ECMO and COVID

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Disclosure

• None
• ECMO outside of CPB is an off-label use of technology
• And—it’s a team sport
Case

- 38 yo M marathon runner
- No smoking or vaping
- Travels extensively for work
Initial

- 5 days of cough went to a different hospital
- Chest X-ray and extensive respiratory viral testing was negative at that time
- COVID-19 testing unavailable
- He was discharged home and self-quarantined
Deteriorates

- Case to UMMC 6 days later (11 d of symptoms)
- Worsening dyspnea, dehydration, malaise
- T 104 F RR 30s, saturating 90% on 9 liters FM.
- He received single doses of azithromycin and ceftriaxone as empiric therapy for CAP
ARDS
ARDS

• Over the next 12 hours he became progressively more hypoxic
• Intubated, proned, paralyzed, inhaled epoprostenol
• Oxygen saturations continued around 60-70% on maximum ventilator settings.
ECMO

- PaO2 of 67, with P:F ratio of 61
- Veno-venous ECMO
- Just prior to cannulation
  - COVID-19 reported as positive.
Medical Management

- Hydroxychloroquine
- Azithromycin
- Remdesivir
- No ARB
- tocilizumab
Case

- Decannulated from ECMO after 12 day run
- 1st successful case of ECMO for COVID in the US – to our knowledge
- Still on mechanical ventilation
- Recovering
ECMO for COVID

- Need is uncertain
  - H1N1 2.6 per million cases
  - MERS 5.8 per 100 cases
- ECMO and COVID so far
  - China 50
Disaster Planning
Disaster Planning

PATIENT CARE
STRATEGIES FOR SCARCE RESOURCE SITUATIONS
## Disaster Planning

**ECMO (Extra-corporeal membrane oxygenation)**

**STRATEGIES FOR SCARCE RESOURCE SITUATIONS**

**MINNESOTA HEALTH CARE PREPAREDNESS PROGRAM**

<table>
<thead>
<tr>
<th>Stage</th>
<th>General Priority for ECMO Given Constrained Critical Care Resources:</th>
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<tbody>
<tr>
<td><strong>Tier</strong></td>
<td><strong>Strategy</strong></td>
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<tr>
<td><strong>First Tier (≥0%)</strong></td>
<td>Cardiac arrest or cardiogenic shock due to deep-occluded hypoxemia (resuscitation)</td>
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<tr>
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<td>Pediatric post-cardiectomy</td>
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<tr>
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<td>Acute hypoxic respiratory failure due to status asthmaticus.</td>
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<td><strong>Second Tier (≤10%)</strong></td>
<td>Poisoning-induced cardiogenic shock</td>
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<td>Massive pulmonary embolism</td>
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<td>Refractory VF/VT cardiac arrest with favorable prognostic features (extra-corposcular CPR (E-CPR))</td>
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<tr>
<td><strong>Third Tier (≤10%)</strong></td>
<td>Adult post-cardiectomy</td>
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<tr>
<td></td>
<td>Cardiac arrest with non-shockable rhythm or unfavorable prognostic features, including most adult in-hospital cardiac arrest</td>
</tr>
</tbody>
</table>

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**University of Minnesota**

**Driven to Discover**
Disaster Planning

• When two sites are full
  – Triggers a call

• RCHC

• Text out to all

• Then rotating call
  – 5 Medical Directors
Sharing Data

Patients on Vent and ECMO at 5 Metro ECLS Centers (UMMC, Masonic, Abbott, Children's, HCMC)
Thank you!

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