

ACC Heart Failure Guidelines Slide Set

Based on the 2009 Focused Update Incorporated Into the ACCF/AHA 2005 guidelines for the Diagnosis and Management of Heart Failure in Adults:

A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With:

International Society for Heart and Lung Transplantation



Special Thanks to

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Applying Classification of Recommendations and Level of Evidence

Class I	Class IIa	Class IIb	Class III
<i>Benefit >>> Risk</i>	<i>Benefit >> Risk</i> <i>Additional studies with focused objectives needed</i>	<i>Benefit ≥ Risk</i> <i>Additional studies with broad objectives needed;</i> <i>Additional registry data would be helpful</i>	<i>Risk ≥ Benefit</i> <i>No additional studies needed</i>
Procedure/ Treatment SHOULD be performed/ administered	IT IS REASONABLE to perform procedure/administer treatment	Procedure/Treatment MAY BE CONSIDERED	Procedure/Treatment should NOT be performed/administered SINCE IT IS NOT HELPFUL AND MAY BE HARMFUL

Alternative Phrasing:

should is recommended is indicated is useful/effective/ beneficial	is reasonable can be useful/effective/ beneficial is probably recommended or indicated	may/might be considered may/might be reasonable usefulness/effectiveness is unknown /unclear/uncertain or not well established	is not recommended is not indicated should not is not useful/effective/beneficial may be harmful
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Applying Classification of Recommendations and Level of Evidence

Class I	Class IIa	Class IIb	Class III
<i>Benefit >>> Risk</i>	<i>Benefit >> Risk</i>	<i>Benefit ≥ Risk</i>	<i>Risk ≥ Benefit</i>
	<i>Additional studies with focused objectives needed</i>	<i>Additional studies with broad objectives needed; Additional registry data would be helpful</i>	<i>No additional studies needed</i>
Procedure/ Treatment SHOULD be performed/ administered	IT IS REASONABLE to perform procedure/administer treatment	Procedure/Treatment MAY BE CONSIDERED	Procedure/Treatment should NOT be performed/administered SINCE IT IS NOT HELPFUL AND MAY BE HARMFUL

Level of Evidence:

Level A:	Data derived from multiple randomized clinical trials or meta-analyses Multiple populations evaluated
Level B:	Data derived from a single randomized trial or nonrandomized studies Limited populations evaluated
Level C:	Only consensus of experts opinion, case studies, or standard of care Very limited populations evaluated

Initial Clinical Assessment of Patients Presenting With Heart Failure

Recommendations for the Initial Clinical Assessment of Patients Presenting With Heart Failure

Identifying and Evaluating Noncardiac Disorders or Behaviors

I IIa IIb III



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

← NO CHANGE

I IIa IIb III



A careful history of current and past use of alcohol, illicit drugs, current or past standard or “alternative therapies,” and chemotherapy drugs should be obtained from patients presenting with HF.

← NO CHANGE

Recommendations for the Initial Clinical Assessment of Patients Presenting With Heart Failure

Initial Assessment and Examination of Patients With HF

I IIa IIb III



In patients presenting with HF, initial assessment should be made of the patient's ability to perform routine and desired activities of daily living.

← NO CHANGE

I IIa IIb III



Initial examination of patients presenting with HF should include assessment of the patient's volume status, orthostatic blood pressure changes, measurement of weight and height, and calculation of body mass index.

← NO CHANGE

Recommendations for the Initial Clinical Assessment of Patients Presenting With Heart Failure

Initial Laboratory Evaluation

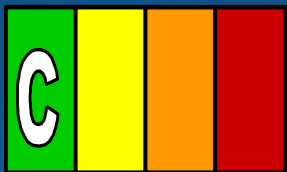
I IIa IIb III



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, fasting blood glucose (glycohemoglobin), lipid profile, liver function tests, and thyroid-stimulating hormone.

← NO CHANGE

I IIa IIb III



Twelve-lead electrocardiogram and chest radiograph (posterior-anterior and lateral) should be performed initially in all patients presenting with HF.

← NO CHANGE

Recommendations for the Initial Clinical Assessment of Patients Presenting With Heart Failure

Two-Dimensional Echocardiography

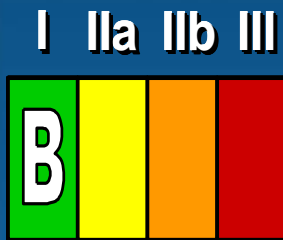


Two-dimensional echocardiography with Doppler should be performed during initial evaluation of patients presenting with HF to assess left ventricular ejection fraction (LVEF), left ventricle size, wall thickness, and valve function.

Radionuclide ventriculography can be performed to assess LVEF and volumes.



Coronary Revascularization



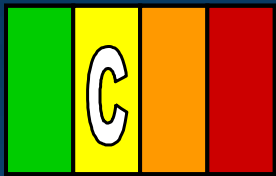
Coronary arteriography should be performed in patients presenting with HF who have angina or significant ischemia unless the patient is not eligible for revascularization of any kind.



Recommendations for the Initial Clinical Assessment of Patients Presenting With Heart Failure

Coronary Revascularization

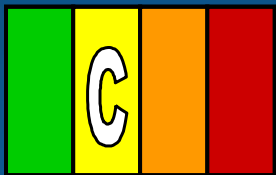
I IIa IIb III



Coronary arteriography is reasonable for patients presenting with HF who have chest pain that may or may not be of cardiac origin who have not had evaluation of their coronary anatomy and who have no contraindications to coronary revascularizations.



I IIa IIb III



Coronary arteriography is reasonable for patients presenting with HF who have known or suspected coronary artery disease but who do not have angina unless the patient is not eligible for revascularization of any kind.

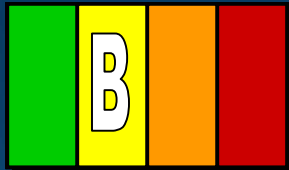


Recommendations for the Initial Clinical Assessment of Patients Presenting With Heart Failure

Noninvasive Imaging and Exercise Testing

Detecting Myocardial Ischemia

I IIa IIb III

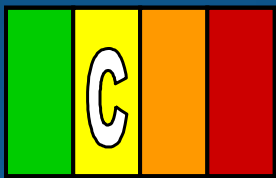


Noninvasive imaging to detect myocardial ischemia and viability is reasonable in patients presenting with HF who have known coronary artery disease and no angina unless the patient is not eligible for revascularization of any kind.

← NO CHANGE

Maximal Exercise Testing

I IIa IIb III



Maximal exercise testing with or without measurement of respiratory gas exchange and/or blood oxygen saturation is reasonable in patients presenting with HF to help determine whether HF is the cause of exercise limitation when the contribution of HF is uncertain.

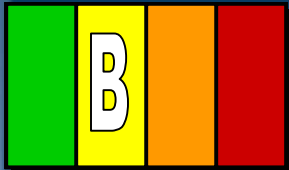
← NO CHANGE

Recommendations for the Initial Clinical Assessment of Patients Presenting With Heart Failure

Noninvasive Imaging and Screening

Maximal Exercise Testing

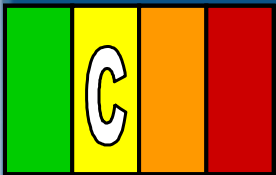
I IIa IIb III



Maximal exercise testing with measurement of respiratory gas exchange is reasonable to identify high-risk patients presenting with HF who are candidates for cardiac transplantation or other advanced treatments.

← NO CHANGE

I IIa IIb III



Screening Patients With HF

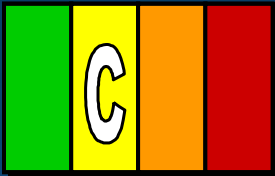
Screening for hemochromatosis, sleep-disturbed breathing, or HIV is reasonable in selected patients who present with HF.

← NO CHANGE

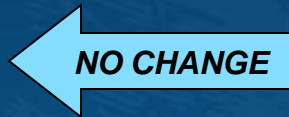
Initial Clinical Assessment of Patients Presenting With Heart Failure

Diagnostic Tests

I IIa IIb III



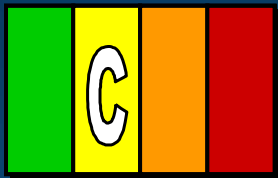
Diagnostic tests for rheumatologic diseases, amyloidosis, or pheochromocytoma are reasonable in patients presenting with HF in whom there is a clinical suspicion of these diseases.



Initial Clinical Assessment of Patients Presenting With Heart Failure

Endomyocardial Biopsy

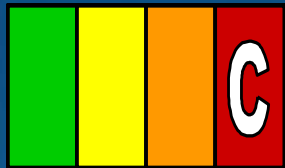
I IIa IIb III



Endomyocardial biopsy can be useful in patients presenting with HF when a specific diagnosis is suspected that would influence therapy.

← NO CHANGE

I IIa IIb III



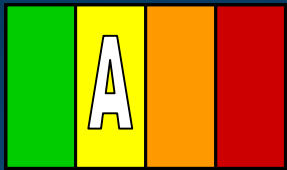
Endomyocardial biopsy should not be performed in the routine evaluation of patients with HF.

← NO CHANGE

Initial Clinical Assessment of Patients Presenting With Heart Failure

Measurement of BNP and Noninvasive Imaging

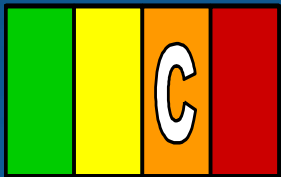
I IIa IIb III



Measurement of natriuretic peptides (B-type natriuretic peptide (BNP) or N-terminal pro-B-type natriuretic peptide (NT-proBNP)) can be useful in the evaluation of patients presenting in the urgent care setting in whom the clinical diagnosis of HF is uncertain. Measurement of natriuretic peptides (BMP and NT-proBNP) can be helpful in risk stratification.



I IIa IIb III

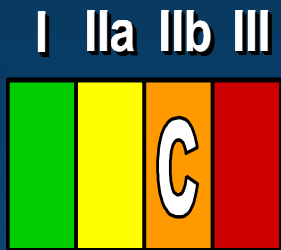


Noninvasive imaging may be considered to define the likelihood of coronary artery disease in patients with HF and LV dysfunction.

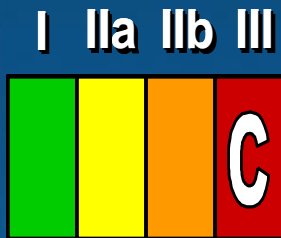


Initial Clinical Assessment of Patients Presenting With Heart Failure

Documenting Ventricular Tachycardia Inducibility



Holter monitoring might be considered in patients presenting with HF who have a history of MI and are being considered for electrophysiologic study to document ventricular tachycardia inducibility.



Routine use of signal-averaged electrocardiography is not recommended for the evaluation of patients presenting with HF.



Initial Clinical Assessment of Patients Presenting With Heart Failure

Measuring Circulating Levels of Neurohormones



Routine measurement of circulating levels of neurohormones (e.g., norepinephrine or endothelin) is not recommended for patients presenting with HF.



Recommendations for Serial Clinical Assessment of Patients Presenting With Heart Failure

Serial Clinical Assessment of Patients Presenting With Heart Failure

Assessment of Patients With HF

I IIa IIb III



Assessment should be made at each visit of the ability of a patient with HF to perform routine and desired activities of daily living.

← NO CHANGE

I IIa IIb III



Assessment should be made at each visit of the volume status and weight of a patient with HF.

← NO CHANGE

I IIa IIb III



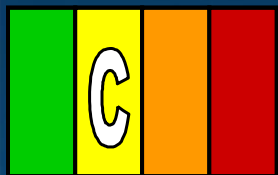
Careful history of current use of alcohol, tobacco, illicit drugs, “alternative therapies,” and chemotherapy drugs, as well as diet and sodium intake, should be obtained at each visit of a patient with HF.

← NO CHANGE

Serial Clinical Assessment of Patients Presenting With Heart Failure

Measuring Ejection Fraction and Structural Remodeling

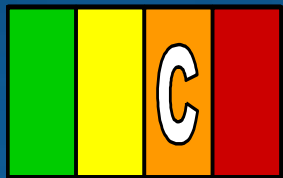
I IIa IIb III



Repeat measurement of EF and the severity of structural remodeling can be useful to provide information in patients with HF who have had a change in clinical status or who have experienced or recovered from a clinical event or received treatment that might have had a significant effect on cardiac function.



I IIa IIb III



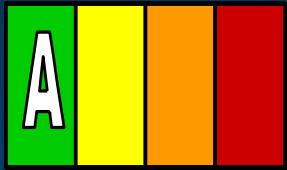
The value of serial measurements of BNP to guide therapy for patients with HF is not well established.



Patients With Reduced Left Ventricular Ejection Fraction

Patients With Reduced Left Ventricular Ejection Fraction

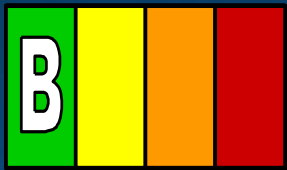
I IIa IIb III



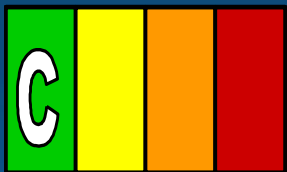
Measuring LVEF

Measures listed as Class I recommendations for patients in Stages A and B are also appropriate for patients in Stage C. ← **NO CHANGE**

I IIa IIb III

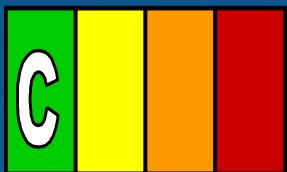


I IIa IIb III



Diuretics and salt restriction are indicated in patients with current or prior symptoms of HF and reduced LVEF who have evidence of fluid retention. ← **NO CHANGE**

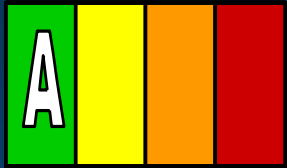
I IIa IIb III



Patients With Reduced Left Ventricular Ejection Fraction

Measuring LVEF

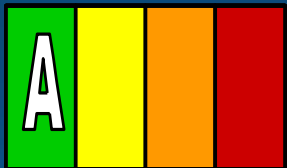
I IIa IIb III



Angiotensin-converting enzyme (ACE) inhibitors are recommended for all patients with current or prior symptoms of HF and reduced LVEF, unless contraindicated.



I IIa IIb III



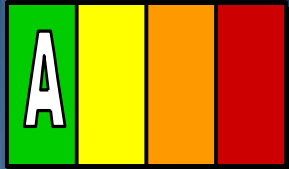
Use of 1 of the 3 beta blockers proven to reduce mortality (i.e., bisoprolol, carvedilol, and sustained release metoprolol succinate) is recommended for all stable patients with current or prior symptoms of HF and reduced LVEF, unless contraindicated.



Patients With Reduced Left Ventricular Ejection Fraction

Angiotensin II Receptor Blockers

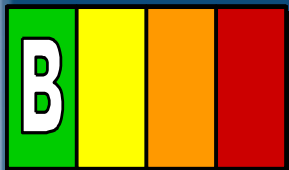
I IIa IIb III



Angiotensin II receptor blockers are recommended in patient with current or prior symptoms of HF and reduced LVEF who are ACE- inhibitor intolerant (see full text guidelines).

← NO CHANGE

I IIa IIb III



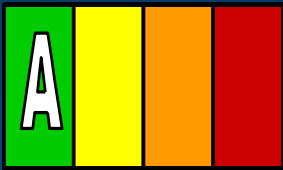
Drugs known to adversely affect the clinical status of patients with current or prior symptoms of HF and reduced LVEF should be avoided or withdrawn whenever possible (e.g., nonsteroidal anti-inflammatory drugs, most antiarrhythmic drugs, and most calcium channel blocking drugs).

← NO CHANGE

Patients With Reduced Left Ventricular Ejection Fraction

Secondary Prevention: Implantable Cardioverter-Defibrillator

I IIa IIb III



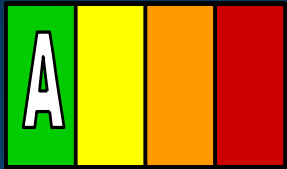
A cardioverter-defibrillator (ICD) is recommended as secondary prevention to prolong survival in patients with current or prior symptoms of HF and reduced LVEF who have a history of cardiac arrest, ventricular fibrillation, or hemodynamically destabilizing ventricular tachycardia.

← NO CHANGE

Patients With Reduced Left Ventricular Ejection Fraction

Primary Prevention: Implantable Cardioverter-Defibrillator

I IIa IIb III



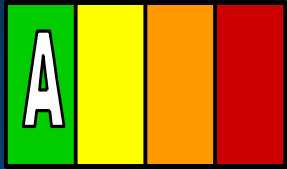
ICD therapy is recommended for primary prevention of sudden cardiac death to reduce total mortality in patients with nonischemic dilated cardiomyopathy or ischemic heart disease at least 40 days post-myocardial infraction, have an LVEF less than or equal to 35%, with NYHA functional class II or III symptoms while receiving chronic optimal medical therapy, and who have reasonable expectation of survival with a good functional status for more than 1 year.

Modified

Patients With Reduced Left Ventricular Ejection Fraction

Resynchronization Therapy

I IIa IIb III



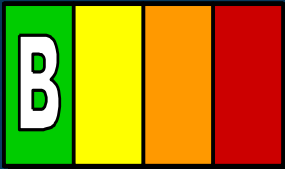
Patients with LVEF less than or equal to 35%, sinus rhythm, and NYHA functional class III or ambulatory class IV symptoms despite recommended, optimal medical therapy and who have cardiac dyssynchrony, which is currently defined as a QRS duration greater than or equal to 0.12 seconds, should receive cardiac resynchronization therapy, with or without an ICD, unless contraindicated.

Clarified Rec

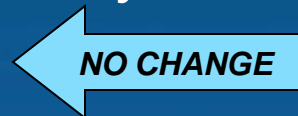
Patients With Reduced Left Ventricular Ejection Fraction

The Risks of Aldosterone Antagonists

I IIa IIb III

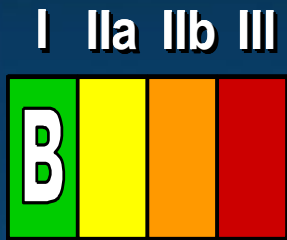


Addition of an aldosterone antagonist is recommended in selected patients with moderately severe to severe symptoms of HF and reduced LVEF who can be carefully monitored for preserved renal function and normal potassium concentration. Creatinine 2.5 mg/dL or less in men or 2.0 mg/dL or less in women and potassium should be less than 5.0 mEq/L. Under circumstances where monitoring for hyperkalemia or renal dysfunction is not anticipated to be feasible, the risks may outweigh the benefits of aldosterone antagonists.

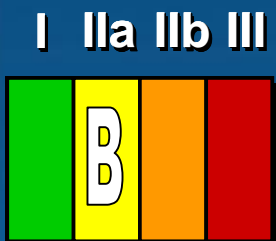
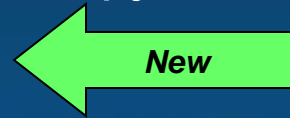


Patients With Reduced Left Ventricular Ejection Fraction

Recommendations for Hydralazine and Nitrates



The combination of hydralazine and nitrates is recommended to improve outcomes for patients self-described as African-Americans, with moderate-severe symptoms on optimal therapy with ACE inhibitors, beta blockers, and diuretics.



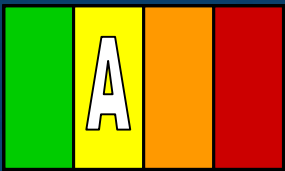
The addition of a combination of hydralazine and a nitrate is reasonable for patients with reduced LVEF who are already taking an ACE inhibitor and beta blocker for symptomatic HF and who have persistent symptoms.



Patients With Reduced Left Ventricular Ejection Fraction

Recommendations for Atrial Fibrillation and Heart Failure

I IIa IIb III



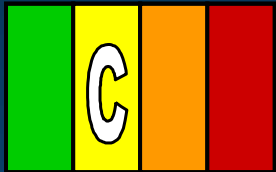
It is reasonable to treat patients with atrial fibrillation and HF with a strategy to maintain sinus rhythm or with a strategy to control ventricular rate alone.



Patients With Reduced Left Ventricular Ejection Fraction

Measurement of Respiratory Gas Exchange

I IIa IIb III

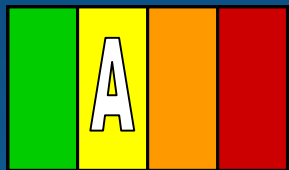


Maximal exercise testing with or without measurement of respiratory gas exchange is reasonable to facilitate prescription of an appropriate exercise program for patients presenting with HF.



Angiotensin II receptor blockers

I IIa IIb III

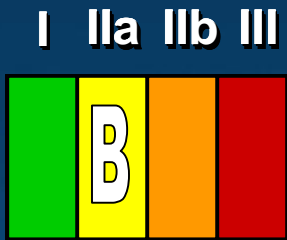


Angiotensin II receptor blockers are reasonable to use as alternatives to ACE inhibitors as first-line therapy for patients with mild to moderate HF and reduced LVEF, especially for patients already taking ARBs for other indications.



Patients With Reduced Left Ventricular Ejection Fraction

The Benefits of Digitalis



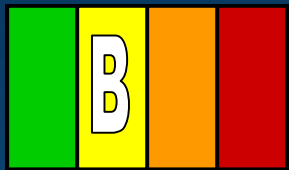
Digitalis can be beneficial in patients with current or prior symptoms of HF and reduced LVEF to decrease hospitalizations for HF.

← NO CHANGE

Patients With Reduced Left Ventricular Ejection Fraction

Implantable Cardioverter-Defibrillator in Patients With Low LVEF

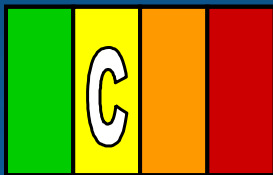
I IIa IIb III



For patients who have LVEF less than or equal to 35%, a QRS duration of greater than or equal to 0.12 seconds, and atrial fibrillation, cardiac resynchronization therapy with or without an ICD is reasonable for the treatment of NYHA functional class III or ambulatory class IV heart failure symptoms on optimal recommended medical therapy.



I IIa IIb III

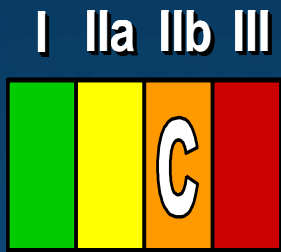


For patients with LVEF of less than or equal to 35% with NYHA functional class III or ambulatory class IV symptoms who are receiving optimal recommended medical therapy and who have frequent dependence on ventricular pacing, cardiac resynchronization therapy is reasonable.



Patients With Reduced Left Ventricular Ejection Fraction

Hydralazine and Nitrate Combination



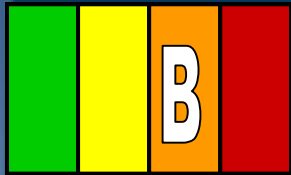
A combination of hydralazine and a nitrate might be reasonable in patients with current or prior symptoms of HF and reduced LVEF who cannot be given an ACE inhibitor or ARB because of drug intolerance, hypotension, or renal insufficiency.



Patients With Reduced Left Ventricular Ejection Fraction

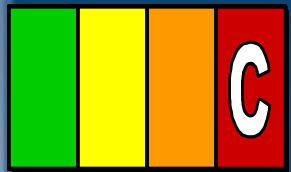
ARB and Conventional Therapy

I IIa IIb III



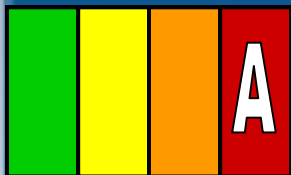
The addition of an ARB may be considered in persistently symptomatic patients with reduced LVEF who are already being treated with conventional therapy. ← **NO CHANGE**

I IIa IIb III



Routine combined use of an ACE inhibitor, ARB, and aldosterone antagonist is not recommended for patients with current or prior symptoms of HF and reduced LVEF. ← **NO CHANGE**

I IIa IIb III



Calcium Channel Blocking Drugs

Calcium channel blocking drugs are not indicated as routine treatment for HF in patients with current or prior symptoms of HF and reduced LVEF. ← **NO CHANGE**

Patients With Reduced Left Ventricular Ejection Fraction (Continued)

Infusion of Positive Inotropic Drugs



Long-term use of an infusion of a positive inotropic drug may be harmful and is not recommended for patients with current or prior symptoms of HF and reduced LVEF, except as palliation for patients with end-stage disease who cannot be stabilized with standard medical treatment.



Patients With Reduced Left Ventricular Ejection Fraction

Hormonal Therapies



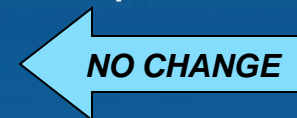
Hormonal therapies other than to replete deficiencies are not recommended and may be harmful to patients with current or prior symptoms of HF and reduced LVEF.



Nutritional Supplements



Use of nutritional supplements as treatment for HF is not indicated in patients with current or prior symptoms of HF and reduced LVEF.

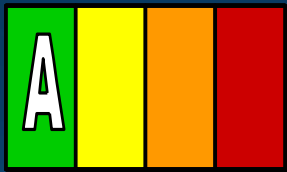


Patients With Heart Failure and Normal Left Ventricular Ejection Fraction

Patients With Heart Failure and Normal Left Ventricular Ejection Fraction

Normal Left Ventricular Ejection Fraction

I IIa IIb III



Physicians should control systolic and diastolic hypertension in patients with HF and normal LVEF, in accordance with published guidelines.

← NO CHANGE

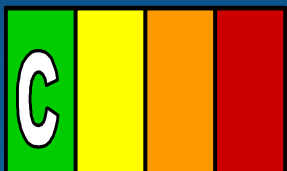
I IIa IIb III



Physicians should control ventricular rate in patients with HF and normal LVEF and atrial fibrillation.

← NO CHANGE

I IIa IIb III



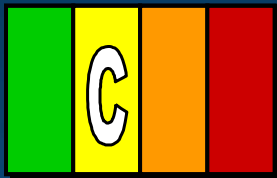
Physicians should use diuretics to control pulmonary congestion and peripheral edema in patients with HF and normal LVEF.

← NO CHANGE

Patients With Heart Failure and Normal Left Ventricular Ejection Fraction

Normal Left Ventricular Ejection Fraction

I IIa IIb III



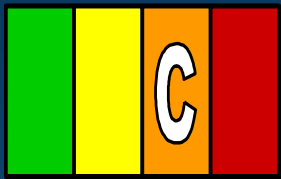
Coronary revascularization is reasonable in patients with HF and normal LVEF and coronary artery disease in whom symptomatic or demonstrable myocardial ischemia is judged to be having an adverse effect on cardiac function.



Patients With Heart Failure and Normal Left Ventricular Ejection Fraction

Normal Left Ventricular Ejection Fraction

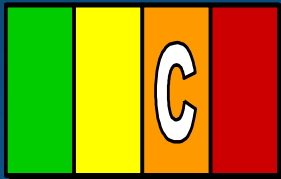
I IIa IIb III



Restoration and maintenance of sinus rhythm in patients with atrial fibrillation and HF and normal LVEF might be useful to improve symptoms.



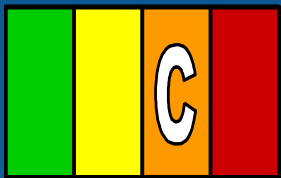
I IIa IIb III



The use of beta-adrenergic blocking agents, ACEIs, ARBs, or calcium antagonists in patients with HF and normal LVEF and controlled hypertension might be effective to minimize symptoms of HF.



I IIa IIb III



The usefulness of digitalis to minimize symptoms of HF in patients with HF and normal LVEF is not well established.

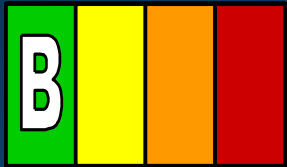


Patients With Refractory End-Stage Heart Failure (Stage D)

Patients With Refractory End-Stage Heart Failure (Stage D)

Referral of Patients with Refractory End-Stage HF

I IIa IIb III



Meticulous identification and control of fluid retention is recommended in patients with refractory end-stage HF.

← NO CHANGE

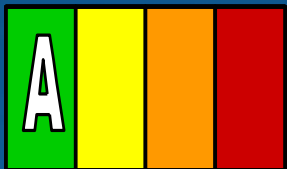
I IIa IIb III



Referral for cardiac transplantation in potentially eligible patients is recommended for patients with refractory end-stage HF.

← NO CHANGE

I IIa IIb III



Referral of patients with refractory end-stage HF to an HF program with expertise in the management of refractory HF is useful.

← NO CHANGE

Patients With Refractory End-Stage Heart Failure (Stage D)

Severe Symptoms in Patients With Refractory End-Stage HF

I IIa IIb III



Options for end-of-life care should be discussed with the patient and family when severe symptoms in patients with refractory end-stage HF persist despite application of all recommended therapies.

← NO CHANGE

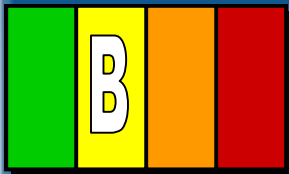
I IIa IIb III



Patients with refractory end-stage HF and implantable defibrillators should receive information about the option to inactivate defibrillation.

← NO CHANGE

I IIa IIb III

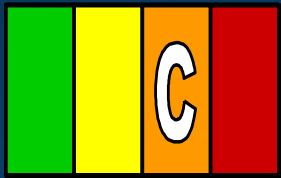


Consideration of a left ventricular assist device as permanent or “destination” therapy is reasonable in highly selected patients with refractory end-stage HF and an estimated 1-year mortality over 50% with medical therapy.

← NO CHANGE

Patients With Refractory End-Stage Heart Failure (Stage D)

I IIa IIb III

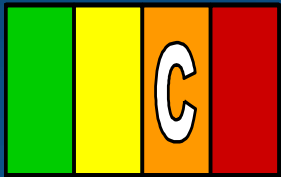


Pulmonary Artery Catheter Placement

Pulmonary artery catheter placement may be reasonable to guide therapy in patients with refractory end-stage HF and persistently severe symptoms.



I IIa IIb III



Mitral Valve Repair or Replacement

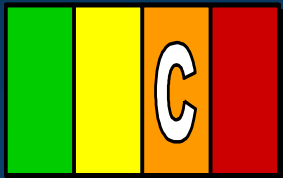
The effectiveness of mitral valve repair or replacement is not well established for severe secondary mitral regurgitation in refractory endstage HF.



Patients With Refractory End-Stage Heart Failure (Stage D)

Continuous Intravenous Infusion of Positive Inotropic Agents

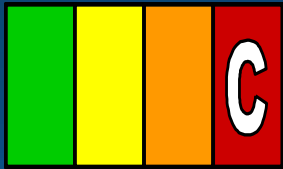
I IIa IIb III



Continuous intravenous infusion of a positive inotropic agent may be considered for palliation of symptoms in patients with refractory end-stage HF.

← NO CHANGE

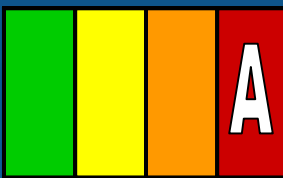
I IIa IIb III



Partial left ventriculectomy is not recommended in patients with nonischemic cardiomyopathy and refractory end-stage HF.

← NO CHANGE

I IIa IIb III



Routine intermittent infusions of vasoactive and positive inotropic agents are not recommended for patients with refractory end-stage HF.

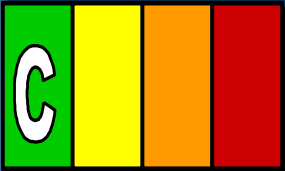
← Modified

Recommendations for the
Hospitalized Patient
New Recommendations

The Hospitalized Patient

Diagnosis of HF

I IIa IIb III

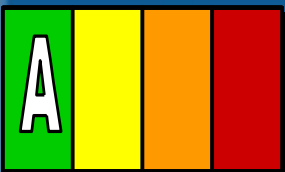


The diagnosis of heart failure is primarily based on signs and symptoms derived from a thorough history and physical exam. Clinicians should determine the following:



- adequacy of systemic perfusion;
- volume status;
- the contribution of precipitating factors and/or co-morbidities
- if the heart failure is new onset or an exacerbation of chronic disease; and
- whether it is associated with preserved normal or reduced ejection fraction.

I IIa IIb III



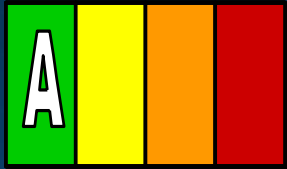
Chest radiographs, echocardiogram, and echocardiography are key tests in this assessment.



The Hospitalized Patient

Patients Being Evaluated for Dyspnea

I IIa IIb III



Concentrations of BNP or NT-proBNP should be measured in patients being evaluated for dyspnea in which the contribution of HF is not known. Final diagnosis requires interpreting these results in the context of all available clinical data and ought not to be considered a stand-alone test.



I IIa IIb III

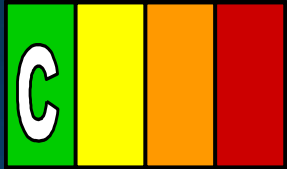


Acute coronary syndrome precipitating HF hospitalization should be promptly identified by electrocardiogram and cardiac troponin testing, and treated, as appropriate to the overall condition and prognosis of the patient.



The Hospitalized Patient

I IIa IIb III



Precipitating Factors for Acute HF

It is recommended that the following common potential precipitating factors for acute HF be identified as recognition of these comorbidities, is critical to guide therapy:



- acute coronary syndromes/coronary ischemia
- severe hypertension
- atrial and ventricular arrhythmias
- infections
- pulmonary emboli
- renal failure
- medical or dietary noncompliance

The Hospitalized Patient

Oxygen Therapy and Rapid Intervention

I IIa IIb III



Oxygen therapy should be administered to relieve symptoms related to hypoxemia.



I IIa IIb III

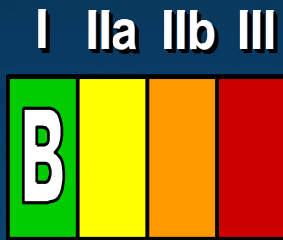


Whether the diagnosis of HF is new or chronic, patients who present with rapid decompensation and hypoperfusion associated with decreasing urine output and other manifestations of shock are critically ill and rapid intervention should be used to improve systemic perfusion.



The Hospitalized Patient

Treatment With Intravenous Loop Diuretics



Patients admitted with HF and with evidence of significant fluid overload should be treated with intravenous loop diuretics. Therapy should begin in the emergency department or outpatient clinic without delay, as early intervention may be associated with better outcomes for patients hospitalized with decompensated HF (**Level of Evidence: B**). If patients are already receiving loop diuretic therapy, the initial intravenous dose should equal or exceed their chronic oral daily dose.



Urine output and signs and symptoms of congestion should be serially assessed, and diuretic dose should be titrated accordingly to relieve symptoms and to reduce extracellular fluid volume excess. (**Level of Evidence: C**).



The Hospitalized Patient

Monitoring and Measuring Fluid Intake and Output



Effect of HF treatment should be monitored with careful measurement of fluid intake and output; vital signs; body weight, determined at the same time each day; clinical signs (supine and standing) and symptoms of systemic perfusion and congestion. Daily serum electrolytes, urea nitrogen, and creatinine concentrations should be measured during the use of intravenous diuretics or active titration of HF medications.



The Hospitalized Patient

Intensifying the Diuretic Regimen

I IIa IIb III



When diuresis is inadequate to relieve congestion, as evidence by clinical evaluation, the diuretic regimen should be intensified using either:

- a. higher doses of loop diuretics;
- b. addition of a second diuretic (such as metolazone, spironolactone or intravenous chlorthiazide) or
- c. Continuous infusion of a loop diuretic.



The Hospitalized Patient

Preserving End-Organ Performance

I IIa IIb III



In patients with clinical evidence of hypotension associated with hypoperfusion and obvious evidence of elevated cardiac filling pressures (e.g., elevated jugular venous pressure; elevated pulmonary artery wedge pressure), intravenous inotropic or vasopressor drugs should be administered to maintain systemic perfusion and preserve end-organ performance while more definitive therapy is considered.



I IIa IIb III



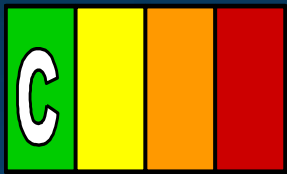
Invasive hemodynamic monitoring should be performed to guide therapy in patients who are in respiratory distress or with clinical evidence of impaired perfusion in whom the adequacy or excess of intracardiac filling pressures cannot be determined from clinical assessment.



The Hospitalized Patient

Reconciling and Adjusting Medications

I IIa IIb III



Medications should be reconciled in every patient and adjusted as appropriate on admission to and discharge from the hospital.



I IIa IIb III

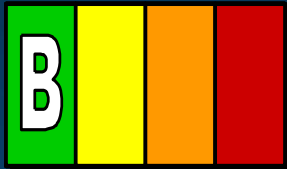


In patients with reduced ejection fraction experiencing a symptomatic exacerbation of HF requiring hospitalization during chronic maintenance treatment with oral therapies known to improve outcomes, particularly ACE inhibitors or ARBs and beta-blocker therapy, it is recommended that these therapies be continued in most patients in the absence of hemodynamic instability or contraindications.



The Hospitalized Patient

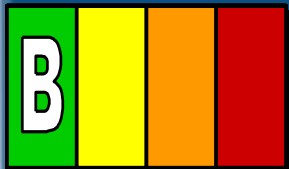
I IIa IIb III



In patients hospitalized with HF with reduced ejection fraction not treated with oral therapies known to improve outcomes, particularly ACE inhibitors or ARBs and beta-blocker therapy, initiation of these therapies is recommended in stable patients prior to hospital discharge.



I IIa IIb III



Initiation of beta-blocker therapy is recommended after optimization of volume status and successful discontinuation of intravenous diuretics, vasodilators, and inotropic agents. Beta-blocker therapy should be initiated at a low dose and only in stable patients. Particular caution should be used when initiating beta-blockers in patients who have required inotropes during their hospital course.



The Hospitalized Patient



In all patients hospitalized with HF, both with preserved and low ejection fraction, transition should be made from intravenous to oral diuretic therapy with careful attention to oral diuretic dosing and monitoring of electrolytes. With all medication changes, the patient should be monitored for supine and upright hypotension and worsening renal function and HF signs/symptoms.



The Hospitalized Patient

Reconciling and Adjusting Medications

I IIa IIb III



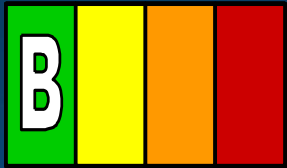
Comprehensive written discharge instructions for all patients with a hospitalization for HF and their caregivers is strongly recommended, with special emphasis on the following 6 aspects of care: diet, discharge medications, with a special focus on adherence, persistence, and uptitration to recommended doses of ACE inhibitor/ARB and beta-blocker medication, activity level, follow-up appointments, weight monitoring, and what to do if HF symptoms worsen.



The Hospitalized Patient

Effective Outpatient Care

I IIa IIb III



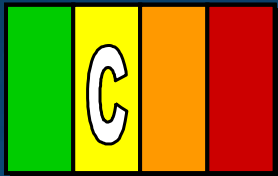
Post-discharge systems of care, if available, should be used to facilitate the transition to effective outpatient care for patients hospitalized with HF.



The Hospitalized Patient

Urgent Cardiac Catheterization and Revascularization

I IIa IIb III



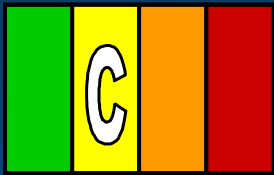
When patients present with acute HF and known or suspected acute myocardial ischemia due to occlusive coronary disease, especially when there are signs and symptoms of inadequate systemic perfusion, urgent cardiac catheterization and revascularization is reasonable where it is likely to prolong meaningful survival.



The Hospitalized Patient

Severe Symptomatic Fluid Overload

I IIa IIb III



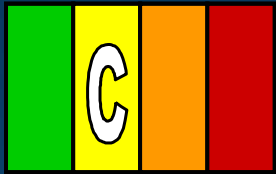
In patients with evidence of severely symptomatic fluid overload in the absence of systemic hypotension, vasodilators such as intravenous nitroglycerin, nitroprusside or neseritide can be beneficial when added to diuretics and/or in those who do not respond to diuretics alone.



The Hospitalized Patient

Invasive Hemodynamic Monitoring

I IIa IIb III



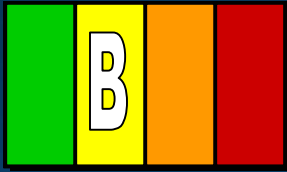
Invasive hemodynamic monitoring can be useful for carefully selected patients with acute HF who have persistent symptoms despite empiric adjustment of standard therapies, and

New

- a. whose fluid status, perfusion, or systemic or pulmonary vascular resistances are uncertain;
- b. whose systolic pressure remains low, pr is associated with symptoms, despite initial therapy;
- c. whose renal function is worsening with therapy;
- d. who require parenteral vasoactive agents; or
- e. who may need consideration for advanced device therapy or transplantation.

The Hospitalized Patient

I IIa IIb III

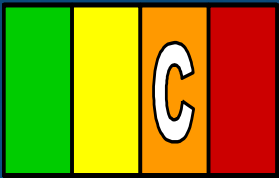


Ultrafiltration and Intravenous Inotropic Drugs

Ultrafiltration is reasonable for patients with refractory congestion not responding to medical therapy.



I IIa IIb III



Intravenous inotropic drugs such as dopamine, dobutamine or milrinone might be reasonable for those patients presenting with documented severe systolic dysfunction, low blood pressure and evidence of low cardiac output, with or without congestion, to maintain systemic perfusion and preserve end-organ performance.



The Hospitalized Patient

Parenteral Inotropes

I IIa IIb III



Use of parenteral inotropes in normotensive patients with acute decompensated HF without evidence of decreased organ perfusion is not recommended.



I IIa IIb III



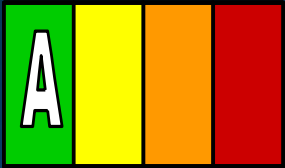
Routine use of invasive hemodynamic monitoring in normotensive patients with acute decompensated HF and congestion with symptomatic response to diuretics and vasodilators is not recommended.



Treatment of Special Populations

Treatment of Special Populations

I IIa IIb III



Standard Medical Regimen for HF

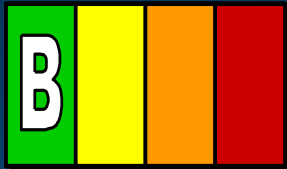
The combination of a fixed dose of isosorbide dinitrate and hydralazine to a standard medical regimen for HF, including ACE inhibitors and beta blockers, is recommended in order to improve outcomes for patients self-described as African Americans, with NYHA functional class III or IV HF. Others may benefit similarly, but this has not yet been tested.



Treatment of Special Populations

Clinical Screening Including High-Risk Minority Groups

I IIa IIb III



Groups of patients including (a) high-risk ethnic minority groups (e.g., blacks), (b) groups underrepresented in clinical trials, and (c) any groups believed to be underserved should, in the absence of specific evidence to direct otherwise, have clinical screening and therapy in a manner identical to that applied to the broader population. ← **NO CHANGE**

Treatment of Special Populations

Evidence Based Therapy for HF

I IIa IIb III



It is recommended that evidence-based therapy for HF be used in the elderly patient, with individualized consideration of the elderly patient's altered ability to metabolize or tolerate standard medications.



Patients With Heart Failure Who Have Concomitant Disorders

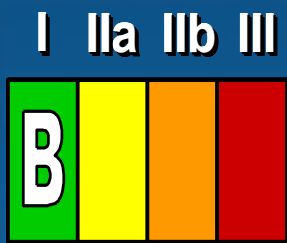
Patients With Heart Failure Who Have Concomitant Disorders



All other recommendations should apply to patients with concomitant disorders unless there are specific exceptions. ← **NO CHANGE**



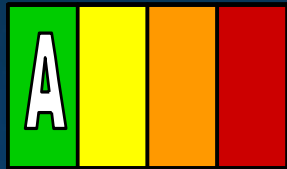
Physicians should control systolic and diastolic hypertension and diabetes mellitus in patients with HF in accordance with recommended guidelines. ← **NO CHANGE**



Physicians should use nitrates and beta blockers for the treatment of angina in patients with HF. ← **NO CHANGE**

Patients With Heart Failure Who Have Concomitant Disorders

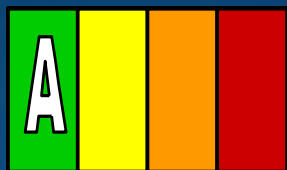
I IIa IIb III



Physicians should recommend coronary revascularization according to recommended guidelines in patients who have both HF and angina.

← NO CHANGE

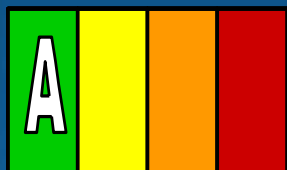
I IIa IIb III



Physicians should prescribe anticoagulants in patients with HF who have paroxysmal or persistent atrial fibrillation or a previous thromboembolic event.

← NO CHANGE

I IIa IIb III



Physicians should control the ventricular response rate in patients with HF and atrial fibrillation with a beta blocker (or amiodarone, if the beta blocker is contraindicated or not tolerated).

← NO CHANGE

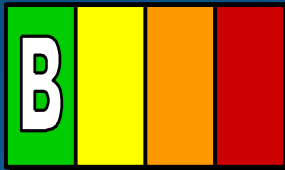
Patients With Heart Failure Who Have Concomitant Disorders

I IIa IIb III



Patients with coronary artery disease and HF should be treated in accordance with recommended guidelines for chronic stable angina. ← **NO CHANGE**

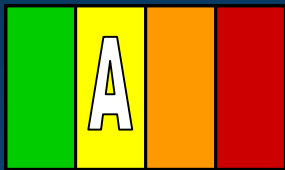
I IIa IIb III



Physicians should prescribe antiplatelet agents for prevention of MI and death in patients with HF who have underlying coronary artery disease. ← **NO CHANGE**

Patients With Heart Failure Who Have Concomitant Disorders

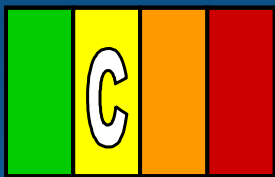
I IIa IIb III



It is reasonable to prescribe digitalis to control the ventricular response rate in patients with HF and atrial fibrillation.



I IIa IIb III

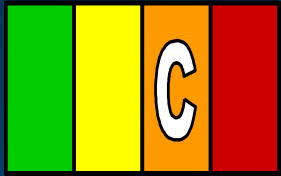


It is reasonable to prescribe amiodarone to decrease recurrence of atrial arrhythmias and to decrease recurrence of ICD discharge for ventricular arrhythmias.



Patients With Heart Failure Who Have Concomitant Disorders

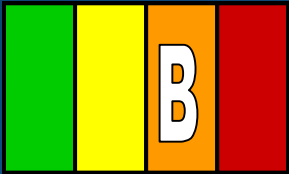
I IIa IIb III



The usefulness of current strategies to restore and maintain sinus rhythm in patients with HF and atrial fibrillation is not well established.

← NO CHANGE

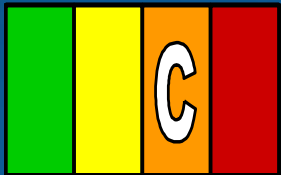
I IIa IIb III



The usefulness of anticoagulation is not well established in patients with HF who do not have atrial fibrillation or a previous thromboembolic event.

← NO CHANGE

I IIa IIb III

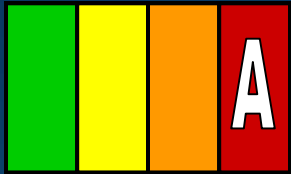


The benefit of enhancing erythropoiesis in patients with HF and anemia is not established.

← NO CHANGE

Patients With Heart Failure Who Have Concomitant Disorders

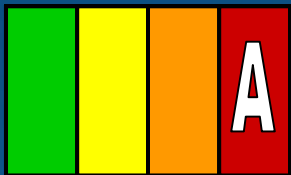
I IIa IIb III



Class I or III antiarrhythmic drugs are not recommended in patients with HF for the prevention of ventricular arrhythmias.

← NO CHANGE

I IIa IIb III



The use of antiarrhythmic medication is not indicated as primary treatment for asymptomatic ventricular arrhythmias or to improve survival in patients with HF.

← NO CHANGE

End-of-Life Considerations

End-of-Life Considerations

I IIa IIb III



Ongoing patient and family education regarding prognosis for functional capacity and survival is recommended for patients with HF at the end of life.



I IIa IIb III



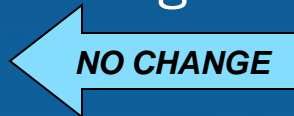
Patient and family education about options for formulating and implementing advance directives and the role of palliative and hospice care services with reevaluation for changing clinical status is recommended for patients with HF at the end of life.



I IIa IIb III



Discussion is recommended regarding the option of inactivating ICDs for patients with HF at the end of life.



End-of-Life Considerations

I IIa IIb III



It is important to ensure continuity of medical care between inpatient and outpatient settings for patients with HF at the end of life.

← NO CHANGE

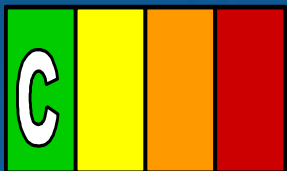
I IIa IIb III



Components of hospice care that are appropriate to the relief of suffering, including opiates, are recommended and do not preclude the options for use of inotropes and intravenous diuretics for symptom palliation for patients with HF at the end of life.

← NO CHANGE

I IIa IIb III



All professionals working with HF patients should examine current end-of-life processes and work toward improvement in approaches to palliation and end-of-life care.

← NO CHANGE

End-of-Life Considerations



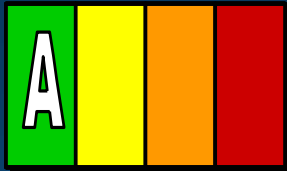
Aggressive procedures performed within the final days of life (including intubation and implantation of a cardioverterdefibrillator in patients with NYHA functional class IV symptoms who are not anticipated to experience clinical improvement from available treatments) are not appropriate.

NO CHANGE

Implementation of Practice Guidelines

Implementation of Practice Guidelines

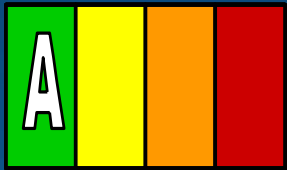
I IIa IIb III



Academic detailing or educational outreach visits are useful to facilitate the implementation of practice guidelines.



I IIa IIb III



Multidisciplinary disease-management programs for patients at high risk for hospital admission or clinical deterioration are recommended to facilitate the implementation of practice guidelines, to attack different barriers to behavioral change, and to reduce the risk of subsequent hospitalization for HF.



Implementation of Practice Guidelines

I IIa IIb III

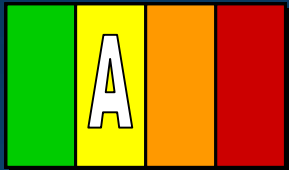
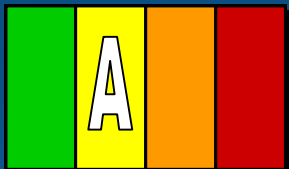


Chart audit and feedback of results can be effective to facilitate implementation of practice guidelines.



I IIa IIb III

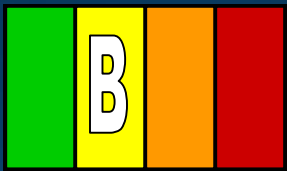


The use of reminder systems can be effective to facilitate implementation of practice guidelines.



Implementation of Practice Guidelines

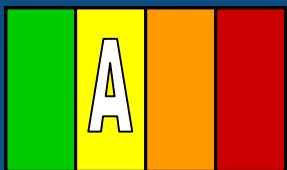
I IIa IIb III



The use of performance measures based on practice guidelines may be useful to improve quality of care.

← NO CHANGE

I IIa IIb III

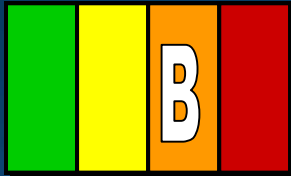


Statements by and support of local opinion leaders can be helpful to facilitate implementation of practice guidelines.

← NO CHANGE

Implementation of Practice Guidelines

I IIa IIb III

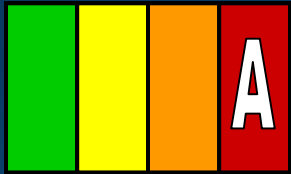


Multidisciplinary disease-management programs for patients at low risk for hospital admission or clinical deterioration may be considered to facilitate implementation of practice guidelines.

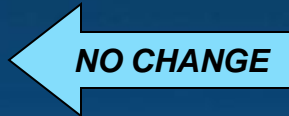


Implementation of Practice Guidelines

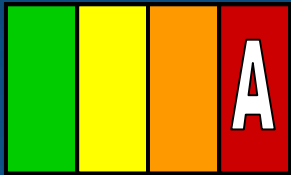
I IIa IIb III



Dissemination of guidelines without more intensive behavioral change efforts is not useful to facilitate implementation of practice guidelines.



I IIa IIb III



Basic provider education alone is not useful to facilitate implementation of practice guidelines.

