



RESPIRATORY PROBLEMS AND MANAGEMENT

NEONATAL EXTRA CORPOREAL MEMBRANE OXYGENATION (ECMO)

Neonatal ECMO is a well-established treatment modality for neonatal patients with medically unresponsive cardio-respiratory failure. Survival is significantly improved for the group of neonates, when selected appropriately, but as would be expected in the high risk situation there are risks of serious complications and long term developmental sequelae.

PMH is able to provide ECMO for neonatal patients but it should be noted that this is a developing service with a number of logistical limitations, e.g. limited ECMO machines, limited PICU and perfusionist staff, and limited surgeon availability. In addition, the current ECMO service cannot provide an outreach service. Therefore early, detailed discussions with PMH PICU staff are required for KEMH patients.

Neonatal indications for ECMO

- Reversible cardiac, pulmonary, or cardiopulmonary failure
- Acceptable quality of life expected if survival occurs
- Likely to die (predicted 80% mortality)
- Mechanical ventilation <14 days
- >34 weeks gestation
- Weight >2000g

The severity of respiratory failure may be indicated by:

1. Oxygen Index (OI) > 40 for > 4 hours
$$OI = (\text{Mean airway Pressure} \times \text{FiO}_2 \times 100) / \text{Post ductal PaO}_2$$
2. OI > 20 with lack of improvement despite prolonged (> 24 hours) maximal medical therapy or persistent episodes of decompensation.
3. Severe hypoxic respiratory failure with acute decompensation ($\text{PaO}_2 < 40\text{mmHg}$) unresponsive to intervention.
4. Progressive respiratory failure and/or pulmonary hypertension with evidence of right ventricular dysfunction.
5. Continued high inotropic requirement e.g. failure to respond to high-dose support. See [Neonatal Medication Protocols](#).

Congenital Diaphragmatic Hernia

Review antenatal scans for poor prognostic factors. Exclude other significant anomalies. Additional respiratory factors to consider to those outlined above: the absence of an initial period with pre-ductal oxygen saturation > 85% and a $\text{PaCO}_2 < 65\text{mmHg}$ are strongly associated with a poor prognosis attributable to pulmonary hypoplasia and constitute an exclusion criteria for ECMO.



EXCLUSION CRITERIA

- Major intracranial haemorrhage
- Severe or lethal malformation or chromosomal anomaly (Trisomy 18,13)
- Severe neurological injury
- Untreatable cardiac or pulmonary malformation
- Uncontrolled bleeding
- Irreversible organ damage

Protocol for ECMO decision making for KEMH babies.

- KEMH neonatologist calls NETS WA
- Conference call immediately set up with KEMH and PMH neonatologist, PMH PICU duty consultant and Mr David Andrews. A cardiologist could be included, as required
- Likely outcomes from this conference call are:
 - Definite decision to go ahead with ECMO
 - Definite decision not to go ahead with ECMO
 - Review decision at an agreed time. This maybe because the patient is stable or because PICU staff want to further consult with their colleagues and senior PICU nursing staff.

Patients should not be transferred to PMH NICU just in case ECMO may be needed on the basis that these are inherently very unstable patients and a “unnecessary” transfer could be life threatening.

Minimal extra requirements in preparation for ECMO

1. Cardiac ECHO
2. Check head ultrasound (include kidneys at this time)
3. Cross-match 2 units Packed red blood cells / 1 unit platelets and 1 unit FFP
4. If not yet in situ, place a NGT / indwelling urinary catheter / peripheral arterial line / central vascular access prior to ECMO. The patient will be fully anti-coagulated for ECMO, significantly increasing the risk of bleeding if these procedures are performed post ECMO.

Protocol for PMH NICU patients

The proximity of the PMH PICU and NICU makes decision making and conjoint review of patients much less problematic, otherwise all of the above issues hold for case selection, decision making and preparation.

National Standards



Legislation - Nil
 Related Policies - Nil
 Other related documents - Nil

RESPONSIBILITY

Policy Sponsor	Neonatology Clinical Care Unit - Neonatal Coordinating Group
Initial Endorsement	April 2016
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