Using Ultrasound To Guide Management In Cardiac Arrest

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Albuquerque Fire Rescue
I Have No Disclosures
Phillips Lumify and Android Tablet
Albuquerque Fire Rescue “78s”

Highly experienced field paramedic captains
UNM EMS Fellows

24/7 Scene Response and On-Line Medical Direction
Ultrasound Approval Process

• Apply to NM State EMS Board
  – Paramedic Special Skill
  – Cardiac arrest only

• Report outcomes at 1 year
  – Frequency of usage
  – Outcomes
  – QA metrics
8 Hours Didactic and Hands-On Training With EMS Physician Faculty
Is There Any Squeeze?
Quality Assurance Measures
46 Year Old Female “Sick”

• PMH: COPD, PE with IVC filter, hypothyroid, adrenal insufficiency, HLD, GERD
  – “Not feeling good since yesterday”

• Arrested on EMS arrival
  – ACLS initiated
  – LMA placed
  – IO access
PEA 60-80
End Tidal 50-60
What Does The End Tidal Increase Suggest?

Just Good CPR?                        ROSC?
Cardiac Ultrasound
Cardiac Ultrasound
Post ROSC 12 Lead EKG

- Name: [Redacted]
- ID: 021719070257
- Date: 2/17/2019
- Patient ID: PR 0.124s
- Incident ID: QT/QTc: 0.310s/0.399s
- Age: 46
- Sex: F
- P-QRS-T Axes: 43° -34° 34°
- 12-Lead 1
- HR: 111 bpm
- **Abnormal ECG: Unconfirmed**
- Sinus tachycardia with PVCs
- Possible left atrial abnormality
- Left axis deviation
- Possible right ventricular hypertrophy
- Inferior and anterior T wave abnormality may be due to hypertrophy and/or ischemia

ST measurements are measured at the J point and are expressed in mm:

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
<th>aVR</th>
<th>aVL</th>
<th>aVF</th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>V5</th>
<th>V6</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.03</td>
<td>-0.04</td>
<td>-0.02</td>
<td>0.01</td>
<td>0.08</td>
<td>-0.05</td>
<td>0.19</td>
<td>0.00</td>
<td>0.51</td>
<td>0.01</td>
<td>0.64</td>
<td>0.12</td>
</tr>
</tbody>
</table>

To ensure printer accuracy, confirm that the calibration markers are 10mm high and the grid squares are 5mm wide.
Awake and Following Commands
27 yo Male, Unresponsive

- Family finds him in the bathroom
- Bystander CPR
- Asystole $\rightarrow$ PEA $\rightarrow$ V-Tach $\rightarrow$ PEA
- ACLS
  - IO
  - 3 Rounds of EPI
  - LMA and BVM
PEA Near 100 Consistently
Initial End Tidal 10 ➔ Now 30

No Pulse
Ultrasound Images
Post ROSC

Name: 020119190252 12-Lead 2 2/1/2019 HR 108bpm **Unconfirmed**
ID: 020119190252 12-Lead 2 2/1/2019 HR 108bpm **Unconfirmed**
Patient ID: PR 0.116s QRS 0.102s Sinus tachycardia Left axis deviation
Incident ID: QT/QTC: 0.344s/0.428s Inferior infarct - age undetermined
Age: 20 Sex: M Lateral ST abnormality may be due to myocardial ischemia
P-QRS-T Axes: 65° -33° 31°

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</tr>
</thead>
<tbody>
<tr>
<td>-0.27</td>
<td>-1.29</td>
<td>-1.02</td>
<td>0.78</td>
<td>0.36</td>
<td>-1.16</td>
<td>0.87</td>
<td>0.88</td>
<td>-0.36</td>
<td>-1.28</td>
<td>-1.15</td>
<td>-0.83</td>
</tr>
</tbody>
</table>

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Outcome

• Anoxic brain injury
• Comfort care
• Died next day
89 Year Old Male SOB

- Recently released from hospital for bradycardia
  - Awaiting pacemaker placement

- Arrests on EMS arrival
  - Immediate Pit Crew CPR
  - Narrow, Slow PEA
Ultrasound Changed Our Direction

- Atropine
- Epi Drip
- Pacing
  - Could not capture

Proceeded to asystole confirmed by US
Conclusions

• Ultrasound can be used by experienced and well-trained paramedics to guide resuscitation management in cardiac arrest
  – Really helpful in PEA arrest

• Need to be careful about time off the chest while trying to get a good view