APPLICATION OF THE 2013 HEART FAILURE (HF) TREATMENT GUIDELINES

Disclosures

Faculty Disclosure

As a sponsor accredited by the ACCME, the ACPE and the ANCC to provide continuing education for the healthcare team, OptumHealth Education requires the disclosure of all relevant financial relationships a faculty member has with any commercial interest. The faculty reported the following:

- Ms. Snell is an employee of BioScrip.

Reviewer Disclosures

To ensure fair balance and avoid bias, the content for this activity has been reviewed by an independent medical expert with no relevant financial relationships and has been approved by OptumHealth Education.

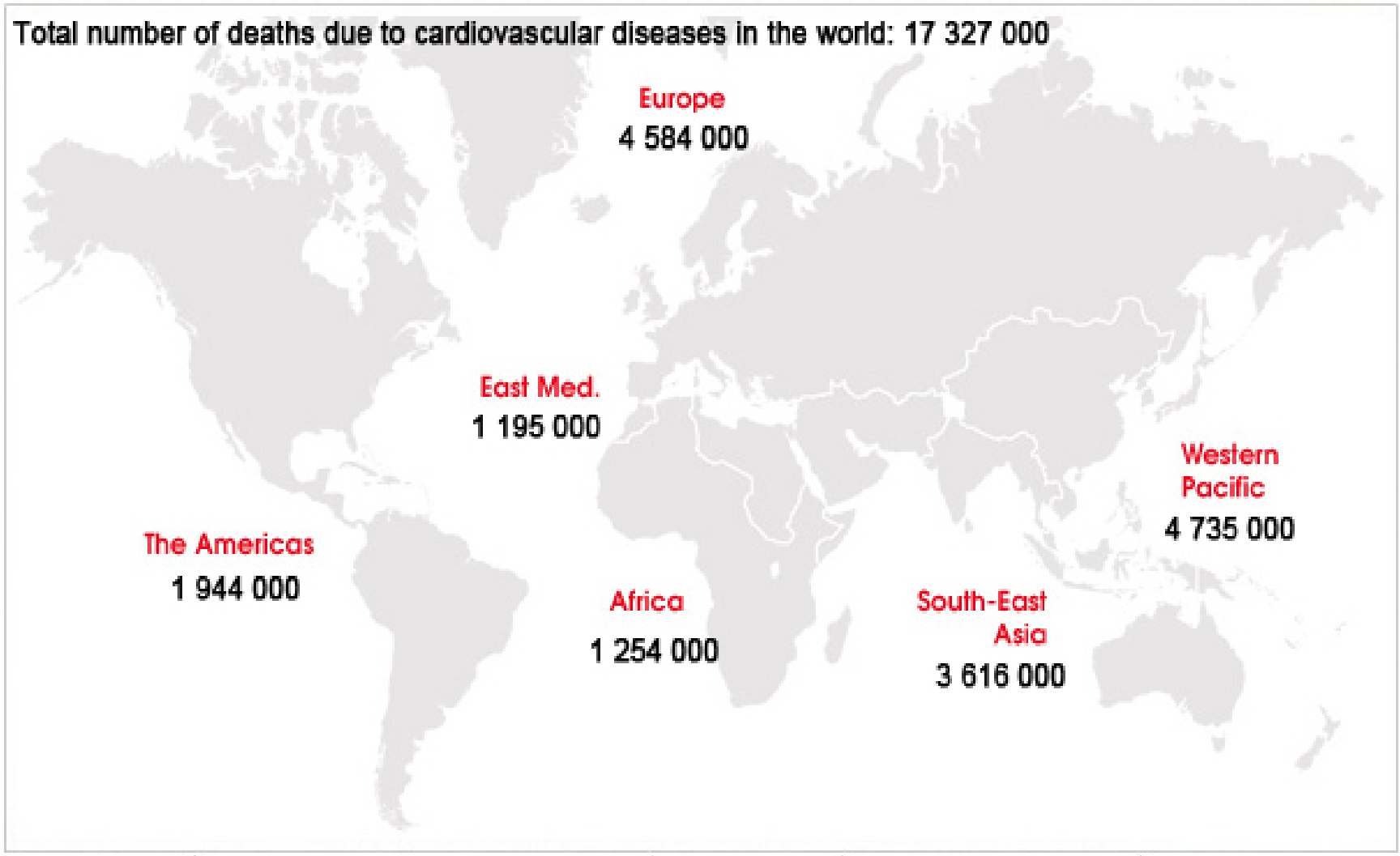
U.S Heart Failure Epidemiology

- Heart Failure (HF) has reached epidemic levels, especially for the elderly

  - **Around 5.1 million Americans have HF (2013)**
  - **Approximately 670,000 new HF cases each year (2013)**
  - **In 2010, HF underlying cause of 57,757 deaths**
  - **HF costs an estimated $32 billion (2011)**

http://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_heart_failure.htm; Accessed May 12, 2014

Overview	Rheumatic	Hypertensive	Ischaemic	Cerebrovascular	Inflammatory



Used with permission

WHO causes of death 2008 summary tables; accessed May 12, 2014-
http://www.world-heart-federation.org/cardiovascular-health/global-facts-map/

U.S Heart Failure Demographics
Heart Failure Hospitalizations

- Medicare heart failure readmissions = 24% within 30 days[1]
- Mean age of hospitalized patients 70-75 yrs[2]
- 50% female (larger proportion in US)[2]
- 20% African American; 7% Hispanic[2]
- Etiology of HF[2]
  - Ischemic
  - Uncontrolled hypertension, congenital, valvular pathology in developing nations

Ambrosy, A. (2013) High post-discharge mortality, readmission rates persist among hospitalized patients. J Am Coll Cardiol; doi:10. 1016/j.jacc. 11.053[2]

U.S Heart Failure Demographics
Heart Failure Hospitalizations

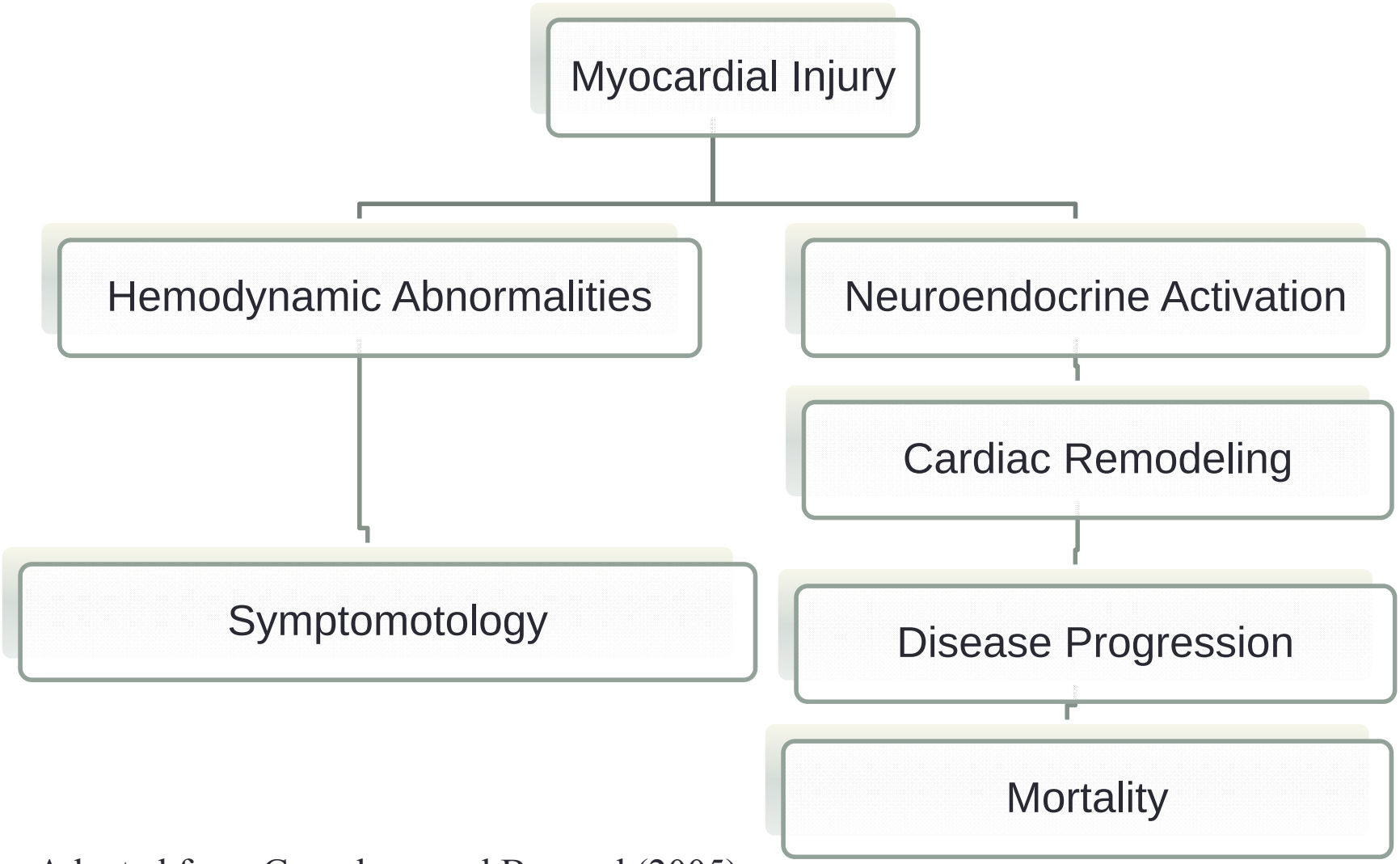
- Comorbidities
  - Cardiac
    - Coronary artery disease
    - Myocardial infarction 20-30%
    - Hypertension
    - AF
  - Non-cardiac
    - Diabetes
    - Chronic kideny disease
    - COPD
- Mean length of stay: 4-20 days
- In-hospital mortality 4-30%

Ambrosy, A. (2013) High post-discharge mortality, readmission rates persist among hospitalized patients. J Am Coll Cardiol; doi:10. 1016/j.jacc. 11.053

Objectives

- Participants will be able to:
  - Describe the clinical presentation and diagnosis of heart failure
  - Apply the 2013 ACCF/AHA treatment guidelines throughout all stages of heart failure

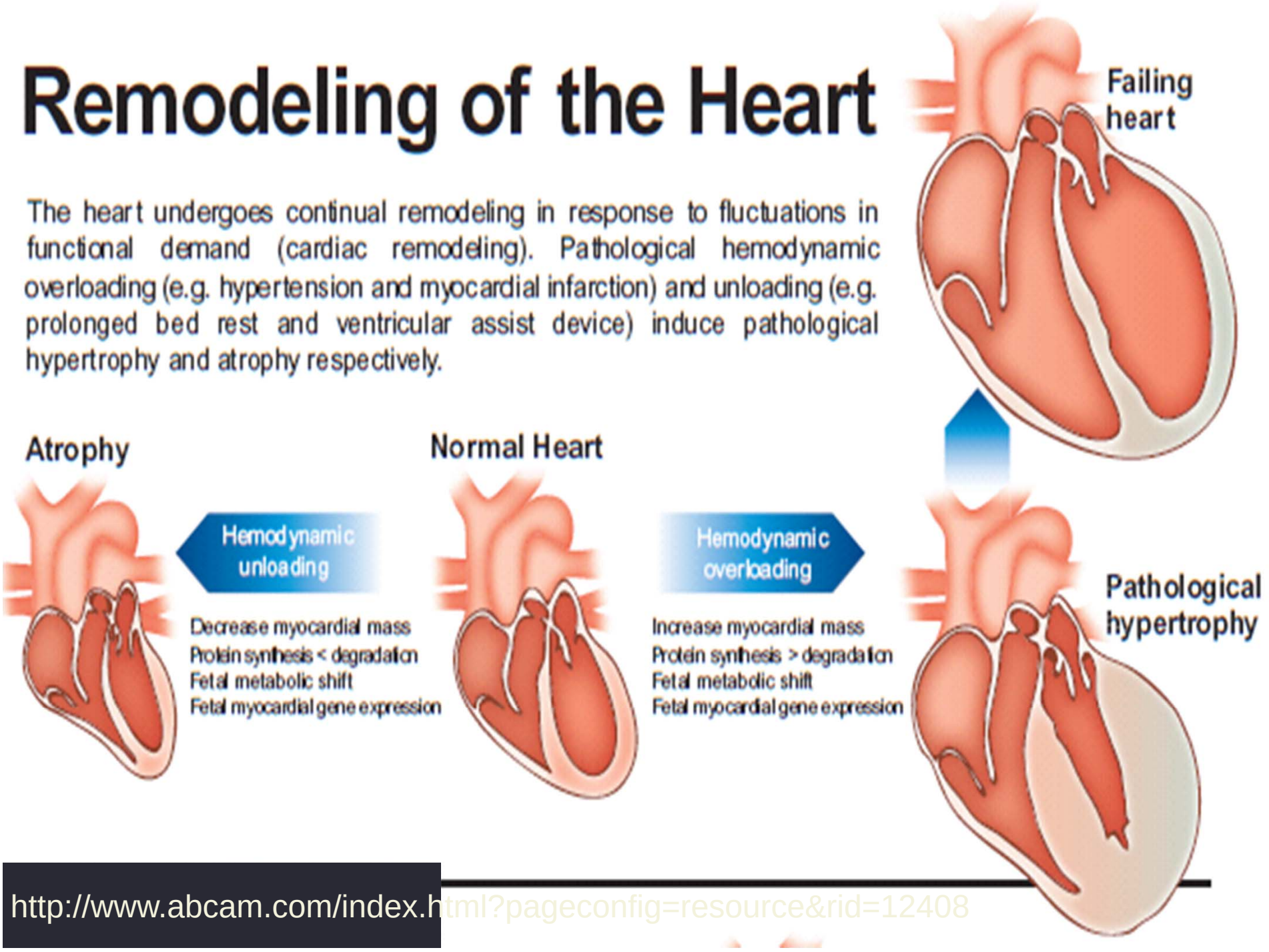
Heart Failure Pathophysiology



Adapted from Greenberg and Barnard (2005)

Remodeling of the Heart

The heart undergoes continual remodeling in response to fluctuations in functional demand (cardiac remodeling). Pathological hemodynamic overloading (e.g. hypertension and myocardial infarction) and unloading (e.g. prolonged bed rest and ventricular assist device) induce pathological hypertrophy and atrophy respectively.



http://www.abcam.com/index.html?pageconfig=resource&rid=12408

2013 ACCF/AHA HEART FAILURE GUIDELINES

2013 ACCF/AHA Guideline for the Management of Heart Failure: Executive Summary : A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines.

Clyde W. Yancy, Mariell Jessup, Biykem Bozkurt, Javed Butler, Donald E. Casey, Jr, Mark H., Drazner, Gregg C. Fonarow, Stephen A. Geraci, Tamara Horwich, James L. Januzzi, Maryl R., Johnson, Edward K. Kasper, Wayne C. Levy, Frederick A. Masoudi, Patrick E. McBride, John J.V., McMurray, Judith E. Mitchell, Pamela N. Peterson, Barbara Riegel, Flora Sam, Lynne W. Stevenson, W.H. Wilson Tang, Emily J. Tsai and Bruce L. Wilkoff. *Circulation.* published online June 5, 2013; Print ISSN: 0009-7322. Online ISSN: 1524-4539

The full-text guidelines are also available on the following Web sites:
ACC (www.cardiosource.org) and AHA (my.americanheart.org)

Heart Failure Types

- **Heart failure with reduced ejection fraction (HF*r*EF)**
  (systolic/left-sided)
- Ejection fraction (EF) <40%

- **Heart failure with preserved ejection fraction** (HF*p*EF)
  (diastolic/right-sided)
- Ejection fraction (EF) >40% (normal)

Ejection Fraction 41-49% is borderline and treated as HFpEF

Clinical Presentation of HF

- Decreased exercise tolerance/SOB
- Fluid retention
- Jugular venous distension (JVD)
- Need to sleep with more pillows or in recliner
  - Paroxymal nocturnal dyspnea (PND)
- Arrhythmias
- No symptoms or symptoms of HF, but have evidence of cardiac enlargement or dysfunction

Classifications of Heart Failure

- **The New York Heart Association classification**
  - Focuses on functional capacity/symptoms
  - Most widely used in practice
- **The American College of Cardiology/American Heart Association (ACC/AHA) stages**
  - Focuses on the progressive nature of HF
  - Most widely used in literature

ACCF/AHA		NYHA	
A	At high risk for HF but without structural heart disease or symptoms of HF	None	
B	Structural heart disease but without signs or symptoms of HF	1	No limitation of physical activity. ordinary physical activity does not cause symptoms of HF
C	Structural heart disease with prior or current symptoms of HF	2	Slight limitation of physical activity comfortable at rest, but ordinary physical activity results in symptoms of HF
		3	Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes symptoms of HF
D	Refractory HF requiring specialized interventions	4	Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest

2013 HF Guidelines Overview

I. Initial and Serial Evaluation of the HF Patient *(including HFpEF)*

II. Treatment of Stage A thru D Heart Failure *(including HFpEF)*

III. The Hospitalized Patient

IV. Surgical/Percutaneous/Transcatheter Interventional Treatments

V. Coordinating Care for Patients With Chronic HF

VI. Quality Metrics/Performance Measures

Levels of Research Evidence

Adapted from
Yancy et al. (2013)

	Class I **Should be performed**	Class IIa **It is reasonable**	Class IIb **May be considered**	Class III **No benefit or harmful**
Level A Multiple populations evaluated	Recommendation effective Sufficient evidence from randomized trials	Recommendation In favor Some conflicting evidence	Efficacy less established Greater conflicting evidence	Not useful; may be harmful
Level B Limited populations evaluated	Recommendation effective Evidence from single randomized study or nonrandomized	Recommendation In favor Some conflicting evidence	Efficacy less established Greater conflicting evidence	Not useful; may be harmful
Level C Very limited populations	Recommendation effective Only expert opinion	Recommendation in favor Diverging expert opinion	Efficacy less established Greater conflicting evidence	Not useful; may be harmful

INITIAL AND SERIAL EVALUATION

History and Physical Examination

A thorough history and physical examination should be obtained/performed in patients presenting with HF to identify cardiac and noncardiac disorders or behaviors that might cause or accelerate the development or progression of HF.

In patients with idiopathic dilated cardiomyopathy, a 3-generational family history should be obtained to aid in establishing the diagnosis of familial DCM.

Volume status and vital signs should be assessed at each patient encounter. This includes serial assessment of weight, as well as estimates of jugular venous pressure and the presence of peripheral edema or orthopnea.

Diagnostic Tests

Initial laboratory evaluation of patients presenting with HF should include

Complete blood count

Urinalysis

Serum electrolytes (including calcium and magnesium)

Blood urea nitrogen, serum creatinine

Glucose

Fasting lipid profile

Liver function tests

Thyroid-stimulating hormone.

Serial monitoring, when indicated, should include serum electrolytes and renal function.

Diagnostic Tests (cont.)

A 12-lead ECG should be performed initially on all patients presenting with HF.

Screening for hemochromatosis or HIV is reasonable in selected patients who present with HF.

Diagnostic tests for rheumatologic diseases, amyloidosis, or pheochromocytoma are reasonable in patients presenting with HF in whom there is a clinical suspicion of these diseases.

Biomarkers: Ambulatory

In ambulatory patients with dyspnea, measurement of BNP or N-terminal pro-B-type natriuretic peptide (NT-proBNP) is useful to support clinical decision making regarding the diagnosis of HF, especially in the setting of clinical uncertainty.

Measurement of BNP or NT-proBNP is useful for establishing prognosis or disease severity in chronic HF.

Biomarkers: Ambulatory (cont')

BNP- or NT-proBNP guided HF therapy can be useful to achieve optimal dosing of GDMT in select clinically euvolemic patients followed in a well-structured HF disease management program.

The usefulness of serial measurement of BNP or NT-proBNP to reduce hospitalization or mortality in patients with HF is not well established.

Measurement of other clinically available tests such as biomarkers of myocardial injury or fibrosis may be considered for additive risk stratification in patients with chronic HF.

Biomarkers: Acute Care

Measurement of BNP or NT-proBNP is useful to support clinical judgment for the diagnosis of acutely decompensated HF, especially in the setting of uncertainty for the diagnosis.

Measurement of BNP or NT-proBNP and/or cardiac troponin is useful for establishing prognosis or disease severity in acutely decompensated HF.

Biomarkers: Acute Care (cont')

The usefulness of BNP- or NT-proBNP guided therapy for acutely decompensated HF is not well-established.

Measurement of other clinically available tests such as biomarkers of myocardial injury or fibrosis may be considered for additive risk stratification in patients with acutely decompensated HF.

Recommendations for Noninvasive Imaging

Recommendation	COR	LOE
Chest X-Ray: Suspected, acute, or new-onset HF	I	C
2-dimensional echocardiogram with Doppler: initial evaluation of HF	I	C
Repeat measurement of EF with a significant change in clinical status or received treatment that might affect cardiac function, or for consideration of device therapy	I	C
Noninvasive imaging to detect myocardial ischemia	IIa	C
Viability assessment : before revascularization in HF patients with CAD	IIa	B
Radionuclide ventriculography or MRI : assess LVEF and volume	IIa	C
MRI : when assessing myocardial infiltration or scar	IIa	B
Routine repeat measurement of LV function assessment should not be performed	III: No Benefit	B

Recommendations for Invasive Evaluation

Recommendation	COR	LOE
Monitoring with a pulmonary artery catheter: with respiratory distress or impaired systemic perfusion when clinical assessment is inadequate	I	C
Invasive hemodynamic monitoring: acute HF with persistent symptoms and/or when hemodynamics are uncertain	IIa	C
Coronary arteriography when coronary ischemia may be contributing to HF	IIa	C
Endomyocardial biopsy can be useful in patients with HF when a specific diagnosis is suspected that would influence therapy	IIa	C
Routine use of invasive hemodynamic monitoring is not recommended in normotensive patients with acute HF	III: No Benefit	B
Endomyocardial biopsy should not be performed in the routine evaluation of HF	III: Harm	C

TREATMENT OF STAGES A TO D

Stage A

Stage A

Control hypertension

Hypertension and lipid disorders should be controlled in accordance with contemporary guidelines to lower the risk of HF.

Reduce contributors/comorbidites

Other conditions that may lead to or contribute to HF, such as obesity, diabetes mellitus, tobacco use, and known cardiotoxic agents, should be controlled or avoided.

TREATMENT OF STAGES A TO D

Stage B

Stage B

Ace inhibitors/Angiotensin Receptor Blockers

In all patients with a recent or remote history of MI or ACS and reduced EF, ACE inhibitors should be used to prevent symptomatic HF and reduce mortality. In patients intolerant of ACE inhibitors, ARBs are appropriate unless contraindicated.

ACE inhibitors should be used in all patients with a reduced EF to prevent symptomatic HF, even if they do not have a history of MI.

Beta blockers

In all patients with a recent or remote history of MI or ACS and reduced EF, evidence-based beta blockers should be used to reduce mortality.

Beta blockers should be used in all patients with a reduced EF to prevent symptomatic HF, even if they do not have a history of MI.

Stage B (cont.)

Statins

In all patients with a recent or remote history of MI or ACS, statins should be used to prevent symptomatic HF and cardiovascular events.

Control hypertension

In patients with structural cardiac abnormalities, including LV hypertrophy, in the absence of a history of MI or ACS, blood pressure should be controlled in accordance with clinical practice guidelines for hypertension to prevent symptomatic HF.

Stage B (cont.)

ICD Placement

To prevent sudden death, placement of an ICD is reasonable in patients with asymptomatic ischemic cardiomyopathy who are at least 40 days post-MI, have an LVEF of 30% or less, are on appropriate medical therapy and have reasonable expectation of survival with a good functional status for more than 1 year.

Harm

NO Calcium channel blockers

Nondihydropyridine calcium channel blockers with negative inotropic effects may be harmful in asymptomatic patients with low LVEF and no symptoms of HF after MI.

TREATMENT OF STAGES A TO D

Stage C

Nonpharmacological Interventions

Stage C: Nonpharmacological Interventions

Education on self-care

Patients with HF should receive specific education to facilitate HF self-care.

Exercise training

Exercise training (or regular physical activity) is recommended as safe and effective for patients with HF who are able to participate to improve functional status.

Sodium Restriction

Sodium restriction is reasonable for patients with symptomatic HF to reduce congestive symptoms.

Stage C:
Nonpharmacological Interventions

CPAP

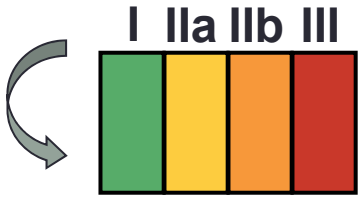
Continuous positive airway pressure (CPAP) can be beneficial to increase LVEF and improve functional status in patients with HF and sleep apnea.

Cardiac Rehab

Cardiac rehabilitation can be useful in clinically stable patients with HF to improve functional capacity, exercise duration, HRQOL, and mortality.

Pharmacological Interventions

Pharmacological Treatment for Stage C HF*r*EF



See recommendations for stages A, B, and C LOE

Stage A and B

Class I recommendations

Measures listed as Class I recommendations for patients in stages A and B are recommended where appropriate for patients in stage C. (Levels of Evidence: A, B, and C as appropriate)

Pharmacological Treatment for Stage C HF*r*EF (cont.)

Diuretics

Diuretics are recommended in patients with HF*r*EF who have evidence of fluid retention, unless contraindicated, to improve symptoms.

Ace Inhibitors/Angiotensin Receptor Blockers

ACE inhibitors are recommended in patients with HF*r*EF and current or prior symptoms, unless contraindicated, to reduce morbidity and mortality.

ARBs are recommended in patients with HF*r*EF with current or prior symptoms who are ACE inhibitor-intolerant, unless contraindicated, to reduce morbidity and mortality.

Drugs Commonly Used for HF*r*EF (Stage C HF)

- *Ace Inhibitors*
  - Captopril
  - Enalapril
  - Fosinopril
  - Lisinopril
  - Perindopril
  - Quinapril
  - Ramipril
- *Angiotensin Receptor Blockers*
  - Candesartan
  - Losartan
  - Valsartan
- *Aldosterone Antagonists*
  - Spironolactone
  - Eplerenone

Drugs Commonly Used for HF*r*EF (Stage C HF)

- *Beta Blockers*
  - Bisoprolol
  - Carvedilol
  - Carvedilol CR
  - Metoprolol succinate XR
- *Hydralazine and and isosorbide dinitrate*

Pharmacological Treatment for Stage C HF*r*EF (cont.)

Angiotensin Receptor Blockers

ARBs are reasonable to reduce morbidity and mortality as alternatives to ACE inhibitors as first-line therapy for patients with HF*r*EF, especially for patients already taking ARBs for other indications, unless contraindicated.

Addition of an ARB may be considered in persistently symptomatic patients with HF*r*EF who are already being treated with an ACE inhibitor and a beta blocker in whom an aldosterone antagonist is not indicated or tolerated.

Pharmacological Treatment for Stage C HF*r*EF (cont.)

Harm

Ace/ARB/Aldosterone Antagonist

Routine *combined* use of an ACE inhibitor, ARB, and aldosterone antagonist is potentially harmful for patients with HF*r*EF.

Beta Blockers

Use of 1 of the 3 beta blockers proven to reduce mortality (i.e., bisoprolol, carvedilol, and sustained-release metoprolol succinate) is recommended for all patients with current or prior symptoms of HF*r*EF, unless contraindicated, to reduce morbidity and mortality.

Pharmacological Treatment for Stage C HF*r*EF (cont.)

Aldosterone Receptor Antagonists

Aldosterone receptor antagonists [or mineralocorticoid receptor antagonists (MRA)] are recommended in patients with NYHA class II-IV and who have LVEF of 35% or less, unless contraindicated, to reduce morbidity and mortality. Careful monitoring of potassium, renal function, and diuretic dosing should be performed at initiation and closely followed thereafter to minimize risk of hyperkalemia and renal insufficiency.

Pharmacological Treatment for Stage C HF*r*EF (cont.)

Hydralazine/isosorbide dininitrate

The combination of hydralazine and isosorbide dinitrate is recommended to reduce morbidity and mortality for patients self-described as African Americans with NYHA class III–IV HF*r*EF receiving optimal therapy with ACE inhibitors and beta blockers, unless contraindicated.

A combination of hydralazine and isosorbide dinitrate can be useful to reduce morbidity or mortality in patients with current or prior symptomatic HF*r*EF who cannot be given an ACE inhibitor or ARB because of drug intolerance, hypotension, or renal insufficiency, unless contraindicated.

Pharmacological Treatment for Stage C HF*r*EF (cont.)

Digoxin

Digoxin can be beneficial in patients with HF*r*EF, unless contraindicated, to decrease hospitalizations for HF.

Anticoagulation

Patients with chronic HF with permanent/persistent/ paroxysmal AF and an additional risk factor for cardioembolic stroke (history of hypertension, diabetes mellitus, previous stroke or transient ischemic attack, or ≥75 years of age) should receive chronic anticoagulant therapy (in the absence of contraindications to anticoagulation).

Pharmacological Treatment for Stage C HF*r*EF (cont.)

No Benefit

No Benefit

Harm

Nutritional supplements as treatment for HF are not recommended in patients with current or prior symptoms of HFrEF.

Hormonal therapies other than to correct deficiencies are not recommended for patients with current or prior symptoms of HF*r*EF.

Drugs known to adversely affect the clinical status of patients with current or prior symptoms of HF*r*EF are potentially harmful and should be avoided or withdrawn whenever possible (e.g., most antiarrhythmic drugs, most calcium channel blocking drugs (except amlodipine), NSAIDs, or TZDs).

Pharmacological Treatment for Stage C HF*r*EF (cont.)

Intravenous Inotropes

Harm

Long-term use of infused positive inotropic drugs is potentially harmful for patients with HF*r*EF, except as palliation for patients with end-stage disease who cannot be stabilized with standard medical treatment (see recommendations for stage D).

Calcium Channel Blockers

No Benefit

Calcium channel blocking drugs are not recommended as routine treatment for patients with HF*r*EF.

Pharmacological Treatment for Stage C HF*p*EF

Hypertension

Systolic and diastolic blood pressure should be controlled in patients with HF*p*EF in accordance with published clinical practice guidelines to prevent morbidity.

Diuretics

Diuretics should be used for relief of symptoms due to volume overload in patients with HF*p*EF.

Coronary Artery Revascularization

Coronary revascularization is reasonable in patients with CAD in whom symptoms (angina) or demonstrable myocardial ischemia is judged to be having an adverse effect on symptomatic HF*p*EF despite GDMT.

Pharmacological Treatment for Stage C HF*p*EF (cont.)

Management of Atrial Fib (AF)

Management of AF according to published clinical practice guidelines in patients with HF*p*EF is reasonable to improve symptomatic HF.

Pharmacologic Management

The use of beta-blocking agents, ACE inhibitors, and ARBs in patients with hypertension is reasonable to control blood pressure in patients with HF*p*EF.

Pharmacological Treatment for Stage C HF*p*EF (cont.)

Angiotensin receptor blockers

The use of ARBs might be considered to decrease hospitalizations for patients with HF*p*EF.

No Benefit

Nutritional Supplementation

Routine use of nutritional supplements is not recommended for patients with HF*p*EF.

TREATMENT OF STAGES A TO D

Stage D

Clinical Events and Findings Useful for Identifying Patients With Advanced HF

Repeated (≥2) hospitalizations or ED visits for HF in the past year
Progressive deterioration in renal function (e.g., rise in BUN and creatinine)
Weight loss without other cause (e.g., cardiac cachexia)
Intolerance to ACE inhibitors due to hypotension and/or worsening renal function
Intolerance to beta blockers due to worsening HF or hypotension
Frequent systolic blood pressure <90 mm Hg
Persistent dyspnea with dressing or bathing requiring rest
Inability to walk 1 block on the level ground due to dyspnea or fatigue
Recent need to escalate diuretics to maintain volume status, often reaching daily furosemide equivalent dose >160 mg/d and/or use of supplemental metolazone therapy
Progressive decline in serum sodium, usually to <133 mEq/L
Frequent ICD shocks

Adapted from Russell et al. Congest Heart Fail. 2008;14:316-21.

Treatment for Stage D: Advanced

Water restriction

Fluid restriction (1.5 to 2 L/d) is reasonable in stage D, especially in patients with hyponatremia, to reduce congestive symptoms.

Inotropic support

Until definitive therapy (e.g., coronary revascularization, MCS, heart transplantation) or resolution of the acute precipitating problem, patients with cardiogenic shock should receive temporary intravenous inotropic support to maintain systemic perfusion and preserve end-organ performance.

Continuous intravenous inotropic support is reasonable as “bridge therapy” in patients with stage D refractory to other treatments and device therapy who are eligible for and awaiting MCS or cardiac transplantation.

Treatment for Stage D

Inotropic Support cont'

Short-term, continuous intravenous inotropic support may be reasonable in those hospitalized patients presenting with documented severe systolic dysfunction who present with low blood pressure and significantly depressed cardiac output to maintain systemic perfusion and preserve end-organ performance.

Long-term, continuous intravenous inotropic support may be considered as palliative therapy for symptom control in select patients with stage D despite optimal GDMT and device therapy who are not eligible for either MCS or cardiac transplantation.

Treatment of Stage D

Harm

Inotropic Support cont'

Long-term use of either continuous or intermittent, intravenous parenteral positive inotropic agents, in the absence of specific indications or for reasons other than palliative care, is potentially harmful in the patient with HF.

Harm

Use of parenteral inotropic agents in hospitalized patients without documented severe systolic dysfunction, low blood pressure, or impaired perfusion, and evidence of significantly depressed cardiac output, with or without congestion, is potentially harmful.

Mechanical Circulatory Support

MCS use is beneficial in carefully selected* patients with stage D HF*r*EF in whom definitive management (e.g., cardiac transplantation) or cardiac recovery is anticipated or planned.

Nondurable MCS, including the use of percutaneous and extracorporeal ventricular assist devices (VADs), is reasonable as a "bridge to recovery" or a "bridge to decision" for carefully selected* patients with HF*r*EF with acute, profound hemodynamic compromise.

Durable MCS is reasonable to prolong survival for carefully selected* patients with stage D HF*r*EF.

Cardiac Transplantation

Evaluation for cardiac transplantation is indicated for carefully selected patients with stage D HF despite GDMT, device, and surgical management.