

Team Medicine

Heart Failure II -
Management and
Prognosis

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■ Important notes ■ Notes & doctor notes



Management of Heart Failure:

- When a patient comes with signs & symptoms of heart failure, we have to assess the **hemodynamic profile** which is composed of **2** things:
 - o **Volume overload** [↑ Jugular Venous Pressure (JVP)]
 - o **Blood perfusion** [assess if arms and legs are cold or warm, not hands and feet]

	Warm	Cold
Dry	-Perfusion well -Not congested (This is the target of treatment)	-Not perfused -Not congested We use inotropes only [eg: dopamine, dobutamine, epinephrine, norepinephrine, phenylephrine]
Wet	-Perfusion well -congested Get rid of the fluid → use diuretics	-Not perfused -Congested 1 st ↑ perfusion: inotropes . 2 nd Dry him out: diuretics . [Diuretics won't work unless there is good perfusion to kidney → give inotropes 1 st , diuretics 2 nd]

- **Classification** of Heart Failure
[according to American College of Cardiology and the American Heart Association (ACC/AHA)]:

TABLE 216-2 Stages in the Evolution of Heart Failure/Recommended Therapy by Stage

Stage A	Stage B	Stage C	Stage D
At high risk for heart failure but without structural heart disease or symptoms of HF	Structural heart disease but without symptoms of HF [Previous myocardial insult but no HF]	Structural heart disease with prior or current symptoms of HF	Refractory HF requiring specialized interventions
Patients with hypertension, coronary artery disease, diabetes mellitus, or patients using cardiotoxins with FHx CM	Patients with previous MI, LV systolic dysfunction, asymptomatic valvular disease	Patients with known structural heart disease, shortness of breath and fatigue, reduced exercise tolerance	Patients who have marked symptoms at rest despite maximal medical therapy (e.g., those who are recurrently hospitalized or cannot be safely discharged from the hospital without specialized interventions)
Structural heart disease	Symptoms of HF develop	Refractory symptoms of HF at rest	
THERAPY			
Treat hypertension, Encourage smoking cessation, Treat lipid disorders, Encourage regular exercise, Discourage alcohol intake, illicit drug use, ACE inhibition	All measures under stage A, ACE inhibitors in appropriate patients, Beta-blockers [Treat underlying disease]	All measures under stage A, Drugs for routine use: Diuretics, ACE inhibitors, Beta-blockers, Digitalis, Dietary Salt restriction	All measures under stages A, B, and C, Mechanical assist devices, Heart transplantation, Continuous (not intermittent) IV inotropic infusions for palliation, Hospice care

[Reduce risk factors]

Abbreviations: HF, heart failure; FHxCM, family history of cardiomyopathy; ACE, angiotensin-converting enzyme; MI, myocardial infarction; LV, left ventricular; IV, intravenous.

Source: Modified from S Hunt: J Am Coll Cardiol, 38:2101, 2001, with permission.

Management of Heart Failure due to systolic dysfunction:

1- Life style modification:

- a. Weight loss and diet control (avoidance of high-salt food).
- b. Smoking cessation and restrict alcohol consumption.
- c. Regular daily aerobic exercise.
- d. Vaccination for influenza and pneumococcal vaccination.

2- Drug therapy: (Davidson p:548, 549, 550)

<u>Diuretics</u>	<u>ACE-I</u>	<u>ARB</u>	<u>Beta Blockers</u>	<u>Spironolactone</u>	<u>Digoxin</u>
-Used in patients with moderate – severe CHF and symptoms of volume overload (dyspnea & peripheral edema) -Doesn't reduce mortality (but control symptoms associated with fluid overload). -Loop diuretics: furosemide. -Thiazide diuretics: hydrochlorothiazide.	-Interrupt the conversion of angiotensin I to angiotensin II. -Major benefit is reduction of afterload and preload. -Reduce mortality in HF patients. -ACE-I: enalapril, captopril	-Block action of <u>angiotensin II</u> on the heart, peripheral vasculature and kidney. -Used in patients who can't tolerate ACE-I (ARB doesn't cause cough like ACE-I) -ARB: losartan	-Decrease mortality in HF Patients. -In small doses they ↑ EF* and improve symptoms (counteract the effect of sympathetic NS). -β-blocker: carvedilol, metoprolol, mesoprolol [only these 3 from beta blockers are recommended in HF]	-Aldosterone antagonist & K ⁺ sparing agent. -prolong survival in CHF patients. -K ⁺ & renal function should be monitored. -Another eg. of aldosterone antagonists: Eplerenone.	-Anti-arrhythmic drug. -useful in HF and severe atrial fib. -used as an add-on drug for patients on beta blockers and ACE-I

* EF: ejection fraction

- **Vasodilators (nitrates & nitrites):**

- Combination of hydralazine and nitrates.
- ↓ afterload & preload, used in patient intolerant of ACE-I & ARB.

3- Contraindicated medications in heart failure:

- Calcium channel blockers: cause ↓HR & BP
- Metformin [used to treat diabetes]: may cause lactic acidosis.
- Thiazolidinediones (glitazones) [used to treat diabetes]: cause fluid retention.
- NSAIDs: ↑ risk of CHF exacerbation.

4- Devices used [for stage D]:

	ICD (Implantable cardioverter defibrillator)	CRT (Cardiac resynchronization therapy)	VAD (Ventricular assist device)
Indications	-prevent sudden cardiac death. -In Patients with symptomatic ventricular arrhythmias and heart failure.	-Biventricular pacemaker. - In Patients with symptomatic ventricular arrhythmias and heart failure.	-A pump placed in the abdominal cavity. -Severe heart failure.

5- Standard drug therapy used in HF patients includes: loop diuretics, ACE-I, and β -blocker. Digoxin, spironolactone and other medications may be added when necessary.

6- Patients with acute decompensated heart failure and/or acute pulmonary edema require urgent intervention and treatment:

- a. Oxygenation.
- b. Diuretics for volume overload and congestive symptoms.
- c. Dietary sodium restriction.

Management of Heart Failure due to diastolic dysfunction:

- Treatment in this condition is symptomatic:
 - o β -blocker
 - o Diuretics for volume overload.
 - o Digoxin and spironolactone should NOT be used.

Prognosis of Heart Failure:

- **5** year mortality rate in about **50%** of patients with CHF.
- Median survival rate depends on the underlying cause.
- Progressive: If end stage HF, patient has 3-5 years left to live unless ICD devices or transplants are done thus prolonging this period.

Summary:

- Patients with symptoms of heart failure → assess hemodynamic profile.
- Classification of heart failure

Table 1: American College of Cardiology–American Heart Association Classification of Chronic Heart Failure

Stage	Description
A: High risk for developing heart failure	Hypertension, diabetes mellitus, CAD, family history of cardiomyopathy
B: Asymptomatic heart failure	Previous MI, LV dysfunction, valvular heart disease
C: Symptomatic heart failure	Structural heart disease, dyspnea and fatigue, impaired exercise tolerance
D: Refractory end-stage heart failure	Marked symptoms at rest despite maximal medical therapy

CAD, coronary artery disease; LV, left ventricular; MI, myocardial infarction.

- Management:

HF due to systolic dysfunction			HF due to diastolic dysfunc.
Life style	Drugs	Devices	Drugs
-Sodium restriction. -Weight loss -Smoking cessation -Restrict alcohol -Exercise program -Vaccination	-Diuretics. -ACE-I -ARB -β-Blockers -Spironolactone -Digoxin -Vasodilators	-ICD -CRD -VAD	-β-Blockers -Diuretics -DO NOT use digoxin and spironolactone.

- Prognosis:

- **5** year mortality rate in about **50%** of patients with CHF.
- Progressive: If end stage HF, patient has 3-5 years left to live unless ICD devices or transplants are done thus prolonging this period.

Questions [mentioned by the doctor during the lecture]:

56-year-old man, diagnosed with dilated cardiomyopathy with ejection fraction less than 25%, NYHA class II dyspnea, BP:112/68, HR:82, JVP: 7cm water [normal], soft S3 and grade 2 pansystolic murmur, chest is clear, no lower limb edema, warm extremities.

1- According to perfusion and congestion, how do we classify this patient?

- A- Warm and dry
- B- Cold and dry
- C- Warm and wet
- D- Cold and wet

2- How do we treat this patient?

- A- Diuretics
- B- ACEI & betablockers
- C- Inotropes
- D- No treatment

39-year-old man is complaining of shortness of breath for 3 days. He woke up last night short of breath. He has cough with white sputum which increases at night. He has history of hypertension. He had been diagnosed with dilated cardiomyopathy 2 years ago. His vitals are as follow:

BP: 125/88

HR: 96

RR: 18

Temperature: 37.8c [arms and legs]

Lung auscultation: Bilateral crepitations

JVP: 12 cm

Chest x-ray: batwing appearance

3- What is his diagnosis based on his current symptoms and previous history?

4- What is your clinical assessment to his congestion and perfusion status?

- A- Warm and dry
- B- Cold and dry
- C- Warm and wet
- D- Cold and wet

5- Which statement about Angiotensin II is true:

- A- It's a vasodilator
- B- Promotes sodium excretion
- C- Inhibits growth and remodeling
- D- Causes release of aldosterone
- E- Inhibits thirst

6- Which statement about ACEI is false [you can choose more than 1 answer]:

- A- They prevent degradation of bradykinin
- B- They cause gynecomastia in men
- C- They might cause cough in heart failure
- D- They cause Hyperkalemia in some patients
- E- They cause dysgeusia (bad taste in mouth) as a side effect

7- A man 62 years old has progressive symptoms of dyspea and noticed recently a difficulty in laying supine.

Examination: elevated JVP 8 cm, 3rd heart sound, edema, bilateral crackles when lungs are auscultated.

Which one of the following maybe the cause of his fluid retention:

- A- Decreased renin
- B- Decreased vasopressin
- C- Decreased estrogen
- D- Increased aldosterone

Answers:

Q. no.	Answer	Additional explanation
1	A	
2	B	All patients (symptomatic or asymptomatic) with poor ejection fraction should be on ACEI and beta-blockers. The rest of medications are prescribed according to symptoms.
3	Acute HF	Bat wing chest x-ray is characteristic of pulmonary edema due to HF
4	C	
5	D	It doesn't inhibit remodeling, in fact, it actually causes remodeling. It doesn't inhibit thirst, it actually stimulates thirst.
6	B, E	Gynecomastia is a side effect of spironolactone.
7	D	In HF: increased renin, increased aldosterone, increased vasopressin