



Evaluation & Management of a Patient with Cardiovascular Failure

Description of the Activity	<p>Cardiac emergencies and urgencies and acute decompensation of chronic cardiac conditions are commonly encountered by surgical intensivists. Intensivists should be able to identify and manage these commonly encountered cardiac conditions. Critical care physicians should consider which interventions are necessary for management, perform diagnostic procedures, and coordinate care with specialist consultants.</p>
Functions	<ul style="list-style-type: none">❖ Resuscitation<ul style="list-style-type: none">➤ Use evidence-based medicine to formulate an efficient, systematic method to evaluate and manage patients with cardiovascular disease in the intensive care unit (ICU).➤ Expeditiously identify the signs and symptoms of impending cardiovascular emergencies and urgencies. Use available physiologic, radiologic, and laboratory data to recognize the primary dysfunction and provide evidence-based resuscitation and initial management.➤ Diagnose and provide initial management of acute coronary syndrome and decompensated heart failure.➤ Anticipate, diagnose, and initiate treatment of common postoperative complications after cardiac or thoracic surgeries.➤ Interpret data from various invasive and noninvasive cardiovascular monitoring modalities to guide management.➤ Demonstrate proficiency in performing resuscitative and diagnostic bedside procedures.➤ Demonstrate thorough knowledge of advanced cardiac life support (ACLS) algorithms and medications, and lead a team in the event of a cardiac arrest.➤ Recognize electrocardiogram (ECG) patterns of common atrial and ventricular arrhythmias, heart blocks, and ECG changes associated with electrolyte abnormalities.➤ Demonstrate knowledge of antiarrhythmic drugs as well as their indications, contraindications, management, and adverse side effects.➤ Identify the indications for initiating mechanical support for cardiac emergencies while being cognizant of individual and system limitations.❖ Ongoing Management<ul style="list-style-type: none">➤ Incorporate current guidelines in the recognition and management of common and complex cardiothoracic conditions.➤ Identify the pathophysiology, management, and sequelae of acute coronary syndromes.➤ Diagnose and treat acute myocardial infarction (MI) and consult appropriate services when needed.➤ Anticipate, diagnose, and provide stabilizing measures and initial management of post-MI complications.➤ Use evidence-based data to manage acute decompensated heart failure.➤ Understand the differences in pathophysiology and treatment of left versus right heart failure and systolic versus diastolic heart failure.➤ Recognize the pharmacokinetics and pharmacodynamics of vasoactive agents.➤ Identify the indications for circulatory assist devices.➤ Manage patients with complex cardiac disease in the setting of other organ dysfunction.➤ Show advanced skills and knowledge of point-of-care ultrasound (POCUS) to evaluate cardiac function and dysfunction.



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	<ul style="list-style-type: none">❖ Transition of Care<ul style="list-style-type: none">➤ 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 as needed.➤ Customize difficult news to patients/caregivers, setting realistic recovery expectations and facilitating goals-of-care discussions.➤ Throughout the care continuum, particularly when there are unanticipated changes in the course of a patient's treatment, provide and lead the team in primary palliative care in communication, symptom management, and goal concordance.➤ Systematically de-escalate care and recognize when patients no longer require ICU-level care.➤ Select transfer destinations and communicate with consultants and teams, as well as patients and caregivers.➤ Identify patients who will require evaluation for transplantation.➤ 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.
Scope	<ul style="list-style-type: none">❖ In scope<ul style="list-style-type: none">➤ Acute coronary syndrome➤ Acute decompensated heart failure➤ Arrhythmias➤ Cardiogenic shock➤ Continuous hemodynamic monitoring➤ Endpoints of resuscitation➤ Mechanical support➤ POCUS➤ Tamponade➤ Vasopressor/inotropic support



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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 a patient presenting in shock and orders initial diagnostic studies to aid with shock differentiation• Participates in ACLS resuscitation• Recognizes a patient presenting with acute coronary syndrome or decompensated heart failure who requires a higher level of care• Recognizes common arrhythmias via ECG and the indications for intervention• Demonstrates limited ability to identify a patient at high risk for needing mechanical support devices• Demonstrates limited knowledge of evidence-based guidelines for initiation of vasopressors/inotropic agents• Demonstrates limited knowledge of monitoring techniques; needs guidance to interpret data• Demonstrates limited understanding of the differences and treatments for right- vs left-sided heart failure• Identifies indications for and complications of common ICU procedures and requires instruction to perform them (eg, arterial/central venous catheterization)• Demonstrates limited ability to perform and interpret POCUS	<ul style="list-style-type: none">• Demonstrates knowledge of the different treatment modalities for arrhythmia management; requires assistance to modify management• Demonstrates limited understanding of the indications for transcutaneous and transvenous pacing• Recognizes the most common postacute coronary syndrome complications; requires coaching in a more complex patient• Needs ongoing direction to manage and modify the treatment plan for a patient after cardiovascular collapse and for interpretation of assessments• Demonstrates understanding of inotropic and vasopressor options for management but requires coaching to modify management in response to changes in a patient's condition• Demonstrates a rudimentary understanding of medical management and mechanical circulatory support in a patient with acute decompensated heart failure• With active supervision, manages the perioperative care of a cardiac surgery patient	<ul style="list-style-type: none">• Recognizes the need for a goals-of-care discussion with a patient/caregiver(s) but requires active, ongoing supervision during the discussion• Recognizes the utility of consulting the palliative care team, if available• Requires prompting to remove central venous and arterial access when it is no longer indicated• Identifies a patient who no longer requires critical care; requires some assistance to coordinate transfer and provide a thorough handoff to the accepting team



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2 Direct Supervision Initiates straightforward management for many critical illnesses but requires active direction for further management and complex critical illnesses Framework: Demonstrates a sufficient fund of knowledge for basic critical care and some knowledge of complex critical illness Performs ICU procedures on straightforward patients but may require supervision/direction for more complex patients/procedures The attending gives active help throughout to direct the clinical course.	<ul style="list-style-type: none">• Demonstrates knowledge of the pathophysiology of various forms of shock and interprets basic diagnostic studies to aid with shock differentiation, needing active direction to initiate management• With direct supervision, leads ACLS resuscitation and initiates postresuscitation management• With direct supervision, initiates management of a patient with acute coronary syndrome and heart failure and knows when to consult other specialists• Identifies and initiates management for common arrhythmias• With active guidance, identifies a patient at high risk of needing mechanical support devices• Demonstrates basic knowledge of evidence-based guidelines for initiation of vasopressors/inotropic agents• Demonstrates knowledge of monitoring techniques and selects appropriate monitoring modalities in a straightforward patient; may need guidance to interpret data• Demonstrates understanding of the differences and treatments for right- vs	<ul style="list-style-type: none">• Demonstrates limited ability to perform and interpret POCUS to guide ongoing management• Manages ongoing arrhythmias in a straightforward patient with limited supervision; requires direct supervision for a more complex patient• Demonstrates understanding of the indications for transcutaneous and transvenous pacing• With prompting, recognizes and manages postacute coronary syndrome complications in a straightforward patient• With ongoing guidance, manages a patient after cardiovascular collapse with serial assessments and indicated modification of the treatment plan• Adjusts vasopressors/inotropic support according to changes in a patient's clinical status under direct supervision• With direct supervision, initiates medical management in a straightforward patient; needs direction to identify the need for mechanical circulatory support in a complex patient with acute decompensated heart failure• With assistance, manages the perioperative care of an uncomplicated cardiac surgery patient	<ul style="list-style-type: none">• Initiates and maintains communication with a patient/caregiver(s)• Identifies a patient with acutely life-limiting cardiovascular disease; needs assistance to coordinate between the patient/caregiver(s) and the palliative care team• Recognizes when to remove central venous and arterial access because it is no longer indicated• Independently identifies a patient who no longer requires critical care; coordinates transfer and provides a thorough handoff to the accepting team



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	<p>left-sided heart failure but is not yet able to diagnose or treat it independently</p> <ul style="list-style-type: none">• Performs bedside procedures in a straightforward patient; needs assistance with a complicated patient• Performs POCUS and uses data to change the treatment plan with guidance	<ul style="list-style-type: none">• Performs and interprets POCUS to guide ongoing management with active direction	
<p>3</p> <p><u>Indirect Supervision</u></p> <p>Manages most critical illnesses but may require guidance for more complex patients or atypical presentations</p> <p><u>Framework:</u></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> <p>The learner can manage a critically ill patient in straightforward circumstances but may require input to manage the most complicated ICU patients.</p>	<ul style="list-style-type: none">• Identifies a patient at risk of impending cardiovascular collapse; interprets diagnostic studies to differentiate shock; optimizes management to prevent acute deterioration• Leads ACLS resuscitation and initiates postresuscitation management• With minimal prompting, initiates management of acute coronary syndrome, heart failure and cardiogenic shock in a complicated patient• Recognizes and initiates management of arrhythmias but needs assistance for a complicated/refractory situation• Identifies a patient in need of mechanical-assist devices; needs limited guidance to stabilize the patient, mobilize resources, and consult the appropriate specialists• Applies evidence-based guidelines to the management of a patient with cardiovascular failure	<ul style="list-style-type: none">• Manages ongoing arrhythmias in straightforward and complex patients with limited supervision• Initiates transcutaneous and transvenous pacing when indicated• Identifies and manages postacute coronary syndrome sequelae in a straightforward patient; requires some direction to manage a complicated patient• Manages a patient after cardiovascular collapse with serial assessments and modification of the treatment plan in a straightforward patient• Manages vasopressor/inotropic support with intermittent assistance• Identifies and manages a straightforward patient in need of mechanical circulatory support with acute decompensated heart failure• Directs the management of a straightforward perioperative cardiac	<ul style="list-style-type: none">• Independently conducts a multidisciplinary goals-of-care discussion for a patient with a life-limiting condition• Identifies a patient who needs transplantation; needs guidance coordinating transfer/consultation• Formulates a post-ICU discharge plan that includes transition of care services, patient/caregiver needs, and the receiving treatment team



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	<ul style="list-style-type: none">• Demonstrates knowledge of advanced monitoring techniques; independently selects appropriate monitoring modalities for a complicated patient (PC3 L3)• Diagnoses and treats right- vs left-sided heart failure in a straightforward patient (PC6 L3)• Independently performs and supervises others in bedside procedures for a straightforward patient; requires limited guidance for a complex patient (PC10 L3)• With minimal direction, performs and interprets POCUS to guide management of an acutely deteriorating patient (PC10 L3)	<p>surgery patient but may require assistance for a complex patient; anticipates, identifies, and manages common postoperative complications</p> <ul style="list-style-type: none">• Performs and interprets POCUS to guide ongoing management of a straightforward patient	
<p>4</p> <p><u>Practice Ready</u></p> <p>Independently manages complex critical illnesses and leads the critical care team</p> <p><u>Framework:</u></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">• Independently recognizes and differentiates shock state and initiates evidence-based interventions (PC3, PC6 L4)• Directs ACLS resuscitation independently, performs a team debriefing, and identifies a patient needing targeted temperature management (PC3 L4)• Independently manages a patient presenting with acute coronary syndrome or heart failure and initiates evidence-based interventions (PC6 L4)• Initiates intervention for refractory arrhythmias in a physiologically complex patient (PC6 L4)• Demonstrates understanding of the indications for mechanical-assist devices	<ul style="list-style-type: none">• Independently manages ongoing and refractory arrhythmias• Demonstrates knowledge of postacute coronary syndromes sequelae (eg, ventricular rupture, tamponade) and manages them independently• Independently manages a complex patient after cardiovascular collapse with serial assessments and indicated modification of the treatment plan• Adjusts inotropic and vasopressor support in response to a patient's hemodynamic needs, even in a complicated patient• Selects and titrates medical management and identifies the need for mechanical	<ul style="list-style-type: none">• Leads a goals-of-care discussion with a patient/caregiver(s)• Identifies a patient who requires transplantation and initiates transfer/consultation• Anticipates potential immediate and long-term postdischarge complications and includes mitigating strategies in the discharge plan



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for common or complex critical illness.	<p>and independently stabilizes a patient, mobilizes resources, and consults appropriate specialists (PC3, PC6 L4)</p> <ul style="list-style-type: none">Independently applies evidence-based guidelines for managing a complex patient with cardiovascular failure (PC3 L4)Demonstrates knowledge of advanced monitoring techniques; independently selects appropriate monitoring modalities and interprets data in a complicated patient (PC3 L4)Diagnoses and treats right- vs left-sided heart failure in a complex patient (PC6 L4)Obtains central venous and arterial access in an anatomically and physiologically complex patient (PC10 L4)Independently uses POCUS or other advanced monitoring to guide management of a complex patient (PC10 L4)	<p>circulatory support in a complex patient with acute decompensated heart failure</p> <ul style="list-style-type: none">Directs the management of a complex perioperative cardiac surgery patient; independently anticipates, identifies, and manages common postop complicationsIndependently performs and interprets POCUS to guide ongoing management	