

HEART FAILURE IN THE HOSPITALIZED PATIENT

By: Dr. Priti Davé, MD, MHA

St. David's Medical Center, Round Rock, TX

NON-DISCLOSURE

- I have no relevant relationships with ineligible companies to disclose within the past 24 months.

OBJECTIVES

- At the conclusion of this session, participants should be able to:
 - Diagnose a patient presenting with heart failure.
 - Treat a patient hospitalized with heart failure.

CAUSES

- Ischemic heart disease – coronary atherosclerosis
- Valvular disease
- Cardiomyopathy – alcoholic, sarcoid, amyloid, arrhythmia-induced, familial
- Hypertension
- Diabetes Mellitus
- Arrhythmias, conduction diseases
- Other less common causes: sleep apnea, anemia

CLASSIFICATION

- Left heart failure: LV, mitral, or aortic valve dysfunction
- Right heart failure: pulmonary hypertension, RV, pulmonic valve, or tricuspid valve dysfunction
- Left heart failure is the most common cause of right heart failure.
- Both can occur separately but are most often seen together.
- LV dysfunction:
 - LVEF \leq 40% - heart failure with reduced ejection fraction (HFrEF)
 - LVEF 41-49% - heart failure with mid-range ejection fraction (HFmrEF)
 - LVEF \geq 50% - heart failure with preserved ejection fraction (HFpEF)

NYHA CLASSIFICATION (FUNCTIONAL STATUS)

Class I	Patients with cardiac disease but without resulting limitations of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea, or anginal pain.
Class II	Patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea, or anginal pain.
Class III	Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less-than-ordinary physical activity causes fatigue, palpitation, dyspnea, or anginal pain.
Class IV	Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of cardiac insufficiency or of the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased.

HISTORY AND PHYSICAL EXAM

- History: hypertension, coronary artery disease, myocardial infarction, atrial fibrillation (AF), obesity
- Symptoms: dyspnea, fatigue, weakness, orthopnea, paroxysmal nocturnal dyspnea, peripheral edema, right upper quadrant pain from hepatic congestion, and diffuse abdominal discomfort due to distention from ascites
- Examination: pulmonary congestion (rales/crackles on lung auscultation), peripheral edema, elevated jugular venous pressure, apical impulse laterally displaced from midclavicular line, third heart sound (S3)

DIAGNOSTICS

- EKG – more helpful for cause of heart failure – ischemia, arrhythmias, etc.
- Echocardiogram
- CXR – pulmonary edema, pleural effusion, cardiomegaly
- BNP
 - Can be falsely low in obese.
 - Can be falsely high in renal dysfunction, significant lung disease, increased age.
- Cardiac troponin
- Complete blood count

DIAGNOSTICS (CONT.)

- Complete metabolic panel
 - Renal impairment can be caused by or contribute to heart failure.
 - Hepatic congestion can result in elevated liver enzymes.
 - Severe heart failure can result in hyponatremia.
- For new onset heart failure → Cardiology consultation and likely cardiac stress test or catheterization

TREATMENT

- First line: ACE-I (lisinopril, enalapril), ARNI (Sacubitril/valsartan), or ARB (losartan, valsartan) and Beta Blocker (Carvedilol, Metoprolol)
- Hydralazine + Nitrate can be substituted for ACE-I, ARNI, or ARB in those with contraindication
- Second line: Mineralocorticoid receptor antagonist (eplerenone, spironolactone)
- For those with concomitant diabetes: sodium-glucose co-transporter 2 inhibitor (canagliflozin, dapagliflozin, and empagliflozin)
- Statin (simvastatin, atorvastatin)
- NO need for antiplatelet or antithrombotic therapy with heart failure alone

TREATMENT IN ACUTE DECOMPENSATION

- First line: Loop diuretics (furosemide)
- Second line: Intravenous chlorothiazide or oral metolazone or a mineralocorticoid receptor antagonist (eg, spironolactone or eplerenone).
- Refractory: IV dobutamine, milrinone
- Short-term support: left ventricular assist device
- Sodium restriction, fluid restriction
- Daily weights, strict monitoring of intake and output

TREATMENT (CONT.)

- Implantable cardioverter-defibrillator or pacemaker in those with LVEF <35%, those with history of sudden cardiac arrest, history of sustained ventricular tachycardia without reversible cause.
- Cardiac rehab for those with NYHA Class II or III heart failure.
- Palliative care for those with end-stage (NYHA Class IV) heart failure.

QUESTIONS?

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