

Transport While on Extracorporeal Membrane Oxygenation Support



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KEYWORDS

- Extracorporeal life support (ECLS) • Extracorporeal membrane oxygenation (ECMO)
- Critical care transport • Pre-hospital • Medical evacuation

KEY POINTS

- The use of extracorporeal membrane oxygenation (ECMO) for severe acute respiratory failure has been increasing steadily.
- Evidence suggests that ECMO performed at higher volume centers is associated with improved mortality and regionalization of ECMO centers has been advocated by The International ECMO Network.
- The process of accepting, retrieving, and successfully transporting a critically ill patient requiring ECMO is a complex endeavor best performed by a specialized ECMO transport team.
- Transport of the most critically ill patients is best performed on ECMO and can be safely performed with careful planning, teamwork, and a highly trained team.

INTRODUCTION

Since the first successful open heart operation using a “heart–lung machine” in 1953, extracorporeal membrane oxygenation (ECMO), or extracorporeal life support, has seen significant technological advances with respect to ECMO cannulas, gas exchange membranes, pumps, and circuit components.^{1,2} Since it began collecting data in 1990, the Extracorporeal Life Support Organization (ELSO) registry (**Fig. 1**) has reported 87,366 ECMO runs as of January, 2017, and this rapidly increasing number will undoubtedly continue to grow.³

As experience with ECMO continues to evolve, there is growing consensus among experts in the field that it should be performed in “centers with sufficient experience,

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Overall Outcomes					
	Total Runs	Survived ECLS		Survived to DC or Transfer	
Neonatal					
Pulmonary	26,719	22,394	83%	19,252	72%
Cardiac	7,266	4,727	65%	2,987	41%
ECPR	1,613	1,089	67%	666	41%
Pediatric					
Pulmonary	8,287	5,608	67%	4,812	58%
Cardiac	9,593	6,620	69%	4,941	51%
ECPR	3,615	2,078	57%	1,508	41%
Adult					
Pulmonary	13,712	9,174	66%	8,040	58%
Cardiac	12,566	7,181	57%	5,222	41%
ECPR	3,995	1,572	39%	1,144	28%
Total	87,366	60,443	69%	48,572	55%

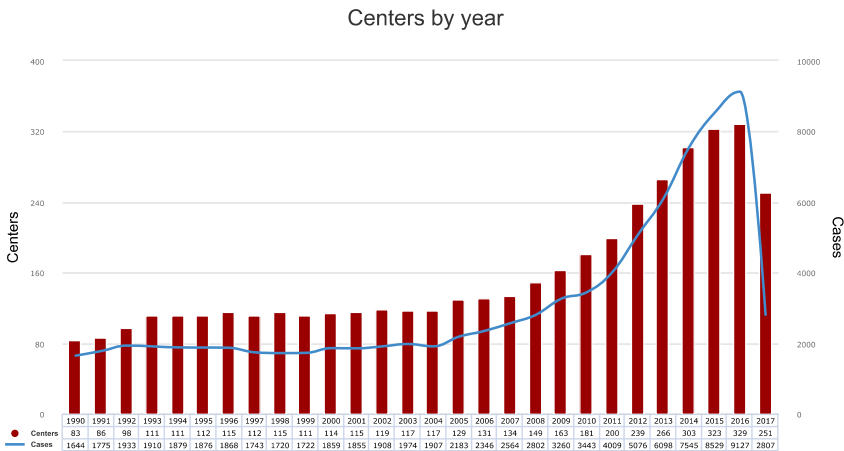


Fig. 1. Extracorporeal life support (ECLS) Registry Report International Summary demonstrating increased use of ECLS in adults. DC, discharge; ECPR, extracorporeal cardiopulmonary resuscitation. (From ECLS registry report: international summary. 2017; with permission. Available at: www.else.org. Accessed 24 July, 2017).

volume, and expertise to ensure it is used safely.”⁴ Thus, the development of ECMO programs has necessitated the formation of ECMO transport teams with the requisite expertise to perform these complex transports.⁵ The rapid increase of extracorporeal support in adults has created an increased need for expedient and safe transport of patients on ECMO. A growing body of literature suggests that adult patients can be safely transported on extracorporeal support. Additionally, it is the author’s opinion that transport of the most critically ill patients is in fact safer once a patient is placed on extracorporeal support and the literature has begun to suggest this.⁶ As the demand for ECMO increases, so will the need for highly specialized teams that can quickly deploy and initiate extracorporeal support in a multiplicity of environments. The purpose of this review is to discuss the state of knowledge with respect to ECMO transport with special emphasis given to how to actually undertake such complex missions.

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