Most Important EMS Articles

EAGLES 2017

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Overview

- Best antiarrhythmic for VF
- What ACLS/BCLS innovations work
- Is early epi better in VF
- When to expect ↓ BP with NTG
- Perfect TOR
What is the best antiarrhythmic for shock resistant VF/pVT:
Amiodarone vs Lidocaine vs Placebo?

- 3,026 pts., 10 ROC sites
- Randomized, double blind, placebo controlled
- VF/pVT, s/p 1 or more shocks, s/p epi
- Only adult medical VF/pVT OOH
Survival to Discharge
Neurologic Outcome


Survival

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>L</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>24.4</td>
<td>23.7</td>
<td>21</td>
</tr>
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</table>

Mod Rankin ≤ 3

<table>
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<tr>
<th></th>
<th>A</th>
<th>L</th>
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</thead>
<tbody>
<tr>
<td>%</td>
<td>18.8</td>
<td>17.5</td>
<td>16.6</td>
</tr>
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</table>
Percentage Differences

- Amiodarone vs Placebo: 3.2% (p=0.08)
- Amiodarone vs Lidocaine: 0.7% (p=0.70)
- Lidocaine vs Placebo: 2.6% (p=0.16)
- Amiodarone vs Placebo: 2.2% (p=0.19)
- Modified Rankin ≤ 3
- Amiodarone vs Lidocaine: 1.3% (p=0.44)
- Modified Rankin ≤ 3
What do all studies combined tell us about Amiodarone vs Lidocaine in VF/pVT?

- 7 studies: 3 RCTs, 4 non-RCTs
- 3,877 pts in RCTs and 700 in non-RCTs
- Includes 2016 NEJM trial
- Admission and Discharged Alive evaluated
Amiodarone vs Lidocaine vs Placebo

Take Homes

• There is no strong evidence on antiarrhythmic efficacy in VF/pVT

• If 3% superiority of Amiodarone over placebo was true difference (requires larger study) then 1,800 lives would be saved in North America yearly

• The drugs are given 10-20+ minutes into arrest
Cardiac arrest is a common and lethal condition frequently encountered by emergency medicine providers. Resuscitation of persons after cardiac arrest remains challenging, and outcomes remain poor overall. Successful resuscitation hinges on the availability of effective therapies. This review provides an authoritative and comprehensive overview of therapeutic interventions and care considerations in the setting of cardiac arrest. Its aim is to enhance survival through improvements in current practice and in the understanding of the underlying pathophysiology.

- Authoritative and comprehensive review
- What works and what doesn’t
- 99 references
- Insightful recs for PEA and Post Resus care
<table>
<thead>
<tr>
<th>Intervention</th>
<th>Effect on Outcomes</th>
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<tbody>
<tr>
<td>Compressions only CPR</td>
<td>No benefit</td>
</tr>
<tr>
<td>Mechanical chest compressions</td>
<td>No benefit</td>
</tr>
<tr>
<td>Impedance threshold device</td>
<td>No benefit</td>
</tr>
<tr>
<td>Active compression/ decompression</td>
<td>No benefit</td>
</tr>
<tr>
<td>Delayed vs immediate CPR</td>
<td>No benefit</td>
</tr>
</tbody>
</table>

Article has excellent algorithms for -

- PEA
- Use of Echo in arrest
- Wide and narrow QRS arrests
- Optimizing outcomes s/p ROSC
- ECLS and ECMO
Maximizing In-Hospital Survival

- Minimizing interruptions
- Frequent review of CPR cases
- High quality CPR training

JAMA Cardiol 2016;1:189-97
Does giving epinephrine before 2\textsuperscript{nd} shock help or hinder resuscitation?

- 2,974 VF/pVT arrests, 1,510 with epi < 2 min
- Inpatient data from 300 GWTG-R hospitals
- Propensity matched cardiac arrest pts
- Compared epi before vs after 2\textsuperscript{nd} shock
Epi Before vs After 2nd Shock

BMJ 2016;353:1577-87

All p < 0.001
Early Epinephrine Administration

Take Homes

• Wait for second shock before administering epinephrine

• The role of epi is still not clearly defined… but wait to administer it

• Epinephrine is the most potent cardiac stimulant – wait to give it during VF
How dangerous is NTG in Inferior AMI?

- 1,466 STEMIs, 56% received NTG
- Montreal Quebec EMS 2010-2012
- Evaluated BP changes in Inf vs Non-Inf AMIs
- BP < 90 or BP↓ > 30mm Hg s/p NTG
STEMI BP Changes Post NTG

Prehosp Emerg Care 2016;20:76-81

BP < 90

Inf: 8.2
Not-Inf: 8.9
P=NS

BP ↓ > 30mm Hg

Inf: 23.4
Not-Inf: 23.9
P=NS
Does the ↑HR predict ↓BP in chest pain pts treated with nitroglycerin?

- 10,308 pts from Montreal EMS
- 20% of pts (2,057) were tachycardic pre-NTG
- NTG dose was 0.4 mg spray
- NTG repeated Q5 if CP persisted
- 3.1% of all pts had hypotension
NTG and Hypotension

Prehosp Emerg Care 2017;21:68-73

- WNL HR
  - 2.9%
- ↑ HR
  - 3.9%
  - P=0.02
  - 35% ↑
Hypotension decreased by 36% for every 10 mm Hg ↑ of systolic BP
NTG and Hypotension

Take Homes

• Inferior and Anterior AMI hypotension equal

• Beware borderline BPs

• Especially if the pt is tachycardic

• EMS and hospital personnel should be prepared for ↓ BP especially in those who are tachycardic, regardless of Inf AMI or Ant AMI
Can we have a TOR criteria that gives us 100% specificity and a PPV of 100% for non-survival?

- Prospective French trial, the PRESENCE Study
- 1,771 pts from Paris’ Sudden Death Expertise Center
- Tested and applied 3 criteria
- Used prospective data from Paris & King County
- Prospectively tested in 5,192 patients
Paris TOR Criteria

• Not witnessed by FF/EMS First Responders
• Non-shockable rhythm
• No ROSC after 2 doses of epinephrine
## 2,799 Patients Meeting All 3 Criteria

Not witnessed, no shock, 2 doses epi

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Survived</th>
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<tbody>
<tr>
<td>Paris 1 year cohort</td>
<td>772</td>
<td>0</td>
</tr>
<tr>
<td>Paris validation cohort</td>
<td>1569</td>
<td>1*</td>
</tr>
<tr>
<td>PRESENCE Trial</td>
<td>285</td>
<td>0</td>
</tr>
<tr>
<td>King County, USA</td>
<td>173</td>
<td>0</td>
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*Persistent vegetative state*
Paris TOR Criteria

- Not witnessed by FF/EMS FirstResponders
- Non-shockable rhythm
- No ROSC after 2 doses of epinephrine

100% predictive of who to terminate and not transport
“We suggest that all treated non-traumatic OHCA patients should be transported to the hospital”

- 2,827 TOR pts still transported
- Dallas – Ft. Worth ROC site data (2006-11)
- 1.1% (31 pts) discharged
- Neuro status unknown
2/31 had VF/VTp
11/31 had ?? Rhythm; % AS vs PEA??
Use of epi unclear, as is # of doses
CPR time not included
Incidence of narrow/rapid PEA not included
TOR Take Homes

• Dallas-Ft. Worth ROC data is very discordant

• I believe that unwitnessed AS and slow wide PEA that does not respond to epi and has low end tidal values less than 10 should be called

• Only rapid and narrow PEA might have a small chance
5 Summary Points

- VF antiarrhythmics of questionable value
- Know what improves CPR outcomes
- Wait for second shock to give epi
- NTG causes hypotension, especially if $\uparrow$ HR
- TOR rules may work 100%, or not