



Evaluation & Management of a Patient Requiring Extracorporeal Life Support (ECLS)

| Description of the Activity | <p>Surgical intensivists often encounter patients who may require ECLS for acute respiratory failure, acute cardiac failure, and other indications. Surgical intensivists are often called to consider the role of ECLS in these patients and must be knowledgeable in the initiation, management, and discontinuation of ECLS.</p> |
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| Functions | <ul style="list-style-type: none">❖ Resuscitation<ul style="list-style-type: none">➤ Identify patients who are candidates for ECLS.➤ Determine the appropriate timing of ECLS initiation.➤ Weigh the potential favorable and unfavorable outcomes of ECLS, and counsel patients/caregivers.➤ Coordinate care with consulting teams to assess the need for intervention and interprofessional management, recognizing resource limitations.➤ Guide the periprocedural management of patients on ECLS.<ul style="list-style-type: none">▪ Recognize the need for potential anticoagulation.▪ Identify various cannulation considerations and configurations.▪ Recognize complications of ECLS cannulation.➤ Initiate and adjust ECLS settings to optimize patient physiology.❖ Ongoing Management<ul style="list-style-type: none">➤ Manage the ECLS circuit to optimize patient physiology.➤ Manage medications and other support devices to optimize patient physiology.➤ Recognize and manage complications of ECLS.➤ Consider how continuous renal replacement circuits interact with the ECLS circuit.❖ Transition of Care<ul style="list-style-type: none">➤ Manage the weaning of ECLS treatment, and identify candidates for decannulation.➤ Coordinate ongoing therapy and rehabilitation with the interprofessional health care team.➤ Prepare for the potential long-term needs of patients requiring ECLS support.<ul style="list-style-type: none">▪ Consider appropriate timing of tracheostomy.▪ Consider patients for advanced cardiac support therapies, durable mechanical support, or cardiac transplantation.▪ Consider patients for pulmonary transplantation evaluation.➤ Lead an interdisciplinary team to ensure streamlined care and communication to patients/caregivers to include decision-making that addresses and considers patients' goals of care. |



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| | <ul style="list-style-type: none">➤ Throughout the care continuum, and particularly when there are unanticipated changes in the course of a patient's ECLS treatment, provide and lead the team in primary palliative care regarding communication, symptom management, and goal concordance.➤ In complex patient care scenarios, lead the team in weighing the risks, benefits, and goal concordance of possible therapies, using the assistance of subspecialty palliative care and ethics teams as needed.➤ Customize difficult news to patients/caregivers, setting realistic recovery expectations and facilitating goals-of-care discussions.➤ Identify when disease has become acutely life-limiting with no further disease-directed treatments, and lead the team in helping transition patients/caregivers to end-of-life care, prioritizing comfort and symptom-directed therapy as indicated.➤ Lead the team in reflection on difficult patient care experiences, and employ coping strategies that maximize provider well-being and the health of the team. |
| Scope | <ul style="list-style-type: none">❖ In scope<ul style="list-style-type: none">➤ All conditions that require ECLS support in adults and children |



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| <p>1</p> <p>Limited Participation Demonstrates limited critical care knowledge and skills</p> <p>Framework: What a learner directly out of residency should know</p> <p>Performs ICU procedures on straightforward patients but requires supervision/direction for more complex patients/procedures</p> <p>Requires continuous direct supervision by the attending for patient management</p> | <ul style="list-style-type: none">Identifies ECLS as a possible treatment for a patient with severe cardiac and respiratory failureDemonstrates limited knowledge of ECLS settingsDemonstrates understanding of the differences between VV and VA ECLSDemonstrates limited knowledge of cannulation and its effect on a patient's physiology and potential complicationsProvides a status update about a straightforward patient to the patient/caregiver(s)Recognizes institutional limitations regarding ECLS (eg, not available)Contacts faculty and consultants for cannulation and relays patient information about eligibility for ECLS when prompted | <ul style="list-style-type: none">Recognizes that the ECLS circuit requires adjustment in settings based on patient physiologyDemonstrates limited understanding that modifications in other treatments and support may be necessary while a patient is on ECLSRequires continuous supervision to address underlying causes of respiratory and cardiac failure in the context of progressing overall patient careDemonstrates limited understanding of various ECLS complications (flow disruption, circuit disruption, circuit failure, clotting, malperfusion)Provides status updates about a straightforward patient to the patient/caregiver(s)Conveys recommendations from consulting services | <ul style="list-style-type: none">Articulates improvements in clinical status but is unable to formulate or implement a plan to wean a patient from ECLSIdentifies the potential long-term needs of a patient on ECLS (tracheostomy, transplant, rehabilitative services) but requires ongoing assistance to develop and implement a plan to meet these needsIdentifies the need for primary palliative care discussions and observes these conversations |
| <p>2</p> <p>Direct Supervision</p> <p>Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses</p> | <ul style="list-style-type: none">Identifies when conventional therapies for a patient with severe cardiac and respiratory failure have failed and ECLS is the next treatment optionDemonstrates understanding of ECLS settings and considers changes to the setting based on patient physiology in the immediate postcannulation period | <ul style="list-style-type: none">Demonstrates understanding of the basics of ECLS circuit settings and their impact on patient physiology, proposing changes in management when necessaryRecognizes that modifications in other treatments and support may be necessary while a patient is on ECLS and implements them with assistance | <ul style="list-style-type: none">Initiates a plan for ECLS weaning enacted by the attending but is unable to adjust it without active inputArticulates when a patient is ready for a procedure/step such as tracheostomy, transplant, or rehabilitative services but requires assistance to execute a plan to accomplish it |



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| <p>Framework:</p> <p>Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness</p> <p>Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures</p> <p>The attending gives active help throughout to direct the clinical course.</p> | <ul style="list-style-type: none">• Demonstrates understanding of the indications for VV vs VA ECLS• Assists in pericannulation management of a patient, including anticoagulation, vascular access, cannula configuration, and potential complications• Coordinates communication with a complex patient and their caregiver(s) and provides them with status updates• Recognizes team and systems limitations to initiating ECLS• When ECLS therapy is indicated, discusses patient-related factors that impact eligibility for ECLS with faculty and consultants | <ul style="list-style-type: none">• Identifies underlying causes of respiratory and cardiac failure in the context of overall patient care but needs assistance to address them• Recognizes ECLS complications (flow disruption, circuit disruption, circuit failure, clotting, malperfusion) but requires assistance to manage them• Coordinates communication with a complex patient and their caregiver(s) and provides them with status updates• Develops a plan in conjunction with consulting service recommendations with some guidance | <ul style="list-style-type: none">• Participates in primary palliative care discussions but does not fully incorporate the unique needs of patients on ECLS into these conversations |
| <p>3</p> <p>Indirect Supervision</p> <p>Manages most critical illnesses but may require guidance for more complex patients or atypical presentations</p> <p>Framework:</p> <p>Demonstrates a sufficient fund of knowledge for basic and most complex critical care</p> <p>Independently performs most ICU procedures and supervises procedures on straightforward patients</p> | <ul style="list-style-type: none">• Identifies a patient with evidence-based indications for ECLS and considers contraindications for ECLS• Develops standard initial settings for ECLS based on patient physiology and, with assistance, makes real-time adjustments in the immediate postcannulation period• Performs pericannulation management of a patient, including anticoagulation, vascular access, cannula configuration, and potential complications, requiring assistance for a complex patient or scenario• Actively coordinates and participates in patient/caregiver conversations regarding | <ul style="list-style-type: none">• Considers and develops a plan for changes to ECLS settings based on patient clinical status• Applies ventilator support changes related to ECLS• Identifies underlying causes of respiratory and cardiac failure in the context of progressing overall patient care and develops a plan for treatment• Adjusts medication dose based on altered pharmacokinetics due to the ECLS circuit with intermittent guidance | <ul style="list-style-type: none">• Initiates a plan for ECLS weaning enacted by the attending and adjusts it independently according to patient status• Identifies when a patient requires a tracheostomy and, with some guidance, coordinates care that includes rehabilitative services• Identifies a patient who is a candidate for transplantation but requires some guidance to initiate evaluation• Recognizes when a patient is not improving and initiates a primary palliative care discussion with |



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| The learner can manage a critically ill patient in straightforward circumstances but may require input to manage the most complicated ICU patients. | <p>treatment and prognosis, incorporating patient/caregiver goals and values</p> <ul style="list-style-type: none">Transfers a patient as necessary based on unit and hospital resource availability or limitationsMobilizes and coordinates the interprofessional team in periprocedural care to initiate ECLS | <ul style="list-style-type: none">Modifies ventilator support related to ECLSRecognizes renal replacement needs and considers implications of ECLS supportDevelops a plan for various ECLS complications (flow disruption, circuit disruption, circuit failure, clotting, malperfusion) and provides immediate intervention for ECLS malfunctionsActively participates in a patient/caregiver conversation regarding treatment and prognosis, incorporating patient/caregiver goals and valuesSeeks interprofessional discussions and develops a care plan regarding ECLS treatment within the context of overall patient care | <p>consideration of the unique needs of a patient on ECLS</p> |
| <p>4</p> <p>Practice Ready</p> <p>Independently manages complex critical illnesses and leads a critical care team</p> <p>Framework:</p> <p>Demonstrates an attending-level fund of knowledge</p> <p>Independently performs and supervises procedures</p> <p>The attending is available at the request of the learner but is not routinely needed</p> | <ul style="list-style-type: none">Selects a patient for ECLS according to evidence-based indications and contraindicationsTailors initial settings for ECLS based on patient physiology and makes real-time adjustments in the immediate postcannulation periodSupervises pericannulation management of a patient, including anticoagulation, vascular access, cannula configuration, and potential complicationsLeads patient/caregiver conversations regarding treatment and prognosis, | <ul style="list-style-type: none">Guides changes to ECLS settings based on patient clinical statusManages ventilator support accounting for ECLS and with consideration for a patient's changing physiologyLeads and educates the team on the management of underlying causes of respiratory and cardiac failureModifies medications based on altered pharmacokinetics due to the ECLS circuitManages complex renal replacement needs on ECLS | <ul style="list-style-type: none">Recognizes readiness to wean a patient from ECLS and develops, initiates, and adjusts the weaning planCoordinates care for tracheostomy if indicated and adjusts techniques/workflows for it; independently engages and leads the team in working with rehabilitative services when indicatedIdentifies a patient who is a candidate for transplantation and initiates evaluation |



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| for common or complex critical illness. | <p>incorporating patient/caregiver goals and values</p> <ul style="list-style-type: none">• When transfer is necessary based on unit and hospital resources, availability, or limitations, prepares the patient and mobilizes systems resources for safe transfer• Independently mobilizes, coordinates, and supervises the interprofessional team in periprocedural care to initiate ECLS | <ul style="list-style-type: none">• Supervises the team in the development of a plan for ECLS complications (flow disruption, circuit disruption, circuit failure, clotting, malperfusion) and educates the team on immediate interventions for ECLS malfunctions• Leads a patient/caregiver conversation regarding treatment and prognosis, incorporating patient/caregiver goals and values• Leads an interprofessional discussion and develops a care plan for ECLS treatment within the context of overall patient care in a complex situation, including when a lack of consensus exists within the care team regarding optimal management | <ul style="list-style-type: none">• Recognizes when a patient is not improving and initiates and leads a primary palliative care discussion with consideration of the unique needs of a patient on ECLS <p>Continuously readdresses goals of care for a patient on ECLS, incorporating their physiology and prognosis, unique needs, and goals and values</p> |