The Five Most Important EMS Articles of this Past Year

EAGLES 2018

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Prehospital STEMIs
ED ECG 12 minutes later
Do serial 12 leads during EMS transport add any useful information in diagnosing a STEMI?

- 728 STEMI transports, Quebec EMS
- Used BLS-EMTs transmitting Q 2 minutes
- 24 minute average transport time (15-38)
- “Persistent” STEMI vs “Evolution” vs “Loss”
Dynamic STEMI ECGs
15.7% (114 / 728)

No STEMI → STEMI: 8.0%
STEMI → No STEMI: 7.7%
STEMI ↔ No (multiple changes): 4.5%

Prehosp Emerg Care 2018; ePub Jan
Results

- 84.3% of STEMIIs were persistent
- 15.7% of STEMIIs were dynamic
- 8% of STEMIIs not evident on first ECG
Some STEMIs stay persistent

Some STEMIs “come and/or go”
Lower Dose Epinephrine in Cardiac Arrest
Could less than 1.0 mg be better dose of epinephrine?

- 2,255 pts from Seattle, 2008-2016
- 554 (24.6%) VF/VT; 1,701 (75.4%) AS/PEA
- Before and after type study
- VF/VT: 0.5 mg min 4, 8; AS/PEA: 0.5 mg Q 2 min
- Evaluated ROSC, Discharge, CPC 1-2
VF/VT Outcomes

0.5 mg vs 1.0 mg Epinephrine

Resuscitation 2018;124:43-48
AS / PEA Outcomes
0.5 mg vs 1.0 mg Epinephrine

Resuscitation 2018;124:43-48
Low Dose Epinephrine

Take Homes

• Not a randomized trial
• Cross overs from either group
• 3.4 mg vs 2.6 mg in VF/VT;
  3.5 mg vs 2.8 mg in AS/PEA

Reducing the dose of epinephrine in OOH cardiac arrests does not affect ROSC, hospital discharge frequency or neurologic outcomes in either shockable or non-shockable rhythms
VFib
Refractory VFib

- Move pads Ant-Lat ↔ Ant-Post
- Consider Beta Blockade
- Consider Double Sequential Defibrillation (DSD)
- PCI
- ECMO
Is double sequential defibrillation (DSD) beneficial in refractory VF/pVT?

- 45 patients treated with DSD
- Retrospective observational study
- London Ambulance Service
- Compared to 175 who got standard defibrillation
- Only patients with ≥ 6 shocks compared
Double Sequential Protocol

- 3 standard Ant-Lat defibrillations
- Anti-arrhythmic administration
- 3 standard Ant-Post defibrillations
- Double sequential defibrillation
- Done 3 – 4 seconds apart
Standard vs DSD in VF/pVT

Resuscitation 2017;117:97-101

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<th>EMS ROSC</th>
<th>Hosp ROSC</th>
<th>Discharged</th>
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<td>35%</td>
<td>56%</td>
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<tr>
<td>DSD</td>
<td>38%</td>
<td>59%</td>
<td>7%</td>
</tr>
<tr>
<td>Discharged</td>
<td>6.6%</td>
<td>7%</td>
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Double Sequential Defibrillation
Take Homes

• Not a randomized trial

• Many pts got up to 10 shocks pre DSD

• The role of Double Sequential Defibrillation is not yet clarified and needs a randomized larger trial
Is Dual Sequential Defibrillation (DSD) dangerous to the defibrillators?

- Zoll M and/or Physio-Control LP 15s
- Two DSDs: 1 Zoll & 1 LP @ 560 J synched
- Two DSDs with 2 LPs at combined 720 J
- All 4 DSDs done A-P
- One LP found to become nonfunctional
“LIFEPAK defibrillators comply with standards which require defibrillators to withstand defibrillation shocks from a second defibrillator connected to a patient. This testing does not include delivering simultaneous/sequential or overlapping 360 J defibrillation shocks from two LIFEPAK defibrillators. There are no design and/or safety standards for use of external defibrillators to perform double sequential defibrillation. We cannot guarantee the reliability of functionality of devices subject to this off-label use. Product warranty cannot legally cover damage to LIFEPAK defibrillators which occurs as a result of performing an off-label use”
Dual Sequential Defibrillation
Take Homes

• May not be more effective
• May damage defibrillator
• Is a crowd pleaser
How deleterious is hypotension in patients with traumatic brain injury (TBI)?

- 7,251 TBI pts ages 10 and older
- Statewide EMS database for Arizona
- Median age 40 yo; IQR 24-58 yo
- 7.2% (539) of patients had BP < 90 mm Hg
- Evaluated time and depth spent hypotensive
“Dose of Hypotension”

90 – SBP = Depth of Hypotension \times \text{Minutes}
Hypotension “Dose”

Each 2 fold increase in hypotension dose, increased mortality by 20%

10 minutes at 80 SBP = dose of 10 x 10 = 100
10 minutes at 70 SBP = dose of 10 x 20 = 200

Thus 10 minutes at 70 mm Hg increases mortality 20% over 10 minutes at 80 mm Hg
Depth and Duration of Hypotension vs Mortality

Annal Emerg Med 2017;70:522-30
Hypotension in TBI

Take Homes

- Dramatically increases mortality
- \( \uparrow 20\% \) for each doubling of dose \((\text{time} \times 90 - \text{SBP})\)
- Is Sys BP 90, 100, or 120 SBP optimal s/p TBI?
- Avoid hypotension, treat hypotension
Depth and Length of Hypotension in TBI are both critical!
Do prehospital steroids affect children’s ED course and does switching to oral steroids increase EMS administration

• 482 patients, retrospective matched study
• Houston Fire EMS, Baylor & UT Houston Hospitals
• Evaluated LOS, hospitalization, invasive airways

This is a before and after study adding oral dexamethasone to protocol for all asthmatics rather than just IV steroids for moderate and severe asthma (226 pre vs 256 post)
Compares use of 2 mg/kg of IV/IM methylprednisolone (max 125 mg) for moderate-severe asthma to: Dexamethasone 0.6 mg/kg (max 10 mg) PO tolerated for any asthmatic including mild asthma – allows IV if PO not tolerated
Affects of Steroid Use

Prehosp Emerg Care 2018; ePub Jan

Steroid Use  Total Care Time  Admitted

Pre  Post  Pre  Post  Pre  Post

11%  18%  6.1 hrs  5.2 hrs  30%  21%

p = 0.02  p = 0.01  p = 0.02
Prehospital Steroid Use In Children

Take Homes

• First EMS steroid study in children
• PO steroids easy to dose
• No IV required
• Cut ICU admits in \( \frac{1}{2} \) (82\% vs 44\%)
• Looks protocol changing
Summary

- Repeat 12 leads often
- Epi half dose not helpful
- Be careful with double sequential
- Beware hypotension s/p TBI
- EMS steroids…Giddy up