 8 min)

Prospective Randomized Trial
“ACLS” with and without IV Meds
418 pts ACLS Meds vs. 433 pts no Meds
33–34% had VF/VT

How effective is epinephrine, atropine, amiodarone or any other ACLS medication?

Discharged Good Neuro (1-2)

• Bystander CPR doubled survival
• Survival decreased by 17% / min of prolonged response time

ACLS Drugs

We need to rethink all the time, money and training that goes into performing multistep multi-arm ACLS Algorithms.
Trauma Care

• 3656 trauma patients; 806 died
• 146 EMS Agencies
• 51 Level I and II Trauma Centers

Do critically ill trauma patients benefit from “scoop and run” rapid transport?

Patient Acuity

• BP ≤ 90 mm Hg
• GCS ≤ 12
• RR < 10 or > 29
• Required Advanced Airway Intervention

No EMS time variable made any difference in trauma survival.

No effect:
• Activation Time
• Response Time
• On-Scene Time
• Transport Time

TIME is muscle… but

How important is it to save minutes if your D2B will beat the 90 minute goal?
• 43,801 STEMI PCI pts
• Median D₂B of 83 min (IQR 6-109 min)
• Evaluated D₂B time vs. mortality
• 2005-2006, 600 US centers

• Consecutive patients
• No transfers
• No pre PCI lytics
• Analysis repeated excluding pts in shock
• Analysis repeated using only D₂B < 6 hrs

Even with Short D₂B’s
Every Minute Counts

Time is Muscle

The key take home point to this article is that every minute makes a difference.

Wasting time on scene for a good history, not pre-activating PCI Team, waiting to get extra test, or in the lab costs lives.
If D₂B times need to be maximally shortened should paramedics read and activate the cath lab and cardiac cath team?

“Paramedics in an urban/suburban EMS system can diagnose STEMI and identify appropriate cardiac catheterization laboratory activations with a high degree of accuracy, and an acceptable false positive rate...”

- Can Paramedics Accurately Read ECGs well enough to activate PCI Center’s Lab without MD involvement?
- Are Paramedics Sensitive Enough? (recognize STEMIs)
- Are Paramedics Specific Enough? (not over call STEMI’s)

Paramedics and STEMI Alerts

Take Home Points

ED MD overreads prior to EMS Arrival
Improve Sensitivity and Specificity – have them send ECG if they can.
Cardiac Arrest
And Resuscitation

Epi vs. Epi + Vasopressin + Steroids
100 in-hospital refractory arrests
Asystole, EMD-PEA and VF pts

Epi, Vasopressin + Steroids in CPR

Comments
Small inpatient study with 3 subgroups
Single non-US Hospital
Functional status not well discussed
Steroids seemed helpful if pt in shock
60% AS, 25% PEA, only 15% VF

ACLS Drugs
Take Home Point

The role and dose of pressors
(and perhaps steroids) in CPR
still is not yet clearly defined.

CPR Survival and Transportation
• 715 non traumatic arrests
• Evaluated 3 different criteria
• All 3 good, BLS best for predicting good survival vs. poor survival or death

**Take Home about TOR**

5 Rules Sometimes Worse Than 3

- Unwitnessed Arrest by EMS
- No ROC Pre-Transport
- Non-Shockable Rhythm

**Evidence Based Recommendations for Therapeutic Hypothermia in STEMI**

A combination of mild hypothermia with 1st PCI “should be strongly considered as standard therapy in patients after out-of-hospital cardiac arrest due to STEMI.”

“...the available clinical evidence does not support therapeutic hypothermia as standard therapy for acute myocardial infarct [post arrest].”

**Therapeutic Hypothermia (TH) s/p Arrest**

Take Home Points

- Smaller studies continue to appear showing the benefits of post arrest
- TH use is rapidly expanding
- No large U.S. trial has yet been published
Therapeutic Hypothermia
Take Home Points

The Jury is Still Out

EMS Airways

• 1,200 Denver paramedics
• 34 EMS transporting agencies
• 58% Fire based, 30% Private, 12% Single Agency
• All followed same airway protocols
• 81% Medial; 3% < 13 years old

• 825 attempted intubations and transported
• 74.8% successful ETT (617/825)
• 20.6% failed ETT
• 5.2% malpositioned tubes (1/2 in esophagus)

Misplaced ETT Observations

• More common if nasal (8.6% vs. 3.4%)
• Only 77.3% of pts had ETCO₂ performed
• Almost double rate of malposition if no ETCO₂ done (7.4% vs. 4%)
• Peds failures much more than Adults (13% vs. 4%)
Retrospective study of 56 “TASER Arrests”

- All patients were monitored at time of arrest or had monitoring within minutes.
- < 3 min in 62%; < 5 min in 77%

**Take Home Points**

- The etiology of these arrests are still not completely understood however:
  - TASERS rarely cause VF Arrests!

**Physiologic Effects of the TASER After Exercise**

- 25 police officers brought to 85% of max HR
- TASERed: ECG, BP, HR, PH, lactate, monitored
- TASERS had no significant ECG or physiologic effects

**Summary and Take Home Points**

1) Time is Muscle
   - STEMI = Scoop and Run (almost)

2) Paramedics are not going to be as accurate on STEMI ECG reads as MDs
   - Consider more MD involvement pre-activation

3) If you don’t do a lot of airways, you shouldn’t intubate
4) BCLS and ACLS is still a work in progress
   - Push more, minimize interruptions
   - *Who needs oxygen anymore?*

5) Tasers are safe in normal people