



CLINICAL PRACTICE GUIDELINE

Guideline coverage includes NICU KEMH, NICU PCH and NETS WA

Extra Corporeal Membrane Oxygenation (ECMO) for the Neonate

This document should be read in conjunction with the [Disclaimer](#)

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.

PCH 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 PCC and perfusionist staff, and limited surgeon availability. In addition, the current ECMO service cannot provide an outreach service. Therefore early, detailed discussions with PCH PCC 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 > 2000 grams.

The Severity of Respiratory Failure may be Indicated by:

1. Oxygen Index (OI) > 40 for > 4 hours.
$$OI = (\text{Mean airway Pressure} \times FiO_2 \times 100) / \text{Post ductal PaO}_2$$
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 (PaO₂ <40mmHg) 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. Refer to [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 PaCO₂ <65mmHg 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 PCH Neonatologist, PCH PCC duty consultant and Mr David Andrews. A cardiologist should always be included even if cardiac problems have been previously excluded.
- 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 PCC staff want to further consult with their colleagues and senior PCC nursing staff.

Patients should not be transferred to PCH 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 PCH NICU Patients

The proximity of the PCH PCC 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.

Related WNHS policies, procedures and guidelines

[Neonatal Medication Protocols](#)

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