ELSO Standardized Core Curriculum for Adult ECMO

Title	Learning Objective	Learning Objective	Learning Objective
ECMO Overview	☐Describe the different modes of ECMO support.	☐Discuss global trends in ECMO utilization.	
History of ECMO	☐List the key milestones in the development of ECMO.	☐Describe the evolution of the Extracorporeal Life Support Organization.	
Circuit Overview	☐Define the main components of an ECMO circuit.	☐List circuit monitoring tools.	
Cannulas and Tubing	☐Describe the differences in ECMO cannula design.	☐List the considerations for selecting the appropriate ECMO cannula.	
Pump	☐Describe the requirements of a blood pump used in ECMO.	☐Explain the physics and working principles of a centrifugal pump.	
Membrane Lung and Blender	☐Describe the structure and function of the membrane lung	☐Describe the function of the blender	
Pressure Monitoring	☐List the different pressure zones in an ECMO circuit	☐Discuss the utility of monitoring drainage pressure	☐Discuss the utility of monitoring pre- and post-membrane lung pressures
Other Circuit Components	☐Describe the utility of the flowmeter	☐Describe the function of the heater	☐Describe the utility of circuit clamps
Cannulation	☐List the differences between percutaneous and open cannulation	☐Outline the process of percutaneous cannulation	☐Discuss the role of ultrasound in cannulation
VV ECMO Configurations	☐List the different configurational options for VV ECMO	☐Review the benefits and limitations of specific configurations	
VA ECMO Configurations	☐List the different configurational options for VA ECMO.	☐Review benefits and limitations of specific configurations.	
Cannulation Complications	☐Identify complications of ECMO cannulation	☐Describe steps to prevent, recognize, and treat complications	
Oxygen Delivery & Uptake	☒Describe the normal physiology of oxygen delivery and uptake.		

Gas Transfer in the Membrane Lung	☐Describe the key determinants of oxygen uptake in the membrane lung.	☐Describe the key determinants of carbon dioxide removal in the membrane lung.	
Hemodynamic Monitoring on VV ECMO	☐List the hemodynamic changes that accompany VV ECMO	☐Describe the changes in hemodynamic monitoring on VV ECMO	
Hemodynamic Monitoring on VA ECMO	☐Discuss the hemodynamic changes that accompany VA ECMO	☐Describe the changes in hemodynamic monitoring on VA ECMO	
Drainage Insufficiency	☐Define and diagnose drainage insufficiency.	☐Troubleshoot drainage insufficiency.	
Return Obstruction	☐Define return obstruction and identify its causes.	☐Diagnose and manage return obstruction.	
Respiratory Failure	☐Provide an overview of respiratory failure	☐List standard management strategies for respiratory failure	☐Discuss the rationale of VV ECMO in respiratory failure
Patient Selection for VV ECMO	☐List the indications and contraindications for VV ECMO support.		
Initiation of VV ECMO	☐Describe the steps in initiating a patient onto VV ECMO.		
VV ECMO Maintenance	☐Describe titration of blood flow and gas flow to achieve adequate support on VV ECMO	☐Describe the concept of native lung rest	
Recirculation	☐Define and identify recirculation.	☐Troubleshoot recirculation.	
Weaning VV ECMO	☐Describe the process of weaning VV ECMO support.	☐List exit strategies for the VV ECMO patient.	
Cardiac Failure	☐Provide an overview of cardiac failure	☐List standard management strategies for cardiac failure	☐Discuss the rationale of VA ECMO in cardiac failure
Patient Selection for VA ECMO	☐List the indications and contraindications for VA ECMO support.		
Initiation of VA ECMO	☐Describe the steps for initiating a patient		
VA Maintenance	☐Describe vasopressor use and blood flow	☐Describe the concept of native heart rest.	☐Describe ventilator management and blood

	titration for cardiovascular support.		and gas flow titration for pulmonary support.
Left Ventricular Distention -- PRIORITY	☐Describe the mechanism of LV distention	☐List strategies to unload the left ventricle	
Differential Oxygenation	☐Define and identify differential oxygenation.	☐Troubleshoot differential oxygenation.	
Weaning VA ECMO -- PRIORITY	☐Describe the process of weaning VA ECMO support	☐List exit strategies for the VA ECMO patient	
Sedation	☐Identify the role of sedation during ECMO support.	☐Discuss the paradigm shift towards awake ECMO.	
Physiotherapy	☐Describe the rationale for physiotherapy during ECMO.	☐Identify appropriate candidates for physiotherapy on ECMO.	
Anticoagulation	☐List anticoagulation strategies on ECMO.	☐Discuss anticoagulation monitoring on ECMO.	
Procedures	☐Discuss considerations for procedures on the ECMO patient.		
Renal Replacement Therapy	☐Identify the benefits and limitations of administering RRT via a dialysis catheter.	☐Identify the benefits and limitations of administering RRT via the ECMO circuit.	
Hospital Transport	☐Identify considerations and logistics for intrahospital transport.	☐Identify considerations and logistics for interhospital transport.	
Complications Overview	☐List medical and mechanical complications of ECMO.		
Neurological Complications	☐List the etiology and risk factors for neurological complications.	☐Discuss the management of ischemic and hemorrhagic strokes.	
Bleeding	☐List the etiology of bleeding	☐Discuss the management of bleeding	
Thrombosis	☐List the etiology of thrombosis	☐Discuss the management of thrombosis	

Hemolysis	☐Understand the etiology and risk factors of hemolysis on ECMO	☐Discuss how to prevent and manage hemolysis	
Limb Ischemia	☐List the risk factors for developing limb ischemia on VA ECMO	☐Describe how to monitor limb perfusion	☐Discuss the prevention and management of limb ischemia
Cardiac Arrest During ECMO	☐Discuss the management of cardiac arrest on VV ECMO	☐Discuss the management of cardiac arrest on VA ECMO	
Pump Failure	☐Define pump failure.	☐Describe how to identify and manage pump failure.	
Membrane Lung Dysfunction	☐Define membrane lung dysfunction.	☐Describe how to diagnose and manage membrane lung dysfunction.	
Air Embolism	☐Define air embolism and its determinants.	☐Define strategies to prevent air embolism.	☐Describe how to detect and manage air embolism.
Circuit Disruption	☐Identify determinants of circuit disruption	☐Recognize early signs of circuit disruption	☐Manage circuit disruption
Accidental Decannulation	☐Manage an accidental decannulation		
Coming Off ECMO Emergently	☐List the indications for coming off ECMO emergently	☐List the steps required to come off and back on ECMO emergently	
Historical Studies	☐List the historical ECMO studies and identify their limitations.		
Recent Evidence for VV ECMO	☐Interpret the results and limitations of the main cohort studies on VV ECMO.	☐Interpret the results and limitations of the CESAR and the EOLIA trials.	
Recent Evidence for VA ECMO	☐Interpret the results and limitations of the main cohort studies on VA ECMO.	☐Describe the results of trials comparing ventricular assist devices to VA ECMO	