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Emergency Department Clinical Guidelines

ED/CCT Acute Pulmonary Edema/Cardiogenic Shock Guidelines

Clinical Context and Purpose
The purpose of this guideline is to provide a clinical pathway for the emergency department management of patients presenting with acute hypertensive cardiogenic pulmonary edema and/or cardiogenic shock.

Background
Acute heart failure (AHF) syndromes are commonly encountered clinical presentations in the emergency department. Patients with AHF may present in a variety of ways including subacute decompensation with fluid overload, acute hypertensive pulmonary edema, and frank cardiogenic shock. While subacute decompensation is normally responsive to optimizing of diuresis and guideline-directed medical therapy, acute hypertensive pulmonary edema and cardiogenic shock have early windows of opportunity for targeted treatment to prevent further clinical deterioration and to optimize clinical outcomes. Acute hypertensive pulmonary edema is a clinical diagnosis that presents with severe hypoxemic respiratory failure, acute in onset, with associated marked hypertension, diaphoresis, restlessness, and adjunctive bedside ultrasonographic findings including the pulmonary B-line pattern suggestive of pulmonary edema. Early recognition and diagnosis are key allowing for rapid treatment. Management includes prompt application of non-invasive positive pressure ventilation (NIPPV) and high-dose nitroglycerin with bedside titration of both therapies to clinical response and improvement. NIPPV functions by decreasing both cardiac preload and afterload, improving hypoxemia, and decreasing the work of breathing. High-dose nitroglycerin also decreases afterload and preload further improving hemodynamics. Nitroglycerin may be administered via the sublingual route while setting up for intravenous administration. Cardiogenic shock is the final common pathway for a variety of pathologies e.g. acute coronary syndrome (ACS), leading to decreased cardiac output and perfusion with resultant end-organ injury; depending on volume status, pulmonary edema and hypoxemic respiratory failure may be present as well. The management of cardiogenic shock includes gentle hydration while assessing fluid tolerance, vasoactive medications, evaluation for and identification of the likely etiology, appropriate consultation, and coordination of definitive care which may require interfacility transfer. The following are some signs suggestive of right versus left sided heart failure and cardiogenic shock, as well as a general cardiogenic shock management pathway (see figures below):

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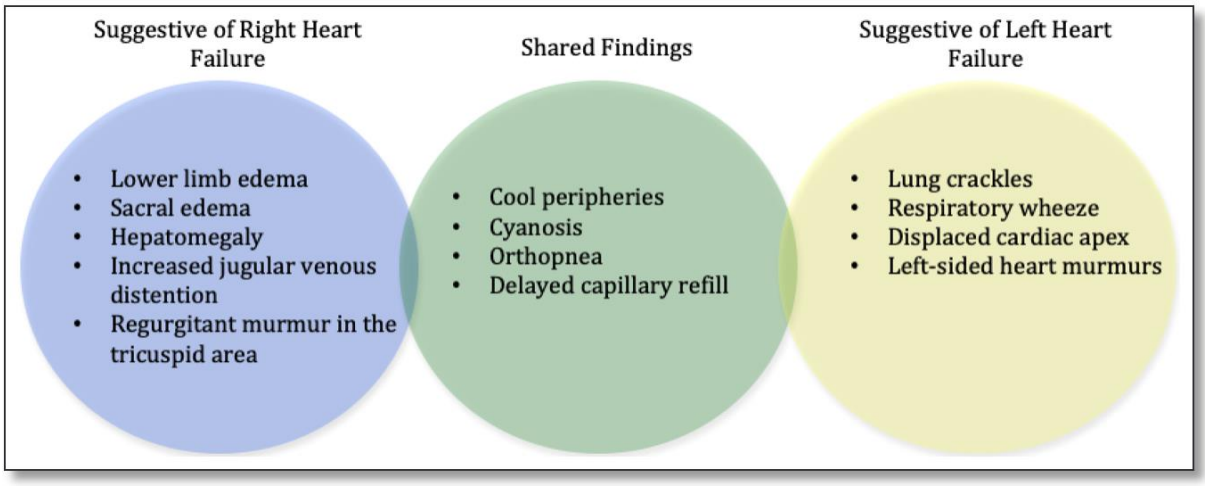

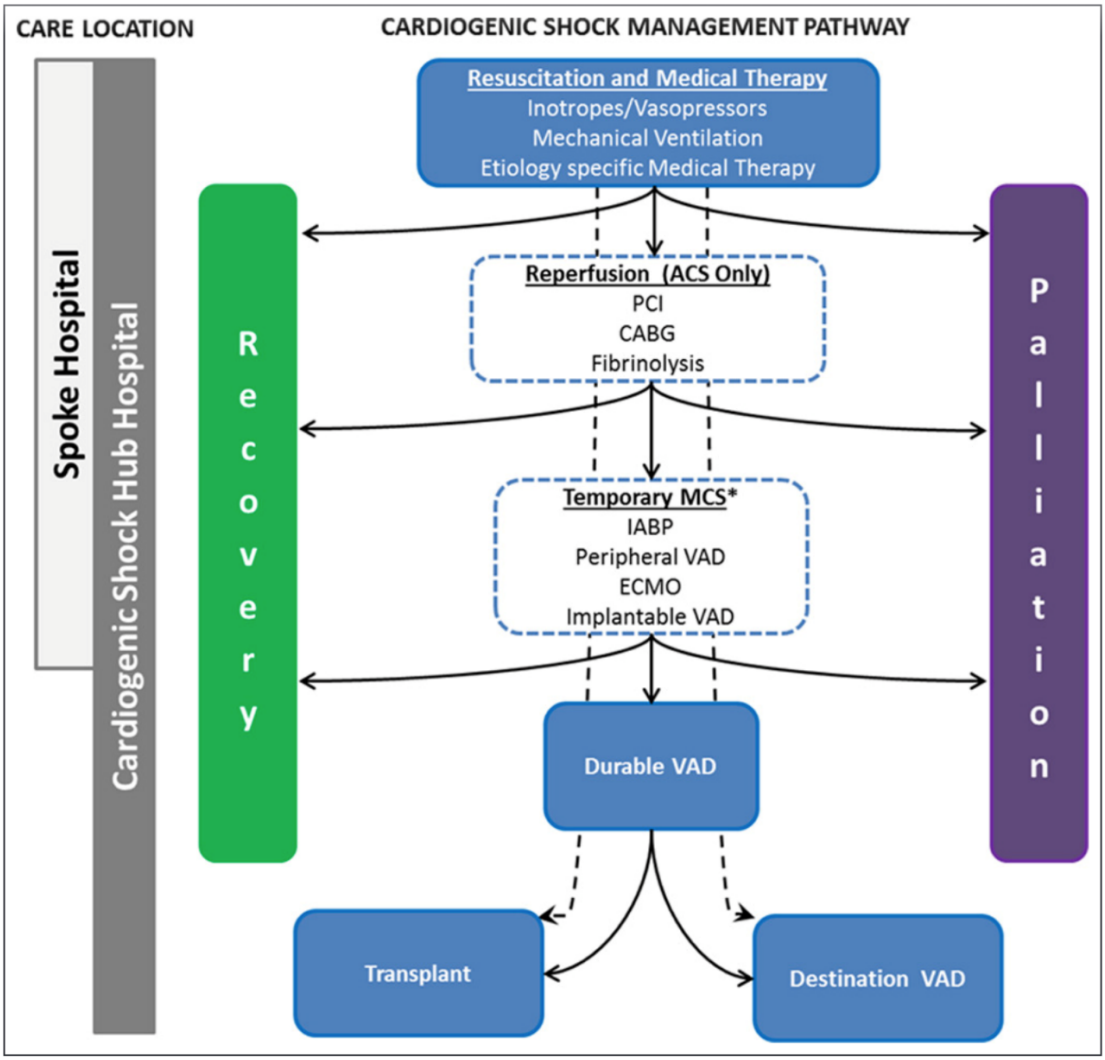

Reviewed as of January 3, 2024

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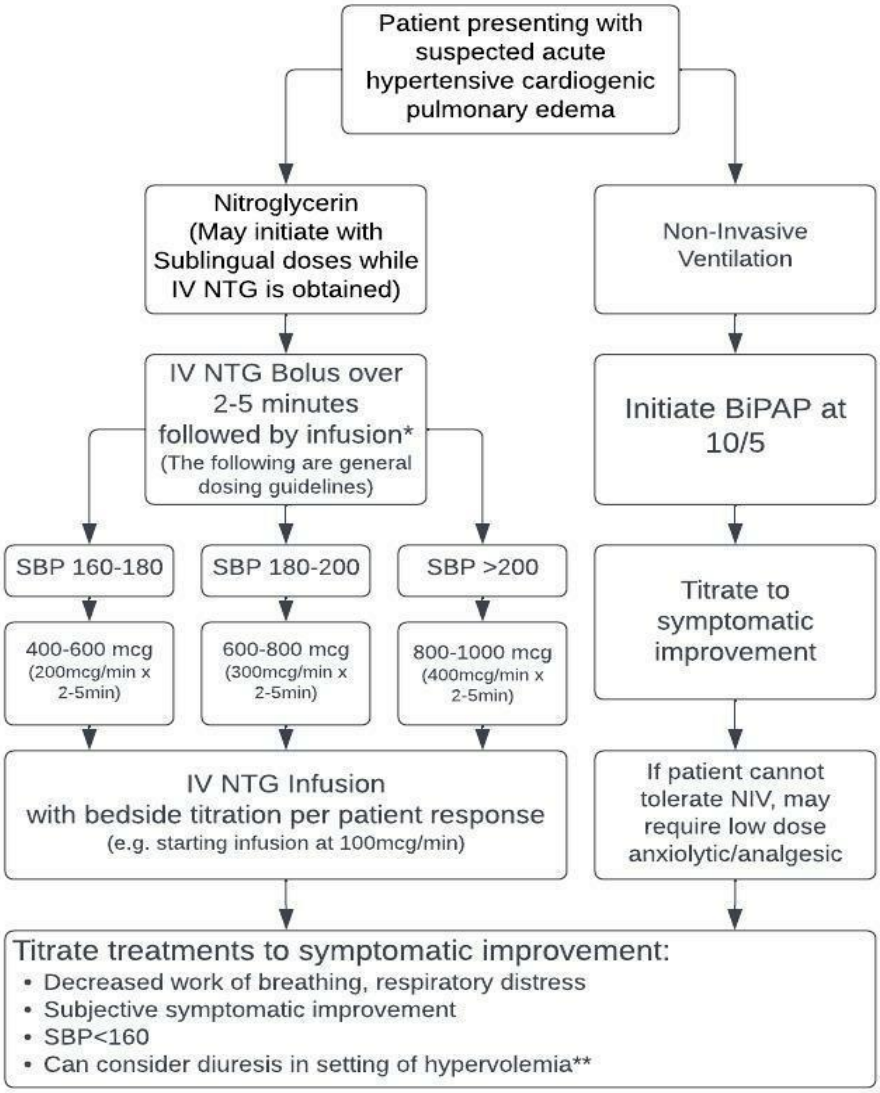
Acute Pulmonary Edema/Cardiogenic Shock Guideline



*Some patients may require higher or lower doses of nitroglycerin during bolus and infusion therapy; it is important to closely monitor and reassess the response to therapy.

**Diuresis is reasonable based on assessment of overall volume status following initial stabilization.

***Depending on response to therapy, consultation with cardiology may be necessary for coordination of care and disposition planning.

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Patient presenting with suspected cardiogenic shock:
- Hypotension (SBP<90 mmHg)/Decreased perfusion
- Cool/mottled extremities/end-organ damage/AMS/decreased urine output
- Requirement for vasoactive medications to support BP
- Crackles on lung exam
- B Lines on Lung POCUS
- Reduced Ejection Fraction on Cardiac POCUS

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Critical Actions to Consider:
- Respiratory support: Non-invasive vs invasive ventilation depending on clinical response (consider and prepare for physiologically difficult airway due to shock state)
- IV Crystalloid fluid challenge 250-500 mL with fluid tolerance assessment

Vasoactive medications to consider:
- Norepinephrine
- Dobutamine
- Epinephrine (especially if bradycardia present)

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Etiology specific therapy:
- Consult with cardiology
- May require cardiothoracic surgical consultation in setting of mechanical cause e.g. acute valve pathology
- Follow etiology specific therapy guidelines e.g. ACS
- Coordinate and arrange for transfer for definitive care when necessary

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Resources/References

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