

ACC/AHA Heart  
Failure Guidelines:  
2013  
Medication Update  
2016

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Causes of Heart Failure

- Myocardial infarction: Regional loss of left systolic heart function
- Dilated Cardiomyopathy/myocarditis: Global loss of left systolic heart function
- Hypertensive heart disease/aortic stenosis: Left sided Diastolic failure with global hypertrophy
- Hypertrophic cardiomyopathy: Left sided Diastolic HF Hypertrophic changes often regional
- Incessant tachycardia: Left sided Systolic global loss of function
- Infiltrative diseases: Right and Left sided Diastolic dysfunction with wall thickening usually global

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Causes of Heart Failure

- Co pulmonale: Right sided systolic and diastolic dysfunction associated with global abnormalities
- Pericardial effusion/tamponade: Right sided Diastolic dysfunction associated with restriction of filling
- Valvular/congenital: Depends on structural abnormality

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Stages of Heart Failure:  
Stage A

- Stage A: At high risk for HF but without structural heart disease or symptoms of HF
  - Hypertension
  - Atherosclerotic disease
  - Diabetes
  - Obesity Metabolic syndrome
  - Using cardiotoxins
  - Family Hx CM

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Therapy for Stage A HF

- Goals:
  - Tx HTN,
  - Smoking cessation
  - treat lipid disorders
  - encourage regular exercise
  - discourage EtOH or illicit drug use
  - control metabolic syndrome
- ACE-Inhibitor or ARB in appropriate patients for vascular disease or DM

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Stages of HF:  
Stage B

- Stage B: Structural heart disease but without signs or symptoms of HF
  - Previous MI
  - LV remodeling including LVH and low EF
  - Asymptomatic valvular disease

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### Therapy for Stage B HF

- All measures under Stage A
- Medications:
  - ACE-Inhibitor or ARB in appropriate patients
    - After MI and HTN to prevent remodeling
  - Beta-blockers in appropriate patients
    - After MI or known severe CAD
    - Carvedilol, Metoprolol XL, Bisoprolol
- Evaluation by Electrophysiology for devices implantation in patients for EF<35%, on guideline medical therapy and expectation that will live greater than one year.

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### Stages of HF: Stage C

- Structural heart disease with prior or current symptoms of HF
  - Known structural heart disease AND
  - Shortness of breath and fatigue
  - Reduced exercise tolerance

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### Therapy for Stage C HF

- All measures under Stages A & B and Dietary Salt restriction
- For all patients:
  - Diuretics for fluid retention
  - ACE-Inhibitor, Angiotension Receptor Blocker (ARB) or Angiotensin receptor-neprilysin (ARNI)
  - Beta-blocker
  - Drugs selected patients: Aldosterone antagonist, Digitalis, Hydralazine/nitrates
  - Evaluate for Device: ICD or biventricular pacemaker

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Stages of HF:

Stage D

- Stage D: Refractory HF requiring specialized interventions
- Symptoms at rest despite maximal medical therapy who recurrently hospitalized or cannot be safely discharged from the hospital without specialized interventions

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Therapy for Stage D HF

- Appropriate measures under Stages A, B, C
- Decision appropriate level of care
- Consider compassionate End of Life Care/Hospice
- Extraordinary measures
  - Heart transplant
  - Chronic inotropes
  - Permanent mechanical support
  - Experimental surgery or medications

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Initial Evaluation of Patients

- Present with a syndrome of decreased exercise tolerance
- Present with syndrome with fluid retention
- Present with no symptoms or symptoms of another cardiac or noncardiac disorder
  - Physical exam abnormal heart sounds
  - Abnormal ECG
  - HTN, DM, acute MI, arrhythmia, pulmonary or systemic thromboembolic event
  - Patient is found to have evidence of cardiac enlargement or dysfunction

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### Initial Evaluation: Class I Recommendations

- Complete H&P
  - MI
  - Valvular disease
  - Congenital heart disease
  - Examination for heart enlargement, murmur, or 3<sup>rd</sup> heart sound
  - EtOH or illicit drugs or alternative therapies and chemotherapy
- Patient's ability to perform routine and desired activities
  - Bathing
  - Dressing
  - Executive functioning
- Volume status, orthostatic BP changes, wt/ht, calculation BMI

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### Exam findings of Left Ventricular Failure

- Fatigue and decrease exercise tolerance
- Orthopnea
- Paroxysmal nocturnal dyspnea
- Rales in bases leading to pulmonary edema due to elevation in pulmonary capillary pressure that can flood the airspace.
- Kerley B Lines: interstitial edema on chest x-ray

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### Exam findings of Right Ventricular Failure

- Dependent edema
- Abdominal bloating
- Constipation
- Decrease appetite
- Hepatomegaly
- Elevated jugular vein distention

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### Initial Evaluation

- If abnormality seen on exam, chest x-ray or ECG obtain additional testing
- Comprehensive 2-dimensional echocardiogram with Doppler flow studies
  - LV EF preserved or reduced?
  - Structure of the LV normal or abnormal? Size?
  - Other structural abnormalities such as valvular, pericardial, or right ventricular abnormalities that could account for abnormalities?
- 12 lead ECG

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### Initial Evaluation: Laboratory testing

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| Complete blood count                     | HIV screening in high risk groups   |
| Serum electrolytes (including Ca and Mg) | NICM-Chagas disease antibodies  |
| Glycohemoglobin                          |   |
| Serum lipids                             | BNP-Used in combination clinical evaluation but not in isolation to confirm or exclude HF |
| Renal and hepatic function               |   |
| Thyroid function                         | Fasting transferrin saturation screen hemochromatosis                                     |

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### WARNING about BNP

- BNP, NT-Pro BNP
  - Sensitive to other biological factors
  - Lend support to a diagnosis of abnormal LV function or hemodynamic causing HF symptoms
  - Can be used to differentiate dyspnea from HF vs other causes
  - Falsely elevated in women and those over 60 yrs.
  - NT-Pro BNP<300 rules out HF
  - BNP >400 highly likely HF
    - 100-400 use clinical judgement
    - <100 negative for HF

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## Cardiologist Evaluation: Class IIa

- Coronary angiogram in patients with angina, high risk for CAD without symptoms
- Noninvasive imaging for ischemia in known CAD and no angina unless not eligible for revascularization
- Maximal exercise testing with and without respiratory gas exchange and/or blood oxygen saturation is reasonable in patients presenting with HF to determine HF is cause of symptoms

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## Medication Management Heart Failure

- Angiotensin Converting Enzyme-Inhibitors (ACE-I) or
- Angiotensin Receptor Blocker's (if not tolerant ACE) or
- Angiotensin receptor-neprilysin (ARNI)
- Beta blockers: Bisoprolol, carvedilol, sustained release metoprolol succinate
- Digoxin (Possible)
- Spironolactone
- Lasix/ Furosemide
- Zaroxolyn/ Metolazone
- Hydralazine/Nitrates
  - Self reported African Americans
  - In addition ACE-I/ARB
  - In patients unable to take ACE-I/ARB due to hyperkalemia or serum creatinine >2.5

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## Management HF

- Moderate sodium restriction
- Daily measurement of weight
- Immunization influenza & pneumococcal to reduce respiratory infections
- Frequent monitoring renal function and electrolyte
- Frequent follow up in clinic
- Reinforce medication adherence and assess tolerance to medications
- Exercise training is beneficial as an adjunctive approach to improve clinical status in ambulatory patients with current or prior symptoms of HF and reduced LVEF.

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## Implantable Cardioverter-Defibrillator

- **Secondary prevention** with symptoms of HF and reduced LVEF who have a history of cardiac arrest, ventricular fibrillation or hemodynamically destabilizing ventricular tachycardia
- **Primary prevention** ischemic heart disease  $\geq 40$  days post-MI, LVEF $<30-35\%$ , NYHA Class II/III, undergoing optimal medical therapy, expected live  $> 1$  year with good functional status

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## Biventricular Pacer with ICD

- Biventricular EF $<30\%$
- QRS  $>0.12$
- NYHA Class II-III
  - NYHA Class IV should be avoided
- Free of infection

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## Evaluation for LVAD

- ▶ The patient's Class IV heart failure symptoms have failed to respond to optimal medical management including dietary salt restriction, diuretics, digitalis, beta-blockers, and ACE inhibitors (if tolerated) for at least 60 of the last 90 days
- ▶ The patient has a left ventricular ejection fraction (LVEF)  $< 25\%$
- ▶ The patient has demonstrated functional limitation with a peak oxygen consumption of  $< 12$  ml/kg/min
- ▶ Patient has a continued need for intravenous inotropic therapy owing to symptomatic hypotension
- ▶ decreasing renal function, or worsening pulmonary congestion
- ▶ The patient has the appropriate body size ( $\geq 1.5$  m<sup>2</sup>) to support the LVAD implantation.

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