PALLIATIVE CARE NETWORK OF WISCONSIN

FAST FACTS AND CONCEPTS #472
EXTRACORPOREAL MEMBRANE OXYGENATION DISCONTINTUATION IN THE DYING PATIENT

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Introduction The use of extracorporeal membrane oxygenation (ECMO), a form of life support for those with refractory respiratory or cardiac failure, has been steadily increasing (1). Unfortunately, some patients receiving ECMO do not recover, and a decision is made to discontinue ECMO and allow the patient to die. This *Fast Fact* discusses practical aspects of ECMO discontinuation in the dying patient. For more details about the role of palliative care for adults receiving ECMO and decisions to remove ECMO or other life-sustaining treatment (LST), see *Fast Facts* #339 and #410. The advice in this *Fast Fact* is largely based on clinical experience and opinion since data are limited on this topic.

ECMO Types There are two types of ECMO: venovenous (VV) and venoarterial (VA).

- VV ECMO is used in refractory respiratory failure, particularly the acute respiratory distress syndrome (ARDS). The VV circuit removes *venous* blood, which passes through a chamber for gas exchange, and returns it to the patient's *venous* circulation. With VV ECMO cardiac function is preserved, so death may take hours or (rarely) days, and patients typically die of hypoxia. Data indicate approximately 50% of patients die within 1 hour of ECMO discontinuation (2).
- VA ECMO is used in those with cardiac failure, e.g., refractory cardiogenic shock or cardiac arrest without return of spontaneous circulation despite resuscitative efforts. The VA circuit removes *venous* blood, which is mechanically pumped through the circuit, though a chamber for gas exchange, and returns it to the patient's *arterial* circulation. With VA ECMO, circulatory collapse occurs when the pump is discontinued, typically leading to death within minutes (2).

Patient/family counseling about ECMO discontinuation When discontinuing ECMO at the end-of-life (EOL), there are many similarities with the approach to discontinuing other forms of life-support technology. Clinicians should discuss with patient/surrogates the plan of care and the anticipated outcomes including how long the patient is anticipated to live after ECMO is stopped. Care should be taken to explain the use of comfort-focused medications and that realistically the patient will need sedating doses of medications to be comfortable. Clinicians should also explain which other treatments will be discontinued (artificially administered nutrition/hydration, mechanical ventilation, internal defibrillator, renal replacement therapy, etc.). Document these discussions in the medical record and ensure that do not resuscitate/intubate orders are in place. Discuss with the patient and their support people who (if anyone) will be at bedside during/after the process. Inquire about and help arrange for meaning-making practices (music, spiritual customs, spiritual leaders, rituals, etc.). Work with the patient/family and ICU/ECMO clinicians to establish an acceptable time for discontinuation.

Discontinuing ECMO (2,3)

<u>Preparation of the Room</u>

- Place orders for necessary medications, typically opioids and benzodiazepines. We recommend having sufficient medications at the bedside prepared to facilitate rapid administration if needed.
- Turn off all alarms and monitors in the room as practical.
- ECMO cannulae are *typically clamped and left in place.* Blood in the tubing may separate and can be visually distressing to loved ones, so cannulae should be covered with sheets/blankets. Consider draping sheets over the machinery (ECMO device, monitors, etc.) as well if practical.

<u>Preparation of the patient</u>

- Ensure an internal cardiac defibrillator, if in place, has been turned off.
- If the patient is paralyzed, paralytic medications should be stopped leading up to the planned discontinuation time. Clinicians should ensure paralytics are no longer in effect (commonly done using train of 4; ensure 4/4 twitches are present) prior to ECMO deactivation. This may result in a need for an increase in sedation medications to maintain patient comfort.
- It is crucial that administration of comfort medications *occurs prior to cessation of life-support technologies,* especially with VA ECMO, to ensure systemic distribution of medications prior to circulatory collapse. Patients receiving ECMO should receive standard comfort medications used

when other LSTs are being stopped such as opioids and benzodiazepines. The exact timing of medication effectiveness is related to dose and specific pharmacokinetics. Broadly speaking, administering parenteral opioids and benzodiazepines at least 10 minutes prior should ensure onset of action. We recommend careful clinical evaluation during and after medication administration to ensure appropriate symptom control prior to proceeding to next steps.

- Work with the ICU team on removing/deactivating other treatments as planned (mechanical ventilation, vasopressors, dialysis, etc.), restraints, and unnecessary lines/tubes.

Discontinuation of the ECMO circuit by the ECMO team The specific procedure will depend on the type of support being used and is typically directed by the ECMO team. Attention should be paid to minimizing alarms, keeping the patient's appearance as tidy as possible, and covering sources of bloody tubing.

After discontinuation of ECMO (2,3): Continue close monitoring and provision of comfort-directed medications to ensure the patient's death is peaceful; provide spiritual and grief support. Consider that ICU/ECMO care team members may be feeling grief and distress about the patient's impending death and work with the interdisciplinary care team to address those needs.

References

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