



ECMO Workshop

Nov 28, 2023

General Objectives:

Basics of ECMO:

Directed to practitioners with minimal or no prior experience/exposure to ECMO.

1. Describe the physiology and function of extracorporeal membrane oxygenation.
2. Contrast the most common circuit configurations used for respiratory and hemodynamic support.
3. List the most common complications experienced by patients supported on ECMO.

Advanced ECMO:

Directed to practitioners with strong foundations or prior experience managing patients on ECMO.

1. List the indications and evidence supporting the use of ECMO in patients with cardiopulmonary failure.
2. Discuss current knowledge gaps and controversies in the use of ECMO in patients with cardiopulmonary failure.
3. Identify essential actions needed to respond to common ECMO scenarios encountered during clinical care.

Pre-conference structure:

The ECMO pre-conference will include morning didactic lectures and afternoon hands-on workshops. Participants will be asked to register in advance for either the Basics of ECMO or Advanced ECMO track based on their foundational knowledge and clinical experience. Participants will also have the option to register in advance for 4 hands-on workshops based on their interests and skills.

Didactic sessions will be delivered simultaneously to both groups. Hands-on workshops will also run simultaneously, and participants will rotate through each 1-hour station.

Content:



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Basics of ECMO:

Physiology of ECMO

- Oxygenator function
- Oxygenation and carbon dioxide removal

Knobology

- Main console interface and controls
- Effects of modifying sweep gas flow and pump speed

ECMO configurations

- Nomenclature
- V-V and variations
- V-A and variations (central, peripheral, sport, etc.)

General care of patients on ECMO

- Daily usual care (cannula and circuit care)
- Basic monitoring (e.g., saturation, blood gases, pulse pressure, delta pressure, etc.)
- Mobilization and patient transport

Complications

- Common complications of VA and VV ECMO

Outcomes

- What to expect

Advanced ECMO:

Patient selection

- When is ECMO indicated? (VA/VV)
- When is ECMO not indicated? (VA/VV)
- ECPR

Mechanical ventilation for patients on ECMO

- Lung rest parameters
- Ventilation during VA ECMO

LV distension

- LV Venting and unloading strategies
- Indications, timing of decompression

Monitoring on ECMO

- Hemodynamics, echo
- Respiratory drive and effort

Anticoagulation

- Targets
- When patients bleed?

Liberation from ECMO

- Lung and cardiac recovery
- Liberation trials



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Workshops:

Nuts & Bolts

Objective: Demonstrate components and function of the circuit/console interface

- Circuit, oxygenator, blender, flow sensor, etc.
- Console interface, adjusting flow/RPMs, monitoring pressures

General care of patients on ECMO

Objective: Demonstrate monitoring and circuit checks routinely performed in patients on ECMO

- Cannula position, measurements, dressing, sutures
- Oxygenator/circuit inspections (air, thrombus)
- Routine monitoring and basic troubleshooting (e.g., respiratory acidosis & sweep, identify low pulse pressure in VA ECMO, bleeding – aPTT, etc.)

ECMO emergencies/water drills

Objective: Introduce the emergency circuit/console check & demonstrate/troubleshoot emergencies on circuit

- Eigenflow?
- Power, flow, color difference, circuit integrity
- Where and when to clamp the circuit
- Air entrainment, oxygenator venting
- Hand cranking
- Cardiac arrest procedures

Liberation from ECMO

Objective: Discuss approaches to liberation from hemodynamic and respiratory ECMO

- Case based discussion
- Monitoring for signs of recovery
- Performing liberation trials (VA/VV)

Cannulation

Objective: Demonstrate how to perform percutaneous cannulation

- Simulation mannequin
- Ultrasound guidance technique/tips
- Progressive dilatation
- Cannula advancement
- Suturing/securing the cannula

ECHO & ECMO

Objective: Demonstrate how to perform basic echocardiographic assessment and guide cannulation with TEE.

- Heart works mannequin (TTE/TEE)
- Cannulation image acquisition sequence
- Identifying the IVC
- Echocardiographic assessment of ventricular interdependence
- Monitoring volume status and LV distension

Hypoxemia on ECMO

Objective: Discuss and contrast most common causes of hypoxemia on ECMO

- Case based discussion
- Oxygenator dysfunction
- Recirculation



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- High circuit bypass
- Drainage insufficiency

Hemodynamic complications of VA ECMO

Objective: Discuss and contrast most common hemodynamic complications of VA ECMO

- Case based discussion
- Differential hypoxemia

Agenda

Didactic Sessions				
BASICS OF ECMO			ADVANCED ECMO	
	Topic	Speaker	Topic	Speaker
0800-0830	The ECMO circuit	Courtney Fischer & Mark Alm	Patient selection – When to use and when not to use ECMO	Nida Qadir
0830-0900	ECMO configurations	Courtney Fischer & Mark Alm	Mechanical ventilation during ECMO	Lorenzo del Sorbo
0900-0930	Physiology of ECMO	Cara Agerstrand	LV Venting and Unloading	Dave Nagpal
Break				
0945-1015	General care of the patient on ECMO	Kirsten Reese	Monitoring on ECMO	Ghislaine Douflé
1015-1045	General complications of ECMO	Ricardo Teijeiro	Anticoagulation on ECMO	Manuel Tisminetsky
1045-1115	Outcomes	Margaret Herridge	Liberation from ECMO	Faizan Amin
Break/breakout to workshops				
ECMO workshops				
1130-1230	Nuts & bolts/knobology Courtney Fischer Mark Alm	Circuit checks and patient monitoring Kirsten Reese Allison Somers Belle Dhillon	ECMO Cannulation Ghislaine Douflé Juan Parra	Echo & ECMO Laura Dragoi Diana Morales Castro Irene Wong
1230-1330	Circuit check Kirsten Reese Allison Somers Belle Dhillon	Nuts & bolts/knobology Courtney Fischer Mark Alm	Echo & ECMO Laura Dragoi Diana Morales Castro Irene Wong	ECMO Cannulation Ghislaine Douflé Juan Parra
Lunch				
1430-1530	ECMO Emergencies/ Water Drills Courtney Fischer Mark Alm	Liberation from ECMO Faizan Amin Ricardo Teijeiro	Hypoxemia on ECMO Cara Agerstrand Varsha Venkataranam Hannah Wozniak	Hemodynamic complications of VA-ECMO Dave Nagpal David McAlpine
1530-1630	Liberation from ECMO Faizan Amin Ricardo Teijeiro	ECMO emergencies/ Water Drills Courtney Fischer Mark Alm	Hemodynamic complications of VA-ECMO Dave Nagpal David McAlpine	Hypoxemia on ECMO Cara Agerstrand Varsha Venkataranam Hannah Wozniak
1630-1700	Closing remarks – Exit survey			