

## Extracorporeal Life Support for Patients with Acute Respiratory Failure



Millions of people with acute respiratory failure are hospitalised every year. Nearly half of these patients require invasive mechanical ventilation. In-hospital mortality in these patients is quite high. Despite the fact that mechanical ventilation is the primary management tool for such patients, it is associated with major complications that increase mortality. That is why there is a need for better ventilator strategies and alternative methods of respiratory support. One such strategy is extracorporeal life support (ECLS).

ECLS was first introduced during the 1970s but was soon abandoned because of lack of clinical evidence supporting its use. But with advancing technology, interest was once again renewed in ECLS. Over the last few years, its use has increased substantially, and there is now sufficient support for the use of ECLS in adult patients with respiratory failure.

ECLS refers to two major modalities: extracorporeal membrane oxygenation (ECMO), and extracorporeal carbon dioxide removal (ECCO<sub>2</sub>R). ECMO provides sufficient blood flow rates for respiratory gas exchange support or circulatory support, while ECCO<sub>2</sub>R removes carbon dioxide. ECLS is a combination of many techniques that support heart or lung failure in the ICU. But while it is effective, it is also a complex strategy that can sometimes result in serious complications. The complications can arise as a result of the device or its insertion or through the use of anticoagulation or the effects of ECLS on distal organs (also known as ECLS-induced injury). The most common complications observed with ECLS include bleeding, infection, circuit-related complications, cardiac arrhythmias, and central nervous system haemorrhage or infarction.

Some of the major goals of ECLS include maintaining adequate oxygenation, decreasing the intensity of mechanical ventilation, minimising sedation, and mobilising patients. The primary indications for ECMO and ECCO<sub>2</sub>R include very severe ARDS, moderate to severe ARDS, lung transplantation, acute exacerbation of chronic obstructive pulmonary disease, and right-sided heart failure with or without respiratory failure.

There is no doubt that the use of ECLS has grown significantly over the last decade. However, there is still a need to standardise practice across major centres and regions. There is still no consensus on the most appropriate approach for delivering and measuring anticoagulation during ECLS. There is also a lack of understanding of the effect of the circuit on pharmacokinetics. Appropriate levels of blood flow and sweep gas flow rates are also unknown. Other areas of uncertainty include optimal management of ventilator during ECMO and weaning from ECMO.

With advancing technology, the landscape of extracorporeal support will change drastically. A novel concept of extracorporeal organ support (ECOS) has emerged and represents support for the lungs, heart, liver, kidneys, and other organs. An integrated ECOS platform that is capable of providing support to multiple organs simultaneously is something that could be seen in the future. The role of ECLS will definitely grow, and that is why it is important to invest in high-quality research to provide more clarity as to how this strategy can be used more effectively in the ICU.

Source: [JAMA](#)

Image Credit: [iStock](#)

Published on : Sun, 18 Aug 2019