

CLASSIFICATION OF HEART FAILURE

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DISCLOSURES: NONE

CLASSIFICATION OF HEART FAILURE

- NYHA I – IV
- New paradigm

Stage A: Pts at high risk of developing HF

Stage B: LV dysfunction, asymptomatic (e.g., prior MI)

Stage C: LV dysfunction, symptomatic

Stage D: Refractory HF

HEART FAILURE – SCOPE OF THE PROBLEM

- **Affects 5 million in U.S., 22 million worldwide**
- **> 500,000 new HF diagnosis / yr**
- **> 6% of > 65 y.o. have HF**
- **Only major cardiovascular disorder increasing in incidence / prevalence**
- **Over 3.5 million hospitalizations annually**
- **Leading cause of hospitalization of adults > 65; > 90% of CHF deaths are > 65**
- **~ 300,000 deaths / yr**
- **\$56 billion in Rx / yr**
- **Up to 50% may have normal EF (diastolic dysfunction)**

Clinical Evidence Suggesting the Diagnosis of Heart Failure - 1

Type of Evidence	Highly Suggestive	Less Specific
Symptoms	Orthopnea PND	Fatigue ↓ exercise tolerance Nocturnal cough Abdominal discomfort Discomfort when bending
Signs	↑ JVP S ₃ gallop (LV, RV)	Tachycardia Hypotension

AHJ 1991;1221:951

Clinical Evidence Suggesting the Diagnosis of Heart Failure - 2

Type of Evidence	Highly Suggestive	Less Specific
Signs	Displaced left ventricular impulse; parasternal lift	Ascites
	Rales	Peripheral edema
	Narrow pulse pressure/alternans	
	Pulsatile hepatomegaly	Tender hepatomegaly

Clinical Evidence Suggesting the Diagnosis of Heart Failure - 3

Type of Evidence	Highly Suggestive	Less Specific
CXR	Cardiomegaly	Pleural effusion
Screening laboratory tests	↑ BNP	
Response to diuretics	↓ orthopnea Improved exercise tolerance Rapid weight loss > 3 lb without dizziness	

AHJ 1991;1221:951

IMPORTANT POINTS IN HF - 1

- **Orthopnea**
 - ↑ interstitial edema
 - ↓ lung compliance
 - Rales may be absent
- **Rales**
 - PAWP may be > 30 without rales due to 10 – 20x lymphatic drainage capability

IMPORTANT POINTS IN HF - 2

Heart Rate - If AF, effort VR is likely to be high; AVN ablation/PM may be required

AF is present in ~ 20% of HF pts and is an independent predictor of mortality

IMPORTANT POINTS IN HF - 3

- **Chronic renal insufficiency –
Worsens prognosis**
- **Troponin leakage –
Poor prognostic sign**

ETIOLOGIES OF HF

- CAD (prior MI, ischemic CM, DM)
- Valve disease
- Arrhythmia (tachycardia CM)
- Hypertension
- Idiopathic (nonischemic)
- Substance abuse (cocaine, ETOH, amphetamines)
- Familial (20% of “idiopathic” CM may be familial)
 - Dilated
 - Hypertrophic
- Hyperthyroidism
- Infiltrative (Chagas, amyloid, hemochromatosis)
- Peripartum

ROLE OF ECHOCARDIOGRAPHY IN HF

- **Ischemic CM (wall motion abnormalities)**
- **Nonischemic CM**
- **Valve disease**
 - **Rheumatic**
 - **Non-rheumatic**
(MR, TR, endocarditis)
- **Congenital HD**

LABORATORY TESTS IN HF

- **BNP**
- **Na⁺ (↓ indicates poor perfusion)**
- **Serum iron (hemochromatosis)**
- **Hb, Hct (anemia → high output state)**

MEDICAL Rx IN HF - 1

- **Low salt diet**
- **ACE-Inhibitors**
- **Angiotensin receptor blockers**
 - Do not use if $K^+ > 5.5$ mEq/dL**
 - Monitor K^+**
 - Caution if creatinine > 3.0**
- **β -blockers**
 - Do not initiate, or use $\frac{1}{2}$ prescribed dose in CHF exacerbation**
 - OK to try in COPD; do not use in bronchospasm or if wheezes develop**

MEDICAL Rx IN HF - 2

- **Diuretics**
- **Spirolonactone**
 - Do not use if Cr > 2.0
 - Monitor K⁺
 - Discontinue any supplemental K⁺
- **Digoxin**
 - Check serum level (avoid ≥ 2.0 ng/dL)
 - Not useful in HF due to diastolic dysfunction
- **Hydralazine/isordil**
 - In addition to substituting for ACE-I and ARBs, can add to regimen in refractory pts

STAGES IN HF – STAGE A

- **At high risk for HF but without structural heart disease or symptoms of HF**

Hypertension

CAD

DM

Cardiotoxins

Family history CM

STAGES IN HF – STAGE A

- **Rx**

Treat HT

Smoking cessation

Treat lipid disorders

Regular exercise

Avoid alcohol intake, illicit drug use

ACE inhibition

STAGES IN HF – STAGE B

- **Structural heart disease but without symptoms of HF**
 - Previous MI**
 - LV systolic dysfunction**
 - Asx valvular disease**
- **Rx**
 - All measures under stage A**
 - ACE inhibitors**
 - Beta-blockers**

STAGES IN HF – STAGE C

- **Structural heart disease with prior or current symptoms of HF**
 - Known structural heart disease**
 - SOB, fatigue, ↓ exercise tolerance**
- **Rx**
 - All measures under stage A**
 - Diuretics**
 - ACE inhibitors/ARBs**
 - Beta-blockers**
 - Digitalis**
 - Dietary salt restriction**

STAGES IN HF – STAGE D

- **Refractory HF requiring specialized interventions**
 - Pts with symptoms at rest despite maximal medical Rx**
- **Rx**
 - All measures under stages A, B, and C**
 - CRT in appropriate pts**
 - Mechanical assist devices**
 - Heart transplantation**
 - Continuous (not intermittent) IV inotropic infusions for palliation**

EFFECTS OF ALDOSTERONE

- \uparrow Na^+ retention
- \uparrow loss of Mg^{++} , K^+
- Sympathetic activation
- Parasympathetic inhibition
- Myocardial fibrosis
- Vascular fibrosis
- Baroreceptor dysfunction
- \downarrow arterial compliance

DETERMINANTS OF EXERCISE CAPACITY IN HF

- **EF (does not predict max VO_2)**
- **Peripheral blood flow**
- **Endothelial function**
- **Skeletal muscle function**
- **Pulmonary function**

Isovolumic time : CAD, LBBB

From Duncan et al JACC 2004;43:1524 N = 111