Escalating Care Pathway for Acute Respiratory Distress Syndrome and Veno-Veno Extracorporeal Life Support: Evaluation, Triage and Management

Endorsed by: BC ECLS Steering Committee

British Columbia (BC) Extracorporeal Life Support (ECLS) Steering Committee:
The committee is lead by Critical Care BC and Cardiac Services BC with representation from each Health Authority and BC Emergency Health Services. The aim of this committee is to reduce unwarranted variation and establish a provincial forum for data-driven quality improvement and patient-centric care for ECLS services across BC.

Scope:
This document is intended to support clinical practitioners in the early recognition and appropriate triage of patients with acute respiratory failure. It will provide an algorithm and framework for recognition, triage, and management of adult and pediatric patients with severe respiratory distress syndrome (ARDS) including ECLS/Veno-Veno Extracorporeal Membrane Oxygenation (VV-ECMO) as part of the treatment pathway. This is not intended to be prescriptive but a resource to assist clinicians in triaging patients provincially.

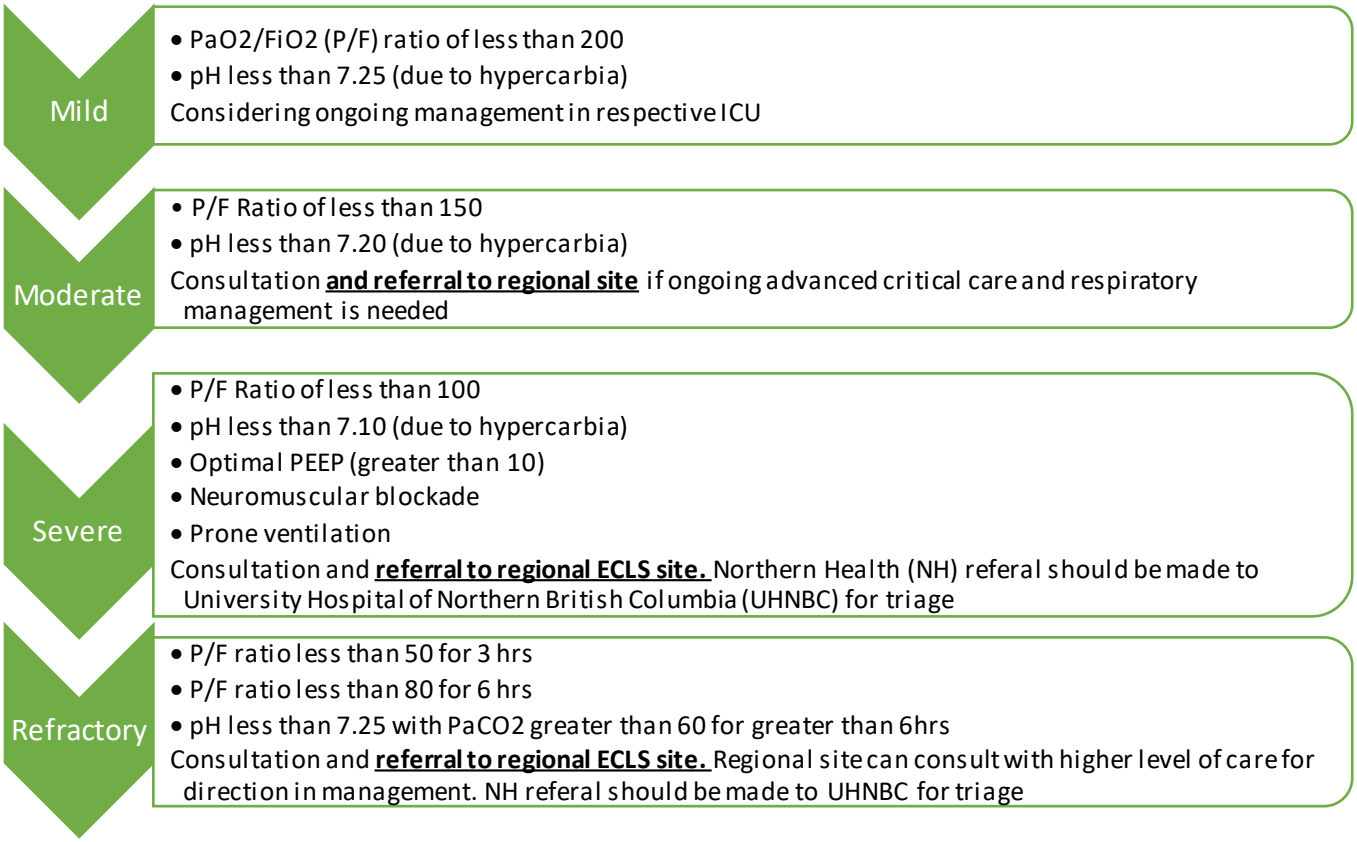
Target Population:
Adult and pediatric patients with acute and treatable ARDS presenting to the hospital system that may include emergency departments and critical care units in the province of British Columbia. Patients less than 17 years of age with acute respiratory failure should be referred to British Columbia Children's Hospital (BCCH) and consultation should be made to the attending Intensivist on call *(see section on pediatric referral)*.

Identify:
Adult patients can be considered to have acute respiratory failure if they require mechanical ventilation for management of hypoxia or hypercarbia and have a partial pressure of oxygen (PO2)/ Fraction of Inspired Oxygen (FiO2) of less than 200, or partial pressure of carbon dioxide (PCO2) greater than 60 with associated pH less than 7.25 after all appropriate management is applied.

Manage:
The following should be considered best practices when managing patients with acute respiratory failure:

1. Optimal lung protective ventilation
2. Optimal positive end-expiratory pressure (PEEP) (greater than 10)
3. Low driving pressure (less than 15)
4. Neuromuscular blockade
5. Prone ventilation
6. Steroids

Triage:



Transport:

Early consultation via Patient Transfer Network (PTN), inclucluding critical care physician on-call, in moderate to severe category to regional site is encouraged. Transporting severely hypoxic or hypercarbic patients can be fraught with complications. Where possible, serial, or duplicate transfers should be avoided.

Royal Columbian Hospital (RCH) provides the only ECLS retrieval program within BC. Developed to support patients within the Fraser Health Authority (FHA) region, the RCH ECLS Program may initiate ECLS support at the referring institution, if patients are too unsafe to be transported conventionally.

Patients with moderate to severe ARDS witih unqiue circumstances should be identified, and transfered to the provincially appropriate site:

- Patient on the lung transplant list to Vancouver General Hospital (VGH)
- Obsectrical patients to RCH
- Pediatric patients to BCCH

Adult ECLS Capable sites:
Fraser Health Authority: Royal Columbian Hospital
Interior Health Authority: Kelowna General Hospital
Vancouver Island Health Authority: Royal Jubilee Hospital
Providence Health Care: Saint Paul's Hospital
Vancouver Coastal Health: Vancouver General Hospital

Pediatric Referals:
Neonates and children with potentially reversible cardiorespiratory failure will be considered for ECLS. Referrals for ECLS consideration/advice should be made to PICU Staff Intensivist/ECLS physician on-call at BC Children's Hospital. This should be initiated through the Patient Transport Network (PTN) calling +1 604 215 5911. All calls are monitored and recorded. The ECLS staff physician will be conferenced into the calls at any time of day/night if the term "ECLS referral or ECLS discussion" is used.

Early discussion for referral is recommended as many neonates that require ECLS for respiratory support may need venoarterial (VA) support. Therefore, early transfer is paramount.

- ECLS consults/referrals should be made whenever there is a question that ECLS is a potential option of care or there is "failure to respond to conventional treatment".
- ECLS will be considered in children and neonates with potentially reversible respiratory failure. Please calculate the Oxygenation Index (OI).
  OI = [FiO2 (%) x Mean Airway Pressure (mmHg)] / PaO2 (mmHg)
- Consideration is made earlier if the patient is already on Nitric oxide and/or other modes of ventilation (High Frequency Jet Ventilation (HFJV) and High Frequency Oscillatory Ventilation (HFOV)) or the patient is located remotely.

Contraindications:

- Irreversible lung disease
- Irreversible multi-organ dysfunction
- Brain death
- Contraindication to prolonged anticoagulation
- Severely reduced long-term functional ability
- Patient is too small or premature for adequate vessel cannulation
- Futility
- Family directives to limit further intensive therapy