Ontario Critical Care
Clinical Practice Rounds (OC3PR): COVID-19

Jun 3 2021...

ECLS for COVID-19 Patients: The Ontario Experience

Chaired by Dr. Dave Neilipovitz
Presented by Dr. Faizan Amin and Dr. Eddy Fan

Meeting Etiquette

• Participants will be muted and can use the chat function to converse with the panelists.
• Attendees can submit questions to Q&A in the chat function in the Zoom menu.
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Disclosures

• E. Fan – none
• F. Amin – none
Objectives

1. The Ontario experience in selecting and treating severe respiratory failure from Covid-19 with ECLS

2. The challenges of handling a surge of ECLS patients

3. The organization of the ECLS programme from the perspective of both an experienced and a newly launched centre.
Thanks

Surgical Directors
ICU, Anesthesia, Surgery, Hematology
Cardiac Perfusion Team
Nursing
Respiratory Therapy
Pharmacy
Social Work
ICU Educators
Administrative Staff
Bioethics
Senior Organizational Leadership
ECLS for COVID-19 ARDS: Summary of Literature
Extracorporeal membrane oxygenation support in COVID-19: an international cohort study of the Extracorporeal Life Support Organization registry


- ELSO registry used for COVID-19 patients receiving ECMO between Jan 16-May 1, 2020 across 216 hospitals in 36 countries
- Data available for 1035 patients
- Primary outcome: in-hospital death in time-to-event analysis
Survival slightly worse than non-COVID ARDS, with more complications and longer ECMO course

- Mortality 38% at 90 days
### COVID-19 Cases on ECMO in the ELSO Registry

<table>
<thead>
<tr>
<th></th>
<th>COVID-19 Suspected or Confirmed</th>
<th>COVID-19 Confirmed Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total COVID-19 Cases</td>
<td>5196</td>
<td>5179</td>
</tr>
</tbody>
</table>

Total counts of COVID-19 confirmed patients and count of COVID-19 suspected but not confirmed by testing.

<table>
<thead>
<tr>
<th>Patients who initiated ECMO at least 90 days ago</th>
<th>COVID-19 Confirmed</th>
<th>COVID-19 In-hospital Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3867</td>
<td>49%</td>
</tr>
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### Outcomes

![Graph showing outcomes](chart.png)

- Discharged (home/rehab)
- Discharged (LTAC/unspecified)
- Discharged (hospital)
- Unknown status (censored)
- Hospitalized
- Died

Days from ECMO

**# patients**

**ELSO Registry Mar 2021**
Overall 90-day Survival 45%
Lessons Learned: ECMO in COVID-19

• ECMO is indicated in COVID-19 patients who fail conventional mechanical ventilation and who do not have contraindications
  • Optimization of the ventilator and a trial of proning and NMBAs is generally indicated before ECMO
• COVID-19 patients have long durations of ECMO support and prolonged hospital stay
• Complication rates are high: VAP, major bleeding, need for RRT, PE, ICH
• Appropriate patient selection is more important than ever before, especially in times of scarce resources
When to Refer

VV-ECMO Criteria:

**Indications:**
1. Persistent (hrs) PaO₂/FiO₂ < 80 mm Hg
   OR
2. Persistent (hrs) pH < 7.25 with PaCO₂ > 60 mm Hg and driving pressure >15 cmH₂O

Gas exchange should be assessed after appropriate fluid resuscitation, sedation/paralysis, ventilator adjustments, and a trial of prone positioning (unless contraindicated).

**Contraindications:**
1. Age 60 or older
2. Significant chronic comorbidity with multi-system involvement
3. BMI > 50 or < 18
4. Duration of mechanical ventilation > 10 days
5. Prior cardiac arrest with chest compressions
6. Refractory shock
7. Multi-organ failure
8. Significant acute neurological injury
9. Chronic lung disease (e.g. COPD, IPF – not asthma)
10. Malignancy with expected life expectancy less than 5 years
11. Chronic immunosuppressed state
12. Poor baseline functional status
ECLS Program at Hamilton General Hospital
Program Development: Timeline

1. Institutional Commitment
2. Selection of Medical & Surgical Directors

Multidisciplinary Training Course

Official Program Launch


- Selection of Program Leads Training Planning Policy Development
- Acquisition of Equipment Refresher Course
- ECLS Patients Ongoing Training and Onboarding of Staff Individual Case Reviews and Quality Improvement
- Expansion of Capacity
- Longitudinal Multidisciplinary Education Quality Improvement & Policy Revision Collaboration with UHN

Regional ECLS Program Registration via CRITICALL
ECLS Services at HHS

- 24/7 ECMO Physician on call via CritiCall
- Patient selection via consensus through multidisciplinary ECLS Triage Team (ICU, CVSx, Anesthesia, Cardiology +/- Resp)
- Perfusionist + Nursing combined ECMO Specialist Model
Organizational Challenges during COVID-19 ECLS Surge

- Huge multidisciplinary collaboration across all clinical areas of the hospital
- Disproportionate impact on other clinical services
- Physical exertion (ECLS complications, bedside procedures required, transports)
- Moral distress
- Rapid uptraining of staff during pre-exhausted timelines
- Dynamic Staffing Models
Lessons and Growth for a New ECLS Program

**Process for Appropriate Patient Selection is Paramount**
- Implementation of a Multi-disciplinary **ECLS Triage Team** that decides on provision of ECMO by **consensus**. Original Criticall referrals reviewed by 2 ECLS Physicians

**Opportunities for Longitudinal Feedback and Education**
- Individual Case Review after each patient for feedback from each discipline with minutes and follow-up
- Quarterly educational workshops for maintenance of competence and annual workshops for new staff

**Internal Auditing and Research**
- Registry of referred patients (including patients accepted and declined)

**Meeting International Standards**
- Registration with Extracorporeal Life Support Organization (ELSO)

**Collaboration with established ECMO centres**
- Collegial collaboration with UHN and LHSC for regional and non-regional patients in order to ensure best standards and access to care

**Continuous Standardization of Day-to-Day ECMO Care**
- Policy & Checklist development
The future of ECLS in Ontario

• Need for a coordinated provincial approach for ECLS referrals
• Ontario ECLS Network collaboration
• Development of local ECLS transport teams
• Clinical and academic collaboration
Thank you for joining us today

Feedback? Submit ideas in our evaluation survey (Link in chat)
Suggestions for the next topic?

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Questions? info@ccso.ca