Extracorporeal Membrane Oxygenation

Extracorporeal membrane oxygenation (ECMO) is used to treat patients with severe, life-threatening conditions of the heart and lungs.

ECMO uses a pump to replace the function of the heart while an oxygenator performs the work of the lungs. ECMO provides short-term support, giving the heart and lungs time to recover.

Why Is ECMO Used?

- **Cardiogenic shock**: The heart is unable to pump adequate blood to meet the body’s demand. This may result from a heart attack, heart failure, pulmonary embolism, or severe infection.
- **Respiratory failure**: The lungs cannot properly exchange oxygen for carbon dioxide. This may occur because of chronic lung disease, severe infections including influenza or pneumonia, or acute lung inflammation (acute respiratory distress syndrome).
- **Postoperative heart failure**: After heart surgery, it can take time for the heart to recover, and ECMO may be used until it does.
- **Extracorporeal cardiopulmonary resuscitation (CPR)**: In specialized centers, ECMO is started during cardiac arrest as part of CPR. Studies examining the outcomes of this usage are under way.
- **Awaiting heart or lung transplant**: Some patients require ECMO while waiting for an organ transplant.

How Does ECMO Work?

Large plastic tubes called cannulas are placed in veins or arteries in the legs, neck, or chest and are connected to an ECMO machine. Blood passes through these tubes out of a patient’s body and through an oxygenator, where oxygen is added to the blood and carbon dioxide is removed before the blood is returned to the patient.

Complications of ECMO

ECMO is temporary and there may be serious risks.

- **Bleeding**: Blood thinners are used to prevent clots from forming in the tubing that carries the blood. Bleeding is the most common complication of ECMO and can be life-threatening if it occurs in the brain, lungs, or gastrointestinal tract. Patients receiving ECMO commonly require blood transfusions.
- **Stroke**: Clots may form in the ECMO circuit or body and cause a stroke. This rarely happens, but it can be disabling or fatal.
- **Leg injury**: When cannulas are placed in vessels in the leg, blood flow to the lower portion of the leg may be compromised. This may require surgery or amputation.

Why Don’t All Patients Improve With ECMO?

Some patients may not improve if their disease is not reversible or does not respond to treatment. Certain diseases may lead to progressive organ dysfunction, such as liver failure or severe neurologic injury. These conditions have a poor prognosis and may warrant discussion about discontinuing ECMO support.

FOR MORE INFORMATION

Extracorporeal Life Support Organization
www.elso.org/Resources/Introduction.aspx