

May, 2015

Excellent outcomes in a small volume neonatal-pediatric ECMO center

Sean Skinner, MD

Hubert Ballard, MD

Erich C. Maul, DO, MPH, *University of Kentucky*

Ashwin Krishna, MD

Michael Wittkamp, MD, et al.

Skinner S.C.¹, Wittkamp M.², Krishna A.², Maul E.², Ballard H.C.³, Ruzic A.¹, Iocono J.¹

¹University of Kentucky, Surgery, Lexington, United States, ²University of Kentucky, Pediatrics, Lexington, United States, ³University of Kentucky, Neonatology, Lexington, United States

Introduction

The management of patients on ECMO requires a highly trained multidisciplinary team. Recent literature contends that superior outcomes depend on large patient volumes. Our experience suggests that lower volume, rural centers can attain excellent outcomes with the right combination of simulation enhanced education, standardized work with checklists and order sets, and constant quality improvement processes.

Methods

We are a smaller neonatal/pediatric ECMO center that performs 7-12 respiratory ECMO runs a year. Our institution does not have a cardiac surgical program. We reviewed our ECMO data reported to the ELSO registry for the past 3 years, looking at all Neonatal and Pediatric respiratory failure ECMO patients and then compared our results with those of the international ELSO registry data from Jan 2015.

Results

We had a total of 28 patients over the 3 year period, with a better survival compared to the international ELSO survival:

- Looking at overall survival
- Comparing venovenous versus venoarterial ECMO
- Breaking down the neonatal population into PPHN and MAS.
- Separating out our pediatric numbers

There were various other diagnoses identified in patients requiring ECMO that included 5 with sepsis, 1 pertussis, 1 CDH, 1 pulmonary fibrosis, 1 drug overdose, 1 severe asthma, and 1 *Mycoplasma pneumoniae*.

3 yr Institutional data (2012-2014)			University of Kentucky Survival Rate	International ELSO Survival Rate
Total number patients		28		
	Survived	25	89%	81%
	VV ECMO	22		
	Survived	20	91%	79%
VA ECMO		6		
	Survived	5	83%	68%
Neonatal patients	Total number	21		
	Survived	20	95%	84%
PPHN		20		
	Survived	19	95%	77%
MAS		8		
	Survived	8	100%	94%
Pediatric patients	Total number	7		
	Survived	5	71%	66%

Conclusion

Our low volume ECMO center has outcomes surpassing ELSO registry results. We have achieved this success through a carefully built program.

- All patients are cared for in the same unit by a multidisciplinary team.
- We utilize checklists for cannulation, daily rounding, and decannulation.
- Complete order sets are constructed within our electronic medical record.
- Every ECMO run is assessed by a case review emphasizing systematic improvement.
- A course of introductory class work is reinforced with a quarterly lecture series and high fidelity simulation.
- Learners evaluate educational content through pre- and post- activity questionnaires.

We believe we have a strong ECMO program and will continue to have excellent outcomes with these systems in place.