

Acute Decompensated Pulmonary Hypertension
 A patient presenting with acute decompensation in the setting of known (or highly suspected) pulmonary hypertension - Significant VS derangements, AMS, signs of poor perfusion

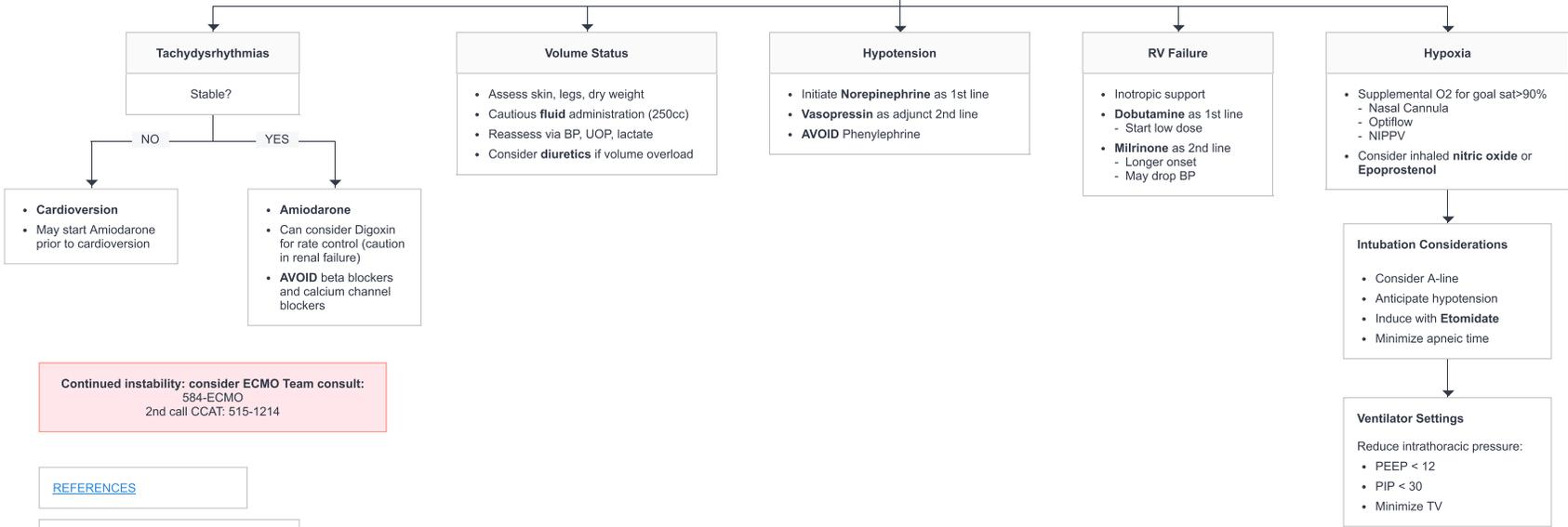
Ensure home medication pump is functioning.
 If not, see algorithm "Pulmonary HTN line malfunction protocol."

- Initial evaluation:**
- EKG
 - CXR
 - CBC
 - BMP
 - BNP/NTproBNP
 - Troponin
 - Blood gas
 - Lactate

- Additional imaging to consider:**
- Cardiac ultrasound (Consider TAPSE)
 - Chest CT/CTPA if PE suspected
 - Engage pulmonary/CCAT team early in ED course

- Additional labs to consider:**
- PT/INR (if on AC)
 - Blood cultures (if infection suspected or indwelling line)
 - LFTs
 - CRP
 - Thyroid studies

- Treatment:**
- Attempt identification of trigger for decompensation
- Antibiotics for suspected infection
 - Blood transfusion for anemia
 - Coronary revascularization for acute MI
 - PERT Team consult for acute PE



Continued instability: consider ECMO Team consult:
 584-ECMO
 2nd call CCAT: 515-1214

[REFERENCES](#)

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Acute Decompensated Pulmonary Hypertension References

- Chen, Edward P, et al. "Milrinone Improves Pulmonary Hemodynamics and Right Ventricular Function in Chronic Pulmonary Hypertension." *The Annals of Thoracic Surgery*, vol. 63, no. 3, 1997, pp. 814–821.
- Currigan, Dale A., et al. "Vasoconstrictor Responses to Vasopressor Agents in Human Pulmonary and Radial Arteries." *Anesthesiology*, vol. 121, no. 5, 2014, pp. 930–936.
- Devaraj, Anand, et al. "Detection of Pulmonary Hypertension with Multidetector CT and Echocardiography Alone and in Combination." *Radiology*, vol. 254, no. 2, 2010, pp. 609–616.
- Forfia P et al. Tricuspid Annular Displacement Predicts Survival in Pulmonary Hypertension. *Am J Respir Crit Care Med*. 2006; 174: 1034-1041.
- Ghio S, Klersy C, Magrini G, D'Armini AM, Scelsi L, Raineri C, Pasotti M, Serio A, Campana C, Vigano M. Prognostic relevance of the echocardiographic assessment of right ventricular function in patients with idiopathic pulmonary arterial hypertension. *Int J Cardiol* 2010;140:272–278.
- Goerne, Harold, et al. "Imaging of Pulmonary Hypertension: an Update." *Cardiovascular Diagnosis and Therapy*, vol. 8, no. 3, 2018, pp. 279–296.
- Granton J, Mercier O, De Perrot M. Management of Severe Pulmonary Arterial Hypertension. *Semin Respir Crit Care Med*. 2013; 34: 700-713.
- Green EM, Givertz MM. Management of acute right ventricular failure in the intensive care unit. *Curr Heart Fail Rep*. 2012;9:228-235.
- Greenwood JC and Spangler RM. Management of Crashing Patients with Pulmonary Hypertension. *Emergency Medicine Clinics of North America*. 2015; 33 (3): 623-643.
- Habib G and Torbicki A. The role of echocardiography in the diagnosis and management of patients with pulmonary hypertension. *Eur Respir Rev*. 2010; 19 (118): 288-299.
- Hoepfer MM, Granton J. Intensive care unit management of patients with severe pulmonary hypertension and right heart failure. *Am J Respir Crit Care Med*. 2011;184:1114-1124.
- Kerbaul, François, et al. "Effects of Norepinephrine and Dobutamine on Pressure Load-Induced Right Ventricular Failure*." *Critical Care Medicine*, vol. 32, no. 4, 2004, pp. 1035–1040.
- Khan, Tanveer A., et al. "A Prospective, Randomized, Crossover Pilot Study of Inhaled Nitric Oxide versus Inhaled Prostacyclin in Heart Transplant and Lung Transplant Recipients." *The Journal of Thoracic and Cardiovascular Surgery*, vol. 138, no. 6, 2009, pp. 1417–1424.

- Kwak, Hyun Jeong, et al. "The Effects of Phenylephrine on Hemodynamics in Patients with Chronic Pulmonary Hypertension Compared to Patients without Chronic Pulmonary Hypertension." *Korean Journal of Anesthesiology*, vol. 42, no. 1, 2002, p. 64.
- Mazurak JA et al. Follow-up tricuspid annular plane systolic excursion predicts survival in pulmonary arterial hypertension. *Pulmonary Circulation*. 2017; 7 (2): 31-371.
- Matthews, Jennifer, and Vallerie Mclaughlin. "Acute Right Ventricular Failure in the Setting of Acute Pulmonary Embolism or Chronic Pulmonary Hypertension: A Detailed Review of the Pathophysiology, Diagnosis, and Management." *Current Cardiology Reviews*, vol. 4, no. 1, 2008, pp. 49–59.
- Monnet X, Marik PE, Teboul JL. Prediction of fluid responsiveness: an update. *Annals of Intensive Care*. 2016; 6: 111.
- Nagaya N et al. Plasma Brain Natriuretic Peptide as a Prognostic Indicator in Patients with Primary Pulmonary Hypertension. *Circulation*. 2000: 865-870.
- Price LC, Wort SJ, Finney SJ, et al. Pulmonary vascular and right ventricular dysfunction in adult critical care: current and emerging options for management: a systematic literature review. *Crit Care*. 2010;14:R169.
- Provencher, Steeve, et al. "Deleterious Effects of β -Blockers on Exercise Capacity and Hemodynamics in Patients With Portopulmonary Hypertension." *Gastroenterology*, vol. 130, no. 1, 2006, pp. 120–126.
- Quark R, Nawrot T, Meyns B, Delcroix M. C-Reactive Protein: A New Predictor of Adverse Outcome in Pulmonary Arterial Hypertension. *Journal of the American College of Cardiology*. 2009; 53 (14): 1211-1218.
- Savale, Laurent, et al. "Acute Decompensated Pulmonary Hypertension." *European Respiratory Review*, vol. 26, no. 146, 2017, p. 170092.
- Siehr, Stephanie L., et al. "Hemodynamic Effects of Phenylephrine, Vasopressin, and Epinephrine in Children With Pulmonary Hypertension." *Pediatric Critical Care Medicine*, vol. 17, no. 5, 2016, pp. 428–437.
- Sztrymf B, Souza R, Bertoletti L, Jais X, Sitbon O, Price LC, Simonneau G, Humbert M. Prognostic factors of acute heart failure in patients with pulmonary arterial hypertension. *Eur Respir J* 2010;35:1286–1293.
- Tongers, Joern, et al. "Incidence and Clinical Relevance of Supraventricular Tachyarrhythmias in Pulmonary Hypertension." *American Heart Journal*, vol. 153, no. 1, 2007, pp. 127–132.

Viitanen A, Salmenpera M, Heinonen J: Right ventricular response to hypercarbia after cardiac surgery. *Anesthesiology* 1990; 73:393–400.

Wilcox SR, Kabrhel C, Channick RN. Pulmonary Hypertension and Right Ventricular Failure in Emergency Medicine. *Annals of Emergency Medicine*. 2015; 7: 5525.

Zamanian RT, Haddad F, Doyle RL, et al. Management strategies for patients with pulmonary hypertension in the intensive care unit. *Crit Care Med*. 2007;35:2037-2050.