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LUCAS → CCL → ECMO → PCI
Current Regions EMS Protocol
(Inclusion Criteria)

If an arrest is felt to be of card etiol and the:

• Initial rhythm is V fib/V tach
• Pt is between ages of 18-75
• Pt is not DNR
• Pt fits into LUCAS
• Transport time under 30 min with time from 911 to CCL < 90 min
Current Regions EMS Protocol (Exclusion Criteria)

Pt is not brought to the U of M if:
- Family/caregiver declines
- Contraindication to mechanical CPR
- Known to be pregnant
- NH resident
- Known terminal illness
Then:

• After 3 shocks
• And 300mg amiodorone
• Try and keep total scene time to under 10-12 minutes
• Transport to the U of M
Pt not candidate for ECMO if:

- ETCO$_2$ < 10 mm Hg
- PaO$_2$ < 50 mm Hg or SaO$_2$ < 85%
- Lactate > 18
Coronary Artery Disease in Patients With Out-of-Hospital Refractory Ventricular Fibrillation Cardiac Arrest

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ABSTRACT

BACKGROUND The prevalence of coronary artery disease (CAD) among patients with refractory out-of-hospital (OH) ventricular fibrillation (VF)/ventricular tachycardia (VT) cardiac arrest is unknown.

OBJECTIVES The goal of this study was to describe the prevalence and complexity of CAD and report survival to hospital discharge in patients experiencing refractory VF/VT cardiac arrest treated with a novel protocol of early transport to a cardiac catheterization laboratory (CCL) for extracorporeal life support (ECLS) and revascularization.

METHODS Between December 1, 2015, and December 1, 2016, consecutive adult patients with refractory OH VF/VT cardiac arrest requiring ongoing cardiopulmonary resuscitation were transported by emergency medical services to the CCL. ECLS, coronary angiography, and percutaneous coronary intervention were performed, as appropriate. Functionally favorable survival to hospital discharge (Cerebral Performance Category 1 or 2) was determined. Outcomes in a historical comparison group were also evaluated.

RESULTS Sixty-two (86%) of 72 transported patients met emergency medical services transport criteria. Fifty-five (89%) of the 62 patients met criteria for continuing resuscitation on CCL arrival; 5 had return of spontaneous circulation, 50 received ECLS, and all 55 received coronary angiography. Forty-six (84%) of 55 patients had significant CAD, 35 (64%) of 55 had acute thrombotic lesions, and 46 (84%) of 55 had percutaneous coronary intervention with 2.7 ± 2.0 stents deployed per patient. The mean SYNTAX score was 29.4 ± 13.9. Twenty-six (42%) of 62 patients were discharged alive with Cerebral Performance Category 1 or 2 versus 26 (15.3%) of 170 in the historical comparison group (odds ratio: 4.0; 95% confidence interval: 2.08 to 7.7; p < 0.0001).

CONCLUSIONS Complex but treatable CAD was prevalent in patients with refractory OH VF/VT cardiac arrest who also met criteria for continuing resuscitation in the CCL. A systems approach using ECLS and reperfusion seemed to improve functionally favorable survival. (J Am Coll Cardiol 2017;70:1109-17) © 2017 by the American College of Cardiology Foundation.
72 Patients that presented with VF were transported by EMS after 3 unsuccessful DC shocks and amiodarone administration.

62 Patients Transported Met Early Transport Protocol Criteria

55 patients received full CCL treatment:
- 5 patients had ROSC before arrival
- 50 patients were placed on ECLS

47 patients were admitted to the CICU.

8 were declared dead after ECLS was initiated due to inability to reestablish organized rhythm after 90 minutes.

7 were declared dead because of failure to meet the ECLS initiation criteria:
- 1 - ETCO2 on arrival < 10mm Hg
- 3 - PaO2 < 50 mmHg or O2 Sat < 85%
- 3 - Lactate > 18

Yannopoulos, et al, JACC, 2017
Results

• Avg time from 911 to CCL was 58 minutes.

• Avg time from arrival to CCL to ECMO was 6.1 minutes.

• Avg time from ECMO to balloon inflation was 60 minutes.
Significant Coronary Disease (≥ 70%)
- Yes 84%
- No 16%

Extent of Coronary Artery Disease
- Three Vessel 44%
- Two Vessel 26%
- Single Vessel 30%

Lesion Complexity

<table>
<thead>
<tr>
<th>Lesion Complexity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior Coronary Artery Bypass Grafts</td>
<td>5 (9%)</td>
</tr>
<tr>
<td>Chronic Total Occlusion Present</td>
<td>18 (33%)</td>
</tr>
<tr>
<td>Patients with Acute Thrombotic Lesions</td>
<td>35 (64%)</td>
</tr>
</tbody>
</table>

Yannopoulos, et al, JACC, 2017
Results

• 91% CA was 1st evidence of CAD.
• No pts had ischemic sx’s PTA.
• Avg age of survivors was 59.
Results

- All pts had severe left ventricular compromise in the first 48 hours which recovered over 3-5 days.
- De-canualation occurred at day 3 on avg.
Results

• Best predictors of survival:
  – ETCO2
  – Lactate
  – Gasping
  – Time
  – Episode(s) of ROSC prior to ECLS
Summary

We have currently treated 110 pts inside of the protocol and 148 total inside and outside of protocol. The results are holding in the 40-45% range.
CONCLUSION

If these preliminary findings hold up, there should be a paradigm shift in the tx of OHCA.
You can’t make chicken salad out of chicken poop,  
But you can make chicken poop out of chicken salad.
THE FUTURE

We are planning expanding the protocol to include:

— A new ambulance design.
— A new staffing model.
— A new billing model.
— Field ECMO.
— ? Field PCI.
Thank You.

Any Questions?

(Remember: a good question is one that I know the answer to.)

(A great question is one that I have a slide for.)