

Management of CHF Exacerbation in the ED

Case: 45 y/o M w/ DM, CAD, CHF (EF 30%) presented w/ a 2 day h/o increasing dyspnea and peripheral edema. Pt was sitting up in bed w/ visible increased work of breathing; he was unable to complete a sentence without taking a breath. Monitor showed tachycardia to 110s and hypertension to the 160s. Pt was treated with nitro paste, BiPAP, and diuretics were deferred – was this the best management? Should I have added an ACEI?

- I. Epidemiology
 - prevalence doubles each decade from 50-80, 10% in the >80yo population
 - **leading cause of hospitalization in >65yo**
 - annual death rate of 18.7%

- II. Etiology (dx is easy, search for cause)
 - Acute MI
 - Chronic myocardial injury or stress – RAS activation, SNS activation
 - Valve disease – e.g. aortic stenosis / insufficiency
 - Infective endocarditis
 - Cardiomyopathies
 - Toxins – EtOH, cocaine, doxorubicin
 - Myocarditis, pericarditis

- III. Classification
 - Hypertensive acute heart failure:
 - i. signs and sx of HF w/ preserved LV function
 - ii. SBP >140
 - iii. CXR consistent w/ pulmonary edema
 - iv. Sx onset over 48 hrs or less
 - Pulmonary Edema:
 - i. Respiratory distress
 - ii. Reduced oxygen saturation from baseline
 - iii. Verify w/ CXR
 - Cardiogenic Shock
 - i. Evidence of tissue hypoperfusion, SBP <90

 - Acute Decompensated HF
 - i. Sx and signs of acute HF mild to moderate, but do not meet criteria for HTN HF, pulmonary edema, or cardiogenic shock
 - ii. Associated w/ increasing peripheral edema

 - High Output Failure
 - i. High cardiac output w/ tachycardia, warm extremities, pulmonary congestion
 - Right Heart Failure

- i. Low-output syndrome w/ JVD, hepatomegaly, may have hypotension

IV. Diagnosis/Work-up

- **Clinical gestalt** better than diagnostic tests generally
- CXR, CBC, BMP, urinalysis, BNP, troponin +/- lactate, LFTs, Mg, phos, EtOH, other drugs
- CXR – poor sensitivity. Up to 18% of CHF syndromes have no findings on CXR
- BNP – **helpful for prognosis as well** (>480 – 40% rate of death or HF rehospitalization w/in 6 months, >1,760 acute mortality of 6%)
- Troponin – up to 14% of ED pts w/ acute HF have positive biomarkers

V. Treatment

- Guided by acuity, volume status, systemic perfusion
- 12 lead ECG, IV access, frequent VS reassessment, may need foley for I/Os
- **Non-invasive ventilation** (ADHERE trial showed rare tx failure w/ CPAP/BiPAP)
- Afterload reduction – **nitroglycerin sublingual, then IV** if needed with rapid titration.
 - i. contraindication to vasodilation – flow-limiting, pre-load dependent states, e.g. RV infarction, aortic stenosis, volume depletion, HOCM
- NO diuretics alone – increase mortality w/o vasodilators
- +/- **ACEI** (captopril or enalapril); may be helpful, evidence not conclusive
- Morphine and opioids increase need for intubation
- If hypotensive HF think acute coronary syndrome

Conclusion – Pt was experiencing a mild CHF exacerbation – w/u did not find an etiology (no MI). His sx markedly improved with nitro paste and only briefly required BiPAP. In his case, there was no need to escalate treatment and thus an ACEI was likely not indicated. However, in a more severe case I believe an ACEI would be a reasonable treatment addition.

References

Fonarow GC, ADHERE Scientific. The acute decompensated heart failure national registry (ADHERE): opportunities to improve care of patients hospitalized with acute decompensated heart failure. 2003. *Rev Cardiovasc Med* 4 Suppl 7 S21-30.

Peacock W. Chapter 57. Congestive Heart Failure and Acute Pulmonary Edema. In: Tintinalli JE, Stapczynski J, Ma O, Cline DM, Cydulka RK, Meckler GD, T. eds. *Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 7e*. New York, NY: McGraw-Hill; 2011.

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<http://accessmedicine.mhmedical.com.foyer.swmed.edu/content.aspx?bookid=348&Sectionid=40381522>. Accessed September 30, 2014

EM:Rap HippoEM Reviews – CHF Update. Herbert M, Orman R, Weingart S, Mattu A, & A Sacchetti.