CRITERIA FOR PEDIATRIC AND YOUNG ADULT ECMO

These criteria and exclusions apply to patients 30 days to 25 years of age with an acute reversible disease process and evidence of either cardiovascular and/or respiratory failure. Consultation with an ECMO consultant is recommended.

For patients less than 30 days of age refer to neonatal criteria

INCLUSION CRITERIA:

Any one of the following criteria qualifies the patient for ECMO, check all that apply.

Any one of the below signs of hypoperfusion or severe cardiac dysfunction, following appropriate volume resuscitation (> 60 mL/kg and/or CVP > 10) and inotropic/vasopressor support:

- Plasma lactate > 45 mg/dl (> 5 mM/L) and not improving for > 30 minutes
- SVO₂ < 55% (estimated Cardiac Index < 2) for > 1 hour
- Rapidly deteriorating or severe ventricular dysfunction
- Intractable arrhythmia with poor perfusion
- Failure to wean from cardiac bypass
- Need for CPR
- Cardiogenic Shock with an inotropic equivalent (IE) > 50 for 1 hour, or >45 for 8 hours

For patients with acute myocarditis or post cardiotomy, IE >40.

Sepsis with severe distributive shock—After the first 6 hours of goal directed resuscitation per current sepsis guidelines, and assuming adequate volume resuscitation and source control measures have been accomplished:

- Inotropic equivalent > 100 with any of the following
  - \( \text{SvO₂} < 65\% \)
  - Lactate > 45 and not improving
  - Urine output < 0.5 ml/kg/hr

\[ IE = DOPapine \left( \text{mcg/kg/min} \right) + DOBUTamine \left( \text{mcg/kg/min} \right) + EPInephrine (100Xs \text{mcg/kg/min}) + NORepinephrine(100Xs \text{mcg/kg/min}) + ISOproterenol(100Xs \text{mcg/kg/min}) + MILrinone(15Xs \text{mcg/kg/min}) + VASOpressin(10XmUnits/kg/min) \]

Any one of the following signs of severe respiratory failure with predicted high mortality rate; all values assume an attempt to optimize mechanical ventilation

- Oxygenation Index (OI) = MAP x FiO₂ x 100 divided by PaO₂
  - OI > 45 for 6 hours on Conventional Ventilation and/or HFOV
  - OI > 35 for > 12 hours

- Exceeding recommended maximal ventilator settings of:
  - Conventional ventilator plateau pressure (Pplat) of >35
  - HFO AMPlitude of >55 for 8 hours

- Severe Air Leak unresponsive to other therapies.

- Hypercarbia with pH <7.10 for 4 hours

- Acute deterioration on optimal therapy
  - PaO₂ < 30 at any time
  - PaO₂ < 40 for 2 hours

- Accidental Hypothermia
  - Core temperature < 32°C with hemodynamic instability, non-perfusing rhythm or cardiac arrest
  - Core temperature < 28° C (due to high risk of hemodynamic deterioration)
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EXCLUSIONS FROM PEDIATRIC ECMO:
Any one of the following underlying imminently fatal or irreversible disease states excludes the patient from ECMO:

— Severe CNS injury or asphyxia
— Persistent plasma lactate > 225 mg/dl is highly predictive of death
  Note: > 135 mg/dl is highly predictive of adverse neurologic sequela in neonates
— Base deficit > 30 on 2 ABG’s
— Severe neurological exam persistent after respiratory and metabolic resuscitation
— End-stage malignancies or advanced AIDS Severe acquired or congenital immunodeficiency
— Major burn
— Advanced liver failure
— Evidence of ongoing uncontrolled bleeding.
— A potentially correctable coagulopathy is not an exclusion.
— Severe fibrosis on lung biopsy
— Severe pulmonary disease ventilated aggressively for > 14 days
— Lethal condition incompatible with long life, including trisomy 13 and 18
— Disseminated herpes disease
— Accidental hypothermia patients with an initial K level > 8 meq/l or pH < 6.6
— Warm water drowning

Provider Signature: ___________________ MD

Date: ____________________ Time: ________________
References:
Trachsel, Daniel, McCrindle, Brian W., Nakagawa, Satoshi and Bohn, Desmond: American Journal of Respiratory Critical Care Medicine (2005), pp.206-211.
Oxygenation Index Predicts Outcome in Children with Acute Respiratory Failure.

Cesar Trial (preliminary result); Society of Critical Care Medicine, presented Feb 3, 2008.