



CLINICAL GUIDELINE	
Extra Corporeal Membrane Oxygenation (ECMO) for the Neonate – Indications and Referral Process	
Scope (Staff):	Nursing and Medical Staff
Scope (Area):	NICU KEMH, NICU PCH, NETS WA, PCC
Child Safe Organisation Statement of Commitment	
CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.	

This document should be read in conjunction with this [DISCLAIMER](#)

Extra Corporeal Membrane Oxygenation (ECMO) is a well-established treatment modality for neonatal patients with medically unresponsive cardio-respiratory failure. Survival is significantly higher in the group of neonates who are selected appropriately. However, as would be expected in this high risk situation, there are risks of serious complications and long term developmental sequelae associated with an ECMO run.

Common reasons for the use of neonatal ECMO include: meconium aspiration syndrome (MAS); congenital diaphragmatic hernia (CDH); persistent pulmonary hypertension of the newborn (PPHN); and sepsis. Survival rates are reported as: MAS 92%; PPHN 73%; Pneumonia 60%; CDH ~50%; sepsis 45%.

Importantly, early discussion is required for any patient who may be a candidate for ECMO with the ECMO service via a NETS WA conference call.

Neonatal criteria for consideration of ECMO

All criteria assume optimal support of respiratory and/or cardiovascular failure including mechanical ventilation, trial of nitric oxide (where appropriate) and appropriate inotropic support.

Entry criteria

- Severe cardiac, pulmonary, or cardiopulmonary failure with a high likelihood of mortality and potentially reversible aetiology
- Acceptable quality of life expected if survival occurs.

With ≥ 1 of the following:

- OI ≥ 40 for >30 mins
- OI >20 with lack of improvement despite prolonged (>24 hrs) maximal medical therapy or persistent episodes of decompensation.
- Decompensation, with PaO₂ <40 mmHg for >2 hrs unresponsive to intervention (non-cyanotic heart disease).
- Metabolic acidosis and shock with pH <7.25 (no respiratory component) for > 2 hrs with hypotension.

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- Progressive pulmonary hypertension with evidence of right ventricular dysfunction or continued high inotropic support requirement.

Oxygenation index (OI) = (Mean Airway Pressure (MAP) x FiO₂) / PaO₂

Absolute contraindications

- Severe or lethal congenital malformation or chromosomal anomaly (includes trisomy 13, 18 but not 21).
- Major intracranial haemorrhage (including IVH ≥ grade 3).
- Severe irreversible neurological injury.
- Uncontrollable bleeding.

Relative contraindications

- Weight <2kg.
- Gestational age <34 weeks.
- Irreversible organ damage.
- Disease state with high probability of a poor prognosis.

NB Any infant with an OI >25 despite adequate medical management should be considered for transport to ECMO centre for ongoing management.

Process of referral for consideration of ECMO

- Referral for neonates is via NETS WA or with a cardiac MDT for neonates on 3B at PCH.
- Following referral to NETSWA and an initial discussion, a conference call will be set up with referring neonatologist/ paediatrician, PCH/ NETS neonatologist, PCC on duty consultant, on call cardiologist and the cardiothoracic surgeon.
- Likely outcomes from this conference call are:
 - 1) Definite decision to go ahead with ECMO.
 - 2) Definite decision not to go ahead with ECMO.
 - 3) Transport to 3B NICU PCH for further management/ assessment.
 - 4) Review decision at an agreed time.

During this discussion, a decision will be made upon timing of transport and where the patient will be admitted to (3B NICU or 3A PCC).

Transport considerations

- Newborns for ECMO consideration are the most complex and physiologically unstable babies that require retrieval.
- It should be accepted that some babies need to be transported in a less than optimal state or are too sick to move.
- In these circumstances there may need to be a conversation with parents on the risk of transport and/or that transport will be too risky to undertake.
- This conversation should be documented in the patients notes.
- Details on the preparation of transport for a baby for ECMO are beyond the scope of this guideline.

Preparation for ECMO (if patient at KEMH or PCH NICU)

- 1) Cross-match 2x units packed red blood cells (PRBC) / 1x unit platelets and 1x unit FFP.
- 2) Send newborn blood spot screening (to be done prior to ECMO commencing and administration of PRBC). **Note:** this is the responsibility of KEMH and PCH NICU staff.
- 3) Echocardiogram if not already done.
- 4) Head and renal ultrasound.
- 5) If not yet in situ, place:
 - a. NGT
 - b. Indwelling urinary catheter
 - c. Arterial line (UAC adequate)
 - d. Central vascular access (UVC adequate)

NB Apart from sending 1) and 2), only perform 3) 4) 5) if time permits.

The above items should **not** hold up transport of the infant.

Related CAHS internal policies, procedures and guidelines


[Neonatal Medication Protocols](#)

References

1. Wild KT, Rintoul N, Kattan J, Gray B. Extracorporeal Life Support Organization (ELSO): Guidelines for Neonatal Respiratory Failure. ASAIO J. 2020;66:463-70 doi: 10.1097/MAT.0000000000001153 [published Online First: 2020/04/14].

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