

10-1-2013

A cost reducing ECMO model: a single institutional experience.

En Yaw Hong
Thomas Jefferson University

Suzanne Wallace
Thomas Jefferson University

Amy Tropea
Thomas Jefferson University

Jaime Byrne, MSN, RN
Thomas Jefferson University, Jaime.Byrne@jefferson.edu

Hitoshi Hirose, MD, PhD
Thomas Jefferson University, Hitoshi.Hirose@Jefferson.edu

See next page for additional authors

[Let us know how access to this document benefits you](#)

Follow this and additional works at: <http://jdc.jefferson.edu/surgeryfp>

 Part of the [Surgery Commons](#)

Recommended Citation

Hong EY, Wallace S, Tropea A, Byrne J, Hirose H, Pitcher HT, Cavarocchi NC. A cost reducing ECMO model: a single institutional experience. Presented at ASAIO's 59th Annual Conference. Chicago, IL. June 12-15, 2013.

This Article is brought to you for free and open access by the Jefferson Digital Commons. The Jefferson Digital Commons is a service of Thomas Jefferson University's [Center for Teaching and Learning \(CTL\)](#). The Commons is a showcase for Jefferson books and journals, peer-reviewed scholarly publications, unique historical collections from the University archives, and teaching tools. The Jefferson Digital Commons allows researchers and interested readers anywhere in the world to learn about and keep up to date with Jefferson scholarship. This article has been accepted for inclusion in Department of Surgery Faculty Papers by an authorized administrator of the Jefferson Digital Commons. For more information, please contact: JeffersonDigitalCommons@jefferson.edu.

Authors

En Yaw Hong; Suzanne Wallace; Amy Tropea; Jaime Byrne, MSN, RN; Hitoshi Hirose, MD, PhD; Harrsion Pitcher, MD; and Nicholas C. Cavarocchi, MD

A Cost Reducing ECMO Model: A Single Institution Experience

En Yaw Hong, Suzanne Wallace, Amy Tropea, Jaime Byrne, Hitoshi Hirose, Harrison T. Pitcher, Nicholas C. Cavarocchi
 From Thomas Jefferson University Hospital, Philadelphia, PA, USA

Introduction

- Shortage of ECMO specialists.
- ELSO to form new guidelines:
- Board certified nurses who have at least one year of critical care experience can be trained as ECMO specialists
- ECMO program expansion
- Financial concerns were reported.
- However, the financial concerns were not weighed against the long-term cost benefit of training nurses as ECMO specialists.

Objective

We aim to describe our experiences in implementing a new cost-reducing ECMO model in an ICU setting involving multidisciplinary providers (registered nurses, midlevel providers and intensivists) as ECMO specialists.

Competency checklist

CRITICAL BEHAVIOR
1. Reviews and follows Nursing Procedure-Care of the Patient with Adult Extracorporeal Membrane Oxygenation
ECMO
1. States location, purpose, indications and contraindications of use.
2. Identifies resources to troubleshoot
3. Describes the process of percutaneous cannulation and ECMO start up
4. Describes the difference between V-V and V-A ECMO
ECMO PUMP/CART
1. States location of the ECMO cart
2. States contents of the ECMO cart
3. Identifies that the ECMO cart has had a daily check completed by perfusionist
4. Identifies the on/off power switch
5. Identifies the battery indicator
6. Identifies the display screen
7. Identifies the pump and oxygenator
8. Identifies the flow sensor
ECMO CIRCUIT
1. States location of backup circuit and states procedures for obtaining replacement/back-up equipment
2. Demonstrates the appropriate technique in assessing the ECMO circuit and keeps circuit visible
3. Performs daily cannula site care per nursing procedure

Methods

(Implementing the program)

- Group I
- New technology:
 - ECMO circuit
 - Oximetry
 - The education platform:
 - Didactic sessions
 - Hands-on sessions
 - Regular competency tests
 - Competency checklist
- Group II
- Allocation of dedicated space
 - Development of algorithms
 - Recruitment of new specialists

Role of new specialists.

- Continuous bedside perfusion monitoring.
- Assess the ECMO circuit
- Assist the perfusionist in initiating ECMO
- No changes in nursing ratio (1:1 nurse to patient ratio)
- PRN Perfusionists' services

Methods

(Calculating for cost benefit)

- Retrospective study
- Patients: N= 74
 Group I n=28, Group II n=46
- Study period: July 2010 - December 2012
- Demographic factors standardized.
- **Primary endpoint:** total hospital cost incurred by ECMO patients.
- **Secondary endpoint:** safety issues and mortality.

Results

Demographics

	Group I	Group II	p value
No. of patients	28	46	
Age	44±15	49±14	0.183
Males	14 (50%)	26 (57%)	0.636
BMI	27.9 ± 7.7	31.5 ± 8.6	0.077
Duration of ECMO	8.2 ± 5.5 d	8.1 ± 6.9 d	0.971

Safety management issue

	Group I	Group II	p value
Dislodged cannula	0%	2.10%	0.622
Mortality	12 (42%)	27 (59%)	0.233

Results

Cost details of Group I vs Group II

Group I ECMO cost first year	Cost	Annual Frequency	Total cost
Fee per ECMO set up	\$834	35	\$29,190
Fee per hour	\$101	5880	\$593,880
Total hospital spend for ECMO program			\$623,070
Group II ECMO cost second year			
Fee per monthly retainer	\$19,500	12	\$234,000
Fee per hour	\$104	657	\$68,328
Total hospital spend for ECMO program			\$302,328
ECMO savings			\$291,552

Conclusion

We demonstrated that the ICU run ECMO model decreases hospital cost by reducing the cost of continuous bedside perfusion support with no loss in safety and outcomes.

Contact information

Dr. Nicholas C. Cavarocchi, MD.
Nicholas.cavarocchi@jefferson.edu
 Professor of Surgery
 Director of Surgical Cardiac Care unit
 Thomas Jefferson University