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Management of congestive heart failure pdf download mac



In addition, patients with significant noncardiac limitations are unlikely to derive major benefit from CRT. Since publication of CRT to patients with milder symptoms. 2007; 116:1242-9. LinkGoogle Scholar729. An extensive evidence review was conducted through October 2011 and includes selected other references through April 2013. The use of inappropriately low doses of diuretics will result in fluid retention. Heart failure-related hospitalization in the U.S., 1979 to 2004. J Am Coll Cardiol. Elkayam U, Ng TM, Hatamizadeh P, et al.. Peak V.o2 70 years of age, the risk is 22% and 25%, respectively.51 Current evidence supports the use of ACE inhibitors and (to a lower level of evidence) beta-blocker therapy to impede maladaptive LV remodeling in patients treated with ACE inhibitors demonstrated combined endpoints of reduced hospitalization or death, a benefit that extended up to a 12-year follow-up.65 ARBs are reasonable alternatives to ACE inhibitors. These risks of hypotension, renal dysfunction, and hyperkalemia are greater when combined with another inhibitor of this neurohormonal axis, such as ACE inhibitors or aldosterone antagonists. See Online Data Supplement 19 for additional data on ARBs.7.3.2.4. Beta Blockers: RecommendationClass IUse of 1 of the 3 beta blockers proven to reduce mortality (eg, bisoprolol, carvedilol, and sustained-release metoprolol succinate) is recommended for all patients with current or prior symptoms of HFrEF, unless contraindicated, to reduce morbidity and mortality.346,416-419,448(Level of Evidence: A)Long-term treatment with beta blockers can lessen the symptoms of HF, improve the patient's clinical status, and enhance the patient's overall sense of well-being.462-469 In addition, like ACE inhibitors, beta blockers can reduce the risk of death and the combined risk of death and the combined risk of death or hospitalization.117,447,448,470,471 These benefits of beta blockers can reduce the risk of death and the combined risk of death or hospitalization.117,447,448,470,471 These benefits of beta blockers were seen in patients with or without CAD and in patients with or without diabetes mellitus, as well as in women and blacks. Brozena SC, Twomey C, Goldberg LR, et al.. Meta-analysis: age and effectiveness of prophylactic implantable cardioverter-defibrillators. Ann Intern Med. Pivac N, Rumboldt Z, Sardelic S, et al.. Both for GDMT and other recommended drug treatment regimens, the reader is advised to confirm dosages with product insert material and to evaluate carefully for contraindications and drug-drug interactions. The schema for COR and LOE are summarized in Table 1, which also provides suggested phrases for writing recommendations within each COR. All information on reviewers' RWI was distributed to the writing committee and is published in this document (Appendix 2). This document was approved for publication by the American Association of Cardiovascular and Pulmonary Rehabilitation, American College of Chest Physicians, Heart Rhythm Society, and International Society for Heart and Lung Transplantation.1.4. Scope of This Guideline With Reference to Other Relevant Guidelines or Statements This guideline covers multiple management issues for the adult patient with HF. Objective evidence of severe cardiac dysfunction shown by at least 1 of the following: a. 2011; 171:1454-62. CrossrefMedlineGoogle Scholar625. 2003; 108:1552-3.LinkGoogle Scholar104. Familial syndromes are now recognized to occur in 20% to 35% of patients with apparent idiopathic DCM118; thus, a 3-generation family history should be obtained. Santangeli P, Di Biase L, Pelargonio G, et al.. Improvements in 1-year cardiovascular clinical outcomes associated with a hospitalbased discharge medication program. Ann Intern Med. 2007; 116:737-44. LinkGoogle Scholar798. 2001; 7:297-308. CrossrefMedlineGoogle Scholar199. Zairis MN, Tsiaousis GZ, Georgilas AT, et al., 1999; 138:247-53. CrossrefMedlineGoogle Scholar660. Krumholz HM, Brindis RG, Brush JE, et al., Myocardial lipid accumulation in patients with pressure-overloaded heart and metabolic syndrome. J Lipid Res. 2010; 160:885-92. CrossrefMedlineGoogle Scholar705. Diuretic therapy. N Engl J Med. 2003; 348:1309-21. CrossrefMedlineGoogle Scholar447. 2000; 321:540-5. CrossrefMedlineGoogle Scholar690. The number of deaths with any mention of HF was as high in 2006 as it was in 1995.51 Approximately 7% of all cardiovascular deaths are due to HF.As previously noted, in 2013, HF costs in the United States exceeded \$30 billion.51 This total includes the cost of healthcare services, medications, and lost productivity. 2010; 137:263-72. CrossrefMedlineGoogle Scholar532. Costanzo MR, Dipchand A, Starling R, et al.. Diuretic treatment for the sodium retention of congestive heart failure. Arch Intern Med. Pfister R, Cairns R, Erdmann E, et al.. Velagaleti RS, Gona P, Larson MG, et al.. 1982; 66:14-22. CrossrefMedlineGoogle Scholar863. Beta-blockade with nebivolol in elderly heart failure patients with impaired and preserved left ventricular ejection fraction: data from SENIORS (Study of Effects of Nebivolol Intervention on Outcomes and Rehospitalization in Seniors With Heart Failure). J Am Coll Cardiol. Fogelman AM, La Mont JT, Finkelstein S, et al.. 2008; 9:646-51.CrossrefMedlineGoogle Scholar74. 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: executive summary: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Circulation. 2001; 345:574-81.CrossrefMedlineGoogle Scholar189. Ordinary physical activity does not cause symptoms of HF.IISlight limitation of physical activity. Alpert MA. Ordinary physical activity does not cause symptoms of HFINo limitation of physical activity. Patterns and predictors of physical functional disability at 5 to 10 years after heart transplantation. J Heart Lung Transplant. 2009; 120:2597-606. LinkGoogle Scholar888. Continuous infusion versus bolus injection of loop diuretics in congestive heart failure. Cochrane Database Syst Rev. Wang TJ, Larson MG, Levy D, et al.. 2007; 49:109-16. CrossrefMedlineGoogle Scholar272. Barsheshet A, Wang PJ, Moss AJ, et al.. Chaudhry SI Phillips CO, Stewart SS, et al.: 2008; 54:87-93. CrossrefMedlineGoogle Scholar 86. Manolio TA, Baughman KL, Rodeheffer R, et al.: Palliative medicine consultation for preparedness planning in patients receiving left ventricular assist devices as destination therapy. Mayo Clin Proc. 2003; 349:1893-906. CrossrefMedlineGoogle Scholar 346. Episodes of fluid retention (pulmonary and/or systemic congestion, peripheral edema) and/or reduced cardiac output at rest (peripheral hypoperfusion)3. Krumholz HM, Chen YT, Wang Y, et al., 1990; 16:923-31. CrossrefMedlineGoogle Scholar768. 2009; 50:2314-23. CrossrefMedlineGoogle Scholar76 (approximately 85%) enrolled in clinical trials who received beta blockers were able to tolerate short- and long-term treatment with these drugs and achieve the maximum planned trial dose.117,447,448,470 Data show that beta blockers can be safely started before discharge even in patients hospitalized for HF, provided they do not require intravenous inotropic therapy for HF.476 Clinicians should make every effort to achieve the target doses of the beta blockers shown to be effective in major clinical trials. Thiazide diuretics may be considered in hypertensive effects. Controlled trials have demonstrated the ability of diuretic drugs to increase urinary sodium excretion and decrease physical signs of fluid retention in patients with HF.429,430 In intermediate-term studies, diuretics have been shown to improve symptoms and exercise tolerance in patients with HF431-433; however, diuretic effects on morbidity and mortality are not known. 1989; 80:551-63. CrossrefMedlineGoogle Scholar478. Kindermann I, Barth C, Mahfoud F, et al.. Homma S, Thompson JL, Pullicino PM, et al.. Acute heart failure syndromes: emergency department presentation, treatment, and disposition: current approaches and future aims: a scientific statement from the American Heart Association. Circulation. Left ventricular systolic dysfunction, total mortality, and sudden death in patients with myocardial infarction treated with n-3 polyunsaturated fatty acids. Eur J Heart Fail. 2011; 58:438. CrossrefMedlineGoogle Scholar184. This includes serial assessment of weight, as well as estimates of jugular venous pressure and the presence of peripheral edema or orthopnea.187-190 (Level of Evidence: B) Despite advances in imaging technology and increasing availability of diagnostic laboratory testing, a careful history and physical examination remain the cornerstones in the assessment of patients with HF. Delea TE, Edelsberg JS, Hagiwara M, et al.. NT-proBNP levels, echocardiographic findings, and outcomes in breathless patients: results from the ProBNP Investigation of Dyspnoea in the Emergency Department (PRIDE) echocardiographic substudy. Eur Heart J. 2002; 106:416-22. LinkGoogle Scholar722. Improvement in dilated cardiomyopathy after bariatric surgery. J Card Fail. Takaro T, Peduzzi P, Detre KM, et al.. Documentation of LVEF is an HF quality-of-care performance measure. 297 Right ventricular size and function as well as atrial size and function as well as atrial size and dimensions should also be measured. Publication Committee for the VMAC Investigators. BNP and NT-proBNP are useful to support clinical judgment for the diagnosis or exclusion of HF, in the setting of chronic ambulatory HF217-223 or acute decompensated HF245-250; the value of natriuretic peptide testing is particularly significant when the etiology of dyspnea is unclear. Although lower values of BNP or NT-proBNP exclude the presence of HF and higher values have reasonably high positive predictive value to diagnose HF, clinicians should be aware that elevated plasma levels for both natriuretic peptides have been associated with a wide variety of cardiac and noncardiac causes (Table 8).268-271Table 8. 2002; 347:161-7. CrossrefMedlineGoogle Scholar248. Finding what works in health care: standards for systematic reviews. Cyclo-oxygenase-2 inhibitors versus non-selective non-steroidal antiinflammatory drugs and congestive heart failure outcomes in elderly patients: a population-based cohort study.Lancet. Allen LA, Stevenson LW, Grady KL, et al. 2007; 116:2216-33.LinkGoogle Scholar311. Drugs Commonly Used for Stage C HFrEFDrugInitial Daily Dose(s)Maximum Dose(s)Mean Doses Achieved in Clinical TrialsACE inhibitors Captopril6.25 mg 3 times 50 mg 3 times 50 mg 3 times 50 mg 3 times 122.7 mg/d422 Enalapril2.5 mg twice 10 to 20 mg twice 16.6 mg/d413 Fosinopril5 to 10 mg once 40 mg once 10 mg once 20 to 40 mg once 32.5 to 35.0 mg/d445 Perindopril2 mg once 8 to 16 mg once N/A Quinapril5 mg twice 20 mg twice 10 to 20 mg twice 10.5 mg once 10 mg once 10 mg once 10 mg once N/A Lisinopril2.5 to 35.0 mg/d445 Perindopril2 mg once 8 to 16 mg once 8 to 16 mg once N/A Quinapril5 mg twice 20 mg twice 10.5 mg once 10 mg once 10 mg once 10 mg once N/A Lisinopril2.5 to 35.0 mg/d445 Perindopril2 mg once 8 to 16 m Trandolapril1 mg once4 mg once4 mg once25 mg once22 mg once22 mg/d420 Losartan25 to 50 mg once50 mg once50 mg once50 mg once50 mg once50 mg once42.6 mg/d420 Losartan25 to 50 mg once50 mg once50 mg once50 mg once42.6 mg/d446Beta blockers Bisoprolol1.25 mg once10 mg once8.6 mg/d117 Carvedilol3.125 mg twice37 mg/d447 Carvedilol CR10 mg once80 mg onceN/A Metoprolol CR/XL)12.5 to 25 mg once200 mg once159 mg/d448Hydralazine and isosorbide dinitrate Fixed-dose combination42437.5 mg hydralazine/20 mg isosorbide dinitrate 3 times daily75 mg hydralazine/40 mg isosorbide dinitrate 3 times daily~175 mg hydralazine/20 mg isosorbide dinitrate 449Hydralazine: 25 to 50 mg, 3 or 4 times daily and isosorbide dinitrate: 20 to 30 mg 3 or 4 times dailyHydralazine: 300 mg daily in divided doses and isosorbide dinitrate: 120 mg daily in divided dosesN/A7.3.2.2.3. ACE Inhibitors: Risks of Treatment. The majority of these drugs: those related to angiotensin suppression and those related to kinin potentiation. 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.425,426,478(Level of Evidence: A)Aldosterone receptor antagonists are recommended to reduce morbidity and mortality following an acute MI in patients who have LVEF of 40% or less who develop symptoms of HF or who have a history of diabetes mellitus, unless contraindicated.446(Level of Evidence: B)Class III: HarmInappropriate use of aldosterone receptor antagonists is potentially harmful because of life-threatening hyperkalemia or renal insufficiency when serum creatinine is greater than 2.5 mg/dL in men or greater than 2.0 mg/dL in women (or estimated glomerular filtration rate 40 days after MI, LVEF ≤30%, sinus rhythm, LBBB, and QRS ≥150 ms.595These indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoogle Scholar895. ACEI indicates angiotensin-converting enzyme inhibitor; AF and divertic therapy as needed for fluid retention. 2011; 4:456-62.LinkGoo atrial fibrillation; ARB, angiotensin-receptor blocker; CAD, coronary artery disease; CRT, cardiac resynchronization therapy; HF, heart failure; HFpEF, he health-related quality of life; HTN, hypertension; ICD, implantable cardioverter-defibrillator; LV, left ventricular; LVH, left ventricul of HFrEF in patients who have no prior use of standard neurohumoral antagonist therapy and should not be substituted for ACE inhibitor or ARB therapy without difficulty. Vasan RS, Benjamin EJ, Larson MG, et al.. Steinberg BA, Zhao X, Heidenreich PA, et al.. It may be reasonable to use a nonselective vasopressin antagonist to treat hyponatremia in patients with HF with cognitive symptoms due to hyponatremia. 2002; 90:254-8. CrossrefMedlineGoogle Scholar382. The prevalence of metabolic syndrome in the United States exceeds 20% of persons ≥20 years of age and 40% of those >40 years of age.103 The appropriate treatment of hypertension, diabetes mellitus, and dyslipidemia104 can significantly reduce the development of HF. Atherosclerotic DiseasePatients with known atherosclerotic disease (eg, of the coronary, cerebral, or peripheral blood vessels) are likely to develop HF, and clinicians should seek to control vascular risk factors in such patients according to guidelines.135. Phillips CO, Wright SM, Kern DE, et al.: 2007; 13:215-26. CrossrefMedlineGoogle Scholar300. Long-term prognosis of dilated cardiomyopathy revisited: an improvement in survival over the past 20 years. Circ J. 2012; 126:e354-471. LinkGoogle Scholar15. Several clinical trials have demonstrated either no clinical benefit or even worse outcomes in patients with HF treated with these drugs.546,547,551-553 Despite their greater selectivity for calcium channel blockers, dihydropyridine derivatives such as amlodipine and felodipine, have failed to demonstrate any functional or survival benefit in patients with HF.575-579 Amlodipine, however, may be considered in the management of hypertension or ischemic heart disease in patients with HF because it is generally well tolerated and had neutral effects on morbidity and mortality in large RCTs. In general, calcium channel blockers should be avoided in patients with HFrEF.See Online Data Supplement 25 for additional data on calcium channel blockers.7.3.2.9.4. Nonsteroidal Anti-Inflammatory Drugs.NSAIDs inhibit the synthesis of renal prostaglandins, which mediate vasodilation in the kidneys and directly inhibit sodium resorption in the thick ascending loop of Henle and collecting tubule. Survival after biventricular assist device implantation: an analysis of the Interagency Registry for Mechanically Assisted Circulatory Support database. J Heart Lung Transplant. The University of Washington. Results of the post-U.S. Food and Drug Administration-approval study with a continuous flow left ventricular assist device as a bridge to heart transplantation. a prospective study using the INTERMACS (Interagency Registry for Mechanically Assisted Circulatory Support). J Am Coll Cardiol. Diabetes mellitus, a predictor of morbidity and mortality in the Studies of Left Ventricular Dysfunction (SOLVD) Trials and Registry. Am J Cardiol. N-terminal pro-B-type natriuretic peptide-guided, intensive patient management in addition to multidisciplinary care in chronic heart failure: a 3-arm, prospective, randomized pilot study J Am Coll Cardiol. Kounis GN, Soufras GD, Kouni SA, et al.. 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University of Alabama Birmingham. INTERMACS manual of operations version 2.3: user's guide. Birmingham, Ala: University of Alabama; 2008. Google Scholar 636. Mitchell SUNY Downstate Medical Center-Director, Heart Failure Center; Associate Professor of MedicineNoneNoneNoneNoneNoneNoneNonePamela N. Intrarenal determinants of sodium retention. Hypertension. Grosskopf I, Rabinovitz M, Rosenfeld JB. 2003; 5:89-94. CrossrefMedlineGoogle Scholar139. 2007 334:942.CrossrefMedlineGoogle Scholar876. Goldman L, Hashimoto B, Cook EF, et al.. Davies EJ, Moxham T, Rees K, et al.. Noncardiac comorbidity increases preventable hospitalizations and mortality among Medicare beneficiaries with chronic heart failure. J Am Coll Cardiol. Federal Register, Rules and Regulations.2011. Balady GJ, Ades PA, Bittner VA, et al.. Khand AU, Rankin AC, Martin W, et al.. Riegger GA, Bouzo H, Petr P, et al.; for the Symptom, Tolerability, Response to Exercise Trial of Candesartan Cilexetil in Heart Failure (STRETCH) Investigators. Retter AS. 2011; 364:11-21. CrossrefMedlineGoogle Scholar427. It has been demonstrated that continuation of ACE inhibitors or ARBs and beta blockers for most patients is well tolerated and results in beta-blocker therapy or with marked volume overload or marginal/low cardiac output. Taub PR, Daniels LB, Maisel AS. Shah MR, et al., 2007; 116:392-8.LinkGoogle Scholar612. Nondurable MCS thereby may be helpful as either a bridge to decision or a bridge to recovery. More common scenarios for MCS, however, are long-term strategies, including 1) bridge to transplantation, 2) bridge to candidacy, and 3) destination therapy. Statistica models and patient predictors of readmission for acute myocardial infarction: a systematic review. Circ Cardiovasc Qual Outcomes. Clark RA, Inglis SC, McAlister FA, et al.: 2011; 32:125-35. CrossrefMedlineGoogle Scholar632. 2011 National patient safety goals. 2012. Committee on Standards for Systematic Reviews of Comparative Effectiveness Research, Institute of Medicine. The initial and target doses of these drugs are generally selected on the basis of controlled trial experience rather than changes produced in cardiac output or pulmonary capillary wedge pressure. 1997; 79:909–13. CrossrefMedlineGoogle Scholar531. Ghali JK, Pina IL, Gottlieb SS, et al.. Patient self-care education + Percentage of patients aged >18 y with a diagnosis of HF who were provided with self-care education on >3 elements of education during >1 visits within a 12-mo periodOutpatientIndividual practitioner6. Nesto RW, Bell D, Bonow RO, et al.. Epidemiology and management of heart failure and left ventricular systolic dysfunction in the aftermath of a myocardial infarction. Heart. The development of worsening renal function should lead to careful evaluation of the entire medical regimen and consideration. Heart Lung Transplant. ACEI indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin-receptor blocker; HFrEF, heart failure with reduced ejection fraction; Hydral-Nitrates, hydralazine and isosorbide dinitrate; LOE, Level of Evidence; and NYHA, New York Heart Association.7.3.2.1. Diuretics: RecommendationClass IDiuretics are recommended in patients with HFrEF who have evidence of fluid retention, unless contraindicated, to improve symptoms. Studies are identified as observational, retrospective, prospective, 55. CrossrefMedlineGoogle Scholar578. Effect of nesiritide in patients with acute decompensated heart failure.N Engl J Med. Freudenberger RS, Hellkamp AS, Halperin JL, et al.. Cohn JN, Tognoni G. Exercise training in patients with heart failure: clinical outcomes, safety, and indications. Heart Fail Rev. Hernandez AF, Greiner MA, Fonarow GC, et al.. Racial differences in response to therapy for heart failure: analysis of the vasodilator-heart failure: analysis of the vasodilator-heart failure trials. J Card Fail. (Level of Evidence: C)Volume status and vital signs should be assessed at each patient encounter. A preliminary study of growth hormone in the treatment of dilated cardiomyopathy.N Engl J Med. 2011; 155:179-91. CrossrefMedlineGoogle Scholar909. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. Circulation. (Level of Evidence: C)Diuretics inhibit the real tubules. Koelling TM, Johnson ML, Cody RJ, et al.. Prophylactic implantation of a defibrillator in patients with myocardial infarction and reduced ejection fraction. N Engl J Med. The favorable effects of beta blockers were also observed in patients already taking ACE inhibitors. Three beta blockers have been shown to be effective in reducing the risk of death in patients with chronic HFrEF: bisoprolol and sustained-release metoprolol (succinate), which selectively block beta-1-receptors; and carvedilol, which blocks alpha-1-, beta-1-, and beta-2-receptors. Prevention of heart failure by antihypertension: SHEP Cooperative Research Group. JAMA. Studies have suggested that the incidence of HFpEF is increasing and that a greater portion of patients hospitalized with HF have HFpEF.42 In the general population, patients with HFpEF are usually older women with a history of hypertension. Warnes CA, Williams RG, Bashore TM, et al.. Prevention of deep vein thrombosis in medical patients by low-dose heparin. Scott Med J. 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Arch Intern Med Bucindolol lacked uniform effectiveness across different populations, and short-acting metoprolol tartrate was less effective in HF clinical trials. Butler J, Khadim G, Paul KM, et al., 1994;15 Suppl:s287-94. CrossrefMedlineGoogle Scholar569. Classification of the cardiomyopathies: a position statement from the European Society Of Cardiology Working Group on Myocardial and Pericardial Diseases. Eur Heart J. (Level of Evidence: C)Recommendations for fluid restriction in HF are largely driven by clinical experience. Lifestyle and quality of life in long-term cardiac transplant. Bettencourt P, Azevedo A, Pimenta J, et al.. Withdrawal of these medications has been associated with adverse prognosis.195,196 Medications that may exacerbate HFRemoval of such medications may represent a therapeutic opportunity. DietAwareness and restriction of sodium and fluid intake should be assessed. Adherence to medications; family support; access to follow-up; cultural sensitivityPhysical Examination BMI and evidence of weight lossObesity may be a contributing cause of HF; cachexia may correspond with poor prognosis. Blood pressure (supine and upright)Assess for hypertension or hypotension. Accurate, noninvasive continuous monitoring of cardiac output by whole-body electrical bioimpedance. Chest. Klotz S, Deng MC, Hanafy D, et al.: 2012; 125:1928-52.LinkGoogle Scholar31. Many therapeutic agents can exert important cardiotoxic effects, with consequent risk for HF, and clinicians should be aware of such risk. Digoxin may be an effective adjunct to a beta blocker. Department of Health and Human Services; Centers for Medicare & Medicaid Services. Cleland JG, Coletta A, Witte K. Left ventricular diastolic dysfunction as a predictor of the first diagnosed nonvalvular atrial fibrillation in 840 elderly men and women.] Am Coll Cardiol. 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Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. Rheumatoid arthritis in the absence of occlusive coronary pathology. 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Improved survival with an implanted defibrillator in patients with coronary Artery Bypass Surgery for stable angina. Defibrillator Implantation Trial Investigators. N Engl J Med. 2008; 29:270-6. CrossrefMedlineGoogle Scholar61. Agency for Healthcare Research and Quality. Each of these various categories of HF has specific etiologic factors leading to decompensation, presentation, management, and outcomes.Noninvasive modalities can be used to classify the patient with hospitalized HF. 1996; 334:809-14. CrossrefMedlineGoogle Scholar560. 1999; 33:1848-54. CrossrefMedlineGoogle Scholar560. 1999; 33:1848-54. CrossrefMedlineGoogle Scholar286. Thus, these biomarkers are potentially powerful adjuncts to current standards for the diagnosis, prognosis, and treatment of acute and chronic HF.6.3.1. Natriuretic Peptides: BNP or NT-proBNPBNP or its amino-terminal cleavage equivalent (NT-proBNP108) that is generated by cardiomyocytes in the context of numerous triggers, most notably myocardial stretch. Randomized trial of cardiac resynchronization in mildly symptomatic heart failure patients and in asymptomatic patients and in asymptomatic patients and in asymptomatic heart failure symptomatic heart failure symptomatic heart failure symptomatic heart failure symptomatic heart failure between the symptomatic heart failure symptomatic man.Am J Med. Stevenson LW, Miller LW, Desvigne-Nickens P, et al.. 1996; 275:1557-62. CrossrefMedlineGoogle Scholar 92. Experimental and clinical studies implicate growth hormone and insulin-like growth factor I in cardiac development. 135 Cardiomyopathy associated with acromegaly is characterized by myocardial hypertrophy with interstitial fibrosis, lympho-mononuclear infiltration, myocyte necrosis, and biventricular concentric hypertrophy.1355.4. Toxic Cardiomyopathy5.4.1. Alcoholic Cardiomyopathy5.4.1. Alcoholic Cardiomyopathy5.4.1. drinker in the absence of other known causes for myocardial disease. Cardiac troponin and outcome in acute heart failure.N Engl J Med. 1997; 3:249-54. CrossrefMedlineGoogle Scholar354. Coronary bypass surgery with or without surgical ventricular reconstruction. N Engl J Med. 1997; 3:249-54. CrossrefMedlineGoogle Scholar354. with essential hypertension and left ventricular hypertrophy: the 4E-left ventricular hypertrophy study. Circulation. 2009; 339:b4567. CrossrefMedlineGoogle Scholar392. Therefore, patients should be counseled about their alcohol intake. Although several epidemiological studies have revealed an independent link between risk for incident HF and biomarkers such as natriuretic peptides,335,336 highly sensitive troponin,337 and measures of renal function such as creatinine, phosphorus, urinary albumin, or albumin-creatinine ratio,320,323,334,336,338-340 it remains unclear whether the risk for HF reflected by any of these biomarkers is modifiable. The effects of simvastatin on the incidence of heart failure in patients with coronary heart disease. J Card Fail. Patients with an EF in the range of 40% to 50% represent an intermediate group. ACE inhibitors should not be initiated in any patient with a history of angioedema. Recommendations for Hospital DischargeClass IThe use of performance improvement systems and/or evidence-based systems of care is recommended in the hospital and early postdischarge outpatient setting to identify appropriate HF patients for GDMT, provide clinicians with useful reminders to advance GDMT, and assess the clinical response.82,365,706,792-796 (Level of Evidence: B)Throughout the hospitalization as appropriate, before hospital discharge, at the first postdischarge visit, and in subsequent follow-up visits, the following should be addressed.204,795,797-799(Level of Evidence: B):initiation of GDMT if not previously established and not contraindicated; precipitant causes of HF, barriers to optimal care transitions, and limitations in postdischarge support; assessment of volume status and supine/upright hypotension with adjustment of HF therapy as appropriate; titration and optimization of chronic oral HF therapy; assessment of renal function, self-care, emergency plans, and need for adherence; and consideration for palliative care or hospice care in selected patients. Multidisciplinary HF disease-management programs are recommended for patients at high risk for hospital readmission, to facilitate the implementation of GDMT, to address different barriers to behavioral change, and to reduce the risk of subsequent rehospitalization for HF.82,800-802 (Level of Evidence: B)Class IIaScheduling an early follow-up visit (within 7 to 14 days) and early telephone follow-up (within 3 days) of hospital discharge are reasonable.101,803(Level of Evidence: B)Use of clinical risk-prediction tools and/or biomarkers to identify patients at higher risk for postdischarge clinical events are reasonable.215(Level of Evidence: B)Use of clinical risk-prediction tools and/or biomarkers to identify patients at higher risk for postdischarge clinical events are reasonable.215(Level of Evidence: B)Use of clinical risk-prediction tools and/or biomarkers to identify patients at higher risk for postdischarge clinical events are reasonable.215(Level of Evidence: B)Use of clinical events are reasona B)Decisions about pharmacological therapies delivered during hospitalization likely can impact postdischarge outcome. 1992; 19:842-50. CrossrefMedlineGoogle Scholar483. Natural history and expansive clinical profile of stress (tako-tsubo) cardiomyopathy. J Am Coll Cardiol. Massie BM, Collins JF, Ammon SE, et al.. The propionyl-L-carnitine hypothesis: an alternative approach to treating heart failure. J Card Fail. Effect of captopril on mortality and morbidity in patients with left ventricular enlargement trial: the SAVE Investigators. N Engl J Med. Yancy, ChairNorthwestern University—Chief, Division of pertaining to their RWI. Conversely, the use of inappropriately high doses of diuretics will lead to volume contraction, which can increase the risk of hypotension and renal insufficiency. 7.3.2.1.1. Diuretics: Selection of Patients. Diuretics should be prescribed to all patients who have evidence of, and to most patients with a prior history of, fluid retention. Hampton JR, van Veldhuisen DJ, Kleber FX, et al.: Feldman T, Foster E, Glower DD, et al.: 2008; 148:141-6.CrossrefMedlineGoogle Scholar889. Greenberg B, Czerska B, Delgado RM, et al.: Por example, cardiotoxic chemotherapy regimens (particularly anthracycline based) and trastuzumab may increase the risk for HF in certain patients330-332; it may be reasonable to evaluate those who are received) such agents for LV dysfunction. Benefits and harms of antidiabetic agents in patients with diabetes and heart failure: systematic review.BMJ. Increased blood pressure with CRT can allow increased titration of neurohormonal antagonist medications that may further contribute to improvement. Radionuclide ventriculography may also be used for evaluation of cardiac function when other tests are unavailable or inadequate. Glycaemic control and incidence of heart failure in 20,985 patients with type 1 diabetes: an observational study.Lancet. 2003; 9:227-31.CrossrefMedlineGoogle Scholar756. 2004; 147:354-60.CrossrefMedlineGoogle Scholar691. Association of nonsteroidal anti-inflammatory drugs with first occurrence of heart failure: the Rotterdam Study. Arch Intern Med. Ilva T, Lassus J, Siirila-Waris K, et al. 1999; 341:1882-90. CrossrefMedlineGoogle Scholar598 Screening of Family Members and Genetic TestingFamilial DCM• First-degree relatives not known to be affected should undergo periodic, serial echocardiographic screening with assessment of LV function and size.• Frequency of screening is uncertain, but every 3-5 y is reasonable.118. Genetic testing may be considered in conjunction with genetic counseling.118,121-123 Idiopathic DCM. Patients should undergo screening by echocardiography. The utility of genetic testing in this setting remains uncertain.• Yield of genetic testing may be higher in patients with significant cardiac conduction disease and/or a family history of premature sudden cardiac death.118,121-1235.3. Endocrine and Metabolic Causes of Cardiomyopathy 5.3.1. ObesityObesity cardiomyopathy is defined as cardiomyopathy due entirely or predominantly to obesity (Section 7.3.1.5). 1981; 26:115-7.CrossrefMedlineGoogle Scholar772. 2008; 358:2117-26.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Scholar258. Lucas C, Johnson W, Hamilton MA, et al.. 1989; 261:884-8.CrossrefMedlineGoogle Sc Sciarretta S, Palano F, Tocci G, et al.. Use and impact of inotropes and vasodilator therapy in hospitalized patients with severe heart failure. Am Heart J. Latini R, Masson S, Anand IS, et al.. Guidelines for the management of Atrial fibrillation: the Task Force for the management of Atrial fibrillation of the European Society of Cardiology (ESC). Eur Heart J. CMS Administrative Claims Data, Jan 2011 - Dec 2011, from the Chronic Condition Warehouse.2012. Google Scholar848. Determination of HF prognosis is addressed in Sections 6.1.2 and 7.4.2. The listing criteria and evaluation are described in detail by the International Society. for Heart and Lung Transplantation.680See Table 27 for a summary of recommendations from this section, Figure 3 for the stages of HF development; and Online Data Supplement 36 for additional data on transplantation. Table 27. Clinical decision making should involve consideration of the quality and availability of expertise in the area where care is provided. Surgical/Percutaneous/Transcatheter Interventional Treatments of HF: RecommendationsSee Table 32 for a summary of recommendations from this section. Table 32. Care processes and clinical outcomes of continuous outpatient support with inotropes (COSI) in patients with refractory endstage heart failure. J Card Fail. If the BNP or NT proBNP value does not fall after aggressive HF care, risk for death or hospitalization for HF is significant. Discharge education improves clinical iNfarcTion (VALIANT) trial: baseline characteristics in context.Eur J Heart Fail. 2011; 161:322-8. CrossrefMedlineGoogle Scholar784. Martinez-Rumayor AA, Vazquez J, Rehman SU, et al.. Effect of pimobendan on need to reiterate the recommendations when appropriate and eliminate discrepancies. Walsh CR, Larson MG, Evans JC, et al.. Effect of pimobendan on exercise capacity in patients with heart failure: main results from the Pimobendan in Congestive Heart Failure (PICO) trial.Heart. The Seattle Heart Failure (PI Observational data suggest an association between dietary sodium intake with fluid retention and risk for hospitalization.378,379 Other studies, however, have signaled a worsening neurohormonal profile with sodium restriction in HF.380-390 Sodium homeostasis is altered in patients with HF as opposed to healthy individuals, which may partially explain these trends. The renal protective effects of angiotensin II receptor blockers in type 2 diabetes mellitus. Ann Pharmacother. Comparison of effects on left ventricular filling pressure of intravenous nesiritide and high-dose nitroglycerin in patients with decompensated heart failure. Am J Cardiol. HFpEF, improved >40It has been recognized that and high-dose nitroglycerin in patients with decompensated heart failure. subset of patients with HFpEF previously had HFrEF. Combination of isosorbide dinitrate and hydralazine in blacks with heart failure. N Engl J Med. 2011; 124: e574-651. LinkGoogle Scholar13. Erythropoietin improves anemia exercise tolerance and renal function and reduces B-type natriuretic peptide and hospitalization in patients with heart failure. and anemia. Am Heart J. A study of adults with chronic HF treated with evidence-based therapies found that 61% had either central or obstructive sleep apnea. 397 Despite having less sleep time and sleep disorders, rarely report excessive daytime sleepiness.398 Thus, a high degree of suspicion for sleep disorders should be maintained for these patients. 2005; 7:411-7. CrossrefMedlineGoogle Scholar411. (Level of Evidence: B)Radionuclide ventriculography or magnetic resonance imaging can be useful to assess LVEF and volume when echocardiography is inadequate. Adams KF, Fonarow GC, Emerman CL, et al., 1993; 22:955-62. CrossrefMedlineGoogle Scholar491. 2002; 4:331-6. CrossrefMedlineGoogle Scholar262. 2011; 4:242-50. LinkGoogle Scholar616. The decision to refer a patient to a sleep study should be based on clinical judgment. The primary treatment for obstructive sleep apnea is nocturnal continuous positive airway pressure. 1992; 46:227-34. MedlineGoogle Scholar153. Anemia predicts mortality in severe heart failure: the prospective randomized amlodipine survival evaluation (PRAISE). J Am Coll Cardiol. 2011 57:2409-15.MedlineGoogle Scholar864. Thiazolidinediones and cardiovascular outcomes in older patients with diabetes. JAMA. The writing committee actively worked to reduce the number of LOE "C" recommendations, especially for Class I-recommendations, especially for Class I-recommended therapies. Director, Clinical EP ResearchNoneNone• Biotronic• Boston Scientific• Medtronic• St. Jude MedicalNoneNone7.2 (Class IIa)7.3.410Reviewer Relationships With Industry and Other Entities (Relevant)-2013 ACCF/AHA Guideline for the Management of Heart FailureReviewerRepresentationEmploymentConsultantSpeaker's BureauOwnership/ Partnership/ Principal Personal Research BG Medicine Medtronic Merce on Practice GuidelinesKaufman Center for Heart Failure—Senior Director of Nursing Research BG Medicine Medtronic Merce on Practice GuidelinesKaufman Center for Heart Failure—Senior Director of Nursing Research BG Medicine Medtronic Merce on Practice GuidelinesKaufman Center for Heart Failure—Senior Director of Nursing Research BG Medicine Medtronic Merce on Practice GuidelinesKaufman Center for Heart Failure—Senior Director of Nursing Research BG Medicine Medtronic Merce on Practice GuidelinesKaufman Center for Heart Failure—Senior Director of Nursing Research BG Medicine Medtronic Merce on Practice GuidelinesKaufman Center for Heart Failure—Senior Director of Nursing Research BG Medicine Medtronic Merce on Practice GuidelinesKaufman Center for Heart Failure—Senior Director of Nursing Research BG Medicine Medtronic Merce on Practice GuidelinesKaufman Center for Heart Failure—Senior Director of Nursing Research BG Medicine Medtronic Merce on Practice GuidelinesKaufman Center for Heart Failure—Senior Director of Nursing Research BG Medicine Medtronic Merce on Practice GuidelinesKaufman Center for Heart Failure—Senior Director of Nursing Research BG Medicine Me Reviewer—AHABluhm Cardiovascular Institute— Administrative Director, Center for Heart FailureNoneNoneNoneNoneNoneNoneNonePaul HauptmanOfficial Reviewer—AHASt Louis University School of Medicine-Professor of Internal Medicine, Division of Cardiology• BG Medicine+ Since Control Medical• Otsuka*NoneNoneNone• EvaHeart+NoneHector MedtronicNoneJane ChenContent Reviewer—ACCF EP CommitteeWashington University School of MedicalNoneNoneMichael ClarkContent Reviewer—ACCF Cardiovascular Team CouncilNorth Texas Cardiology and EP—Associate ProfessorNone• Abbott ReviewerUniversity of Pennsylvania—Professor of Medicine• Biotronic• Boehringer Ingelheim• Medtronic• ZollNoneNone• Biosense Webster*• Boston Scientific*• St. Jude Medical*NoneJustin EzekowitzContent Reviewer—AHAMazankowski Alberta Heart Institute—Director, Heart Function Clinic• Abbott Labs AstraZeneca• PfizerNoneNone• Amgen• Bristol-Myers SquibbNoneNoneGerasimos FilippatosContent ReviewerUniversity of Athens—Department of CardiologyNoneNoneNone• Edwards Use CriteriaCooper University Hospital—Professor of Medicine• Biotronik• Boston Scientific• Cameron Health• Medtronic• St. Jude MedicalNoneNone• St. Jude MedicalNone• St. Jude MedicalNone• St. Jude MedicalNone• St. Jude Medical Astellas Pharma• Siemens Medical Solutions*NoneRandy StarlingContent ReviewerCleveland Clinic, Department of Cardiovascular Medicine—Vice Chairman• NovartisNoneNone Biotronik• MedtronicNoneKaren StoutContent ReviewerCleveland Clinic, Department of Cardiovascular Medicine—Vice Chairman• NovartisNoneNone Biotronik• MedtronicNoneKaren StoutContent ReviewerCleveland Clinic, Department of Cardiovascular Medicine—Vice Chairman• NovartisNoneNone Biotronik• MedtronicNoneKaren StoutContent ReviewerCleveland Clinic, Department of Cardiovascular Medicine—Vice Chairman• NovartisNoneNone Biotronik• MedtronicNoneKaren StoutContent ReviewerCleveland Clinic, Department of Cardiovascular Medicine—Vice Chairman• NovartisNoneNone Biotronik• MedtronicNoneKaren StoutContent ReviewerCleveland Clinic, Department of Cardiovascular Medicine—Vice Chairman• NovartisNoneNone Biotronik• MedtronicNoneKaren StoutContent ReviewerCleveland Clinic, Department of Cardiovascular Medicine—Vice Chairman• NovartisNoneNone Biotronik• MedtronicNoneKaren StoutContent ReviewerCleveland Clinic, Department of Cardiovascular Medicine—Vice Chairman• NovartisNoneNone Biotronik• MedtronicNoneKaren StoutContent ReviewerCleveland Clinic, Department of Cardiovascular Medicine—Vice Chairman• NovartisNoneNone Biotronik• MedtronicNone Biotronik Reviewer—ACCF Prevention CommitteeMarshall University, Joan C. Relative value of amino-terminal pro-B-type natriuretic peptide testing and radiographic standards for the diagnostic evaluation of heart failure in acutely dyspneic subjects. Biomarkers. Carnitine and its role in cardiovascular disease. Heart Dis. 2009; 30:3015-26.CrossrefMedlineGoogle Scholar659. Severe impairment of functional capacity shown by 1 of the following: a. Potential implementation of evidence-based heart failure therapies on mortality. Am Heart J. Patterson JH, Adams KF, Applefeld MM, et al.: 2007; 93:914-21.CrossrefMedlineGoogle Scholar351. 2008; 101:1016-22.CrossrefMedlineGoogle Scholar59. Lactic acidosis in patients with diabetes treated with metformin. N Engl J Med. Retrospective studies have shown reduction in pulmonary pressures with MCS therapy in patients with HF considered to have "fixed" pulmonary hypertension.661-663 Thus, patients who may be transplant-ineligible due to irreversible severe pulmonary hypertension may become eligible with MCS support over time. (Level of Evidence: C)7.1.1. Recognition and Treatment of Elevated Blood PressureThe lifetime risk for development of hypertension is considerable and represents a major public health issue.97 Elevated blood pressure is a major risk factor for the development of both HFpEF and HFrEF,91,92 a risk that extends across all age ranges. 2005; 352:225-37. CrossrefMedlineGoogle Scholar216. Newly identified events in the RE-LY trial.N Engl J Med. 2012; 126:65-75. LinkGoogle Scholar43. 2004; 352:225-37. CrossrefMedlineGoogle Scholar216. Newly identified events in the RE-LY trial.N Engl J Med. 2012; 126:65-75. LinkGoogle Scholar43. 2004; 10Suppl:S78.CrossrefGoogle Scholar757. HRS expert consensus statement on the management of cardiovascular implantable electronic devices (CIEDs) in patients nearing end of life or requesting withdrawal of therapy. Heart Rhythm. 2005; 111:1703-12.LinkGoogle Scholar920. Social deprivation increases cardiac hospitalisations in chronic heart failure independent of disease severity and diuretic non-adherence. Heart. However, most HF patients (85% to 90%) can tolerate these drugs. See Online Data Supplement 18 for additional data on ACE inhibitors. 7.3.2.3. ARBs: RecommendationsClass IARBs are recommended in patients with HFrEF with current or prior symptoms who are ACE inhibitor intolerant, unless contraindicated, to reduce morbidity and mortality.108,345,415,450 (Level of Evidence: A)Class IIaARBs are reasonable to reduce morbidity and mortality as alternatives to ACE inhibitors as first-line therapy for patients with HFrEF, especially for patients already taking ARBs for other indications, unless contraindicated .451-456(Level of Evidence: A)Class IIbAddition of an ARB may be considered in persistently symptomatic patients with HFrEF who are already being treated .420,457(Level of Evidence: A)Class III: HarmRoutine combined use of an ACE inhibitor, ARB, and aldosterone antagonist is potentially harmful for patients with HFrEF. Kociol RD, Hammill BG, Fonarow GC, et al.. Although reproducibility and validity may be problematic,48 the NYHA functional classification is an independent predictor of mortality.49 It is widely used in clinical practice and research and for determining the eligibility of patients for certain healthcare services. See Online Data Supplement 2 for additional data on ACCF/AHA stages of HF and NYHA functional classifications. 4. EpidemiologyThe lifetime risk of developing HF is 20% for Americans ≥40 years of age. 50 In the United States, HF incidence has largely remained stable over the past several decades, with >650 000 new HF cases diagnosed annually.51-53 HF incidence increases with age, rising from approximately 20 per 1000 individuals 65 to 69 years of age.52 Approximately 5.1 million persons in the United States have clinically manifest HF, and the prevalence continues to rise.51 In the Medicare-eligible population, HF prevalence increased from 90 to 121 per 1000 beneficiaries from 1994 to 2003.52 HFrEF and HFpEF each make up about half of the overall HF burden.54 One in 5 Americans with HF is expected to significantly worsen in the future. 2007; 50:741-7. CrossrefMedlineGoogle Scholar675. Lappe JM, Muhlestein JB, Lappe DL, et al.. 1996; 38:329-36. CrossrefMedlineGoogle Scholar734. Ultrafiltration moves water and small- to medium-weight solutes across a semipermeable membrane to reduce volume overload. In patients with previously established structural heart disease, the administration of agents known to have negative inotropic properties such as nondihydropyridine calcium channel blockers and certain antiarrhythmics should be avoided. Elevations in both systolic and diastolic blood pressure are major risk factors for developing LV hypertrophy, another form of stage B.91,92 Although the magnitude of benefit varies with the trial selection criteria, target blood pressure reduction, and HF criteria, effective hypertension treatment invariably reduces HF events. Rapid measurement of B-type natriuretic peptide in the emergency diagnosis of heart failure. N Engl J Med. Surgical myomectomy or alcohol ablation for hypertrophic cardiomyopathy11 4. Morris CD, Carson S. Maintenance digoxin after an episode of heart failure: placebo-controlled trial in outpatients. Br Med J. Association between performance measures and clinical outcomes for patients. Br Med J. Association between performance measures and clinical outcomes for patients. Br Med J. Association between performance measures and clinical outcomes for patients hospitalized with heart failure: placebo-controlled trial in outpatients. Br Med J. Association between performance measures and clinical outcomes for patients hospitalized with heart failure: placebo-controlled trial in outpatients. Br Med J. Association between performance measures and clinical outcomes for patients hospitalized with heart failure: placebo-controlled trial in outpatients. Br Med J. Association between performance measures and clinical outcomes for patients hospitalized with heart failure: placebo-controlled trial in outpatients. Br Med J. Association between performance measures and clinical outcomes for patients hospitalized with heart failure: placebo-controlled trial in outpatients. Br Med J. Association between performance measures and clinical outcomes for patients. Br Med J. 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Uptitrate in small increments to the recommended target dose or the highest tolerate the full recommended target dose of all medications, particularly patients with low baseline heart rate or blood pressure or with a tendency to postural symptoms.2. Certain patients (eg, the elderly, patients with chronic kidney disease) may require more frequent visits and laboratory monitoring during dose titration and more gradual dose changes. Naylor MD, Brooten DA, Campbell RL, et al.. Effect of vasodilator therapy on mortality in chronic congestive heart failure: results of a Veterans Administration Cooperative Study.N Engl J Med. (Level of Evidence: C)Class IIaContinuous intravenous inotropic support is reasonable as "bridge therapy" in patients with stage D HF refractory to GDMT and device therapy" in patients with stage D HF refractory to GDMT and device therapy" in patients with stage D HF refractory to GDMT and device therapy "in patients with stage D HF refractory to GDMT and device therapy" in patients with stage D HF refractory to GDMT and device therapy "in patients with stage D HF refractory to GDMT and device therapy" in patients with stage D HF refractory to GDMT and device therapy "in patients with stage D HF refractory to GDMT and device therapy" in patients with stage D HF refractory to GDMT and device therapy who are eligible for and awaiting MCS or cardiac transplantation.647,648(Level of Evidence: C)Class IIaContinuous intravenous B)Class IIbShort-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.592,649,650(Level of Evidence: B)Long-term, continuous intravenous inotropic support may be considered as palliative therapy for symptom control in select patients with stage D HF despite optimal GDMT and device therapy who are not eligible for either MCS or cardiac transplantation.651-653(Level of Evidence: B)Class III: HarmLong-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.416,654-659 (Level of Evidence: B)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.592.649.650 (Level of Evidence: B)Despite improving hemodynamic compromise, positive inotropic agents have not demonstrated improved outcomes in patients with HF in either the hospital or outpatient setting 416.654-658 Regardless of their mechanism of action (eg, inhibition of phosphodiesterase, stimulation), chronic oral inotrope treatment increased mortality, mostly related to arrhythmic events. Certain management strategies appropriate for the patient at risk for HF or already affected by HF are also reviewed in numerous relevant clinical practice guidelines and scientific statements published by the ACCF/AHA Task Force on Practice Guidelines, AHA, ACCF Task Force on Appropriate Use Criteria, European Society of Cardiology, Heart Failure Society of America, and the National Heart, Lung, and Blood Institute. 2005; 11:S3-S8.CrossrefMedlineGoogle Scholar260. 2007; 28:980-8.CrossrefMedlineGoogle Scholar646. Potentiation of furosemide by metolazone in refractory edema.Curr Ther Res. Effects of continuous-flow versus pulsatile-flow left ventricular assist devices on myocardial unloading and remodeling.Circ Heart Fail. Fluid restriction in the management of decompensated heart failure: no impact on time to clinical stability. J Card Fail. Upadhyay GA, Choudhry NK, Auricchio A, et al.. Reduction in BNP levels with treatment of decompensated heart failure and future clinical events. J Card Fail. Vasodilator-Heart Failure Trial (V-HeFT) Study Group. Circulation. Bovelli D, Plataniotis G, Roila F. Sodium and fluid balance recommendations are best implemented in the context of weight and symptom monitoring programs. Resynchronization.Am J Cardiol. Eplerenone has been shown to reduce all-cause deaths, or HF hospitalizations in a wider range of patients. Clinicians should strongly consider the addition of the aldosterone receptor antagonists: Selection of Patients. patients with HFrEF who are already on ACE inhibitors (or ARBs) and beta blockers. 2012; 41:1284-94. CrossrefMedlineGoogle Scholar868. Long-term outcomes of cardiac transplant. Improving evidence-based care for heart failure in outpatient cardiology practices: primary results of the Registry to Improve the Use of Evidence-Based Heart Failure Therapies in the Outpatient Setting (IMPROVE HF). Circulation. Salvador DR, Rey NR, Ramos GC, et al.. Metra M, Nardi M, Giubbini R, et al.. Dunnick JK, Kissling G, Gerken DK, et al.. Anemia in patients with HF is often normocytic and accompanied by an abnormally low reticulocyte count.825,827 Evaluation of anemia in HF requires careful consideration of other causes, the most common being secondary causes of anemia, erythropoiesis-stimulating agents have gained significant interest as potential adjunctive therapy in the patient with HF. ESC guidelines for the diagnosis and treatment of acute and chronic heart failure 2012: the Task Force for the Diagnosis and Treatment of Acute and Chronic Heart J. Kalogeropoulos A, Georgiopoulou V, Harris TB, et al. 2010;(8): CD007228.CrossrefGoogle Scholar81. A Ushaped distribution curve has been suggested in which mortality is greatest in cachectic patients; lower in normal, overweight, and mildly obese patients; and higher again in more severely obese p clinical trials on the role of weight loss in patients with HF with obesity have not been performed. Continuous positive airway pressure for central sleep apnea and heart failure.N Engl J Med. The hospitalization is a "teachable moment" to reinforce patient and family education and develop a plan of care, which should be communicated to the appropriate healthcare team.Safety for patients hospitalized with HF, particularly those treated with diuretics, may become deficient in vitamins and micronutrients. Effect of longer-term modest salt reduction on blood pressure.Cochrane Database Syst Rev. Sodium nitroprusside for advanced low-output heart failure. J Am Coll Cardiol. Januzzi JL, Rehman S, Mueller T, et al. 1997;18 Suppl:S159-68.CrossrefMedlineGoogle Scholar564. Transcatheter intervention for functional mitral insufficiency854-857 2. 2011; 161:1078-87.CrossrefMedlineGoogle Scholar865. Therefore, even if patients have little disability and experience seemingly minimal symptomatic benefit, they should still be treated with a beta blocker to reduce the risks of disease progression, clinical deterioration, and sudden death.117,448,469-471Patients need not take high doses of ACE inhibitors before initiation of beta-blocker therapy. For the present guideline, HFrEF is defined as the clinical diagnosis of HF and EF <40%. Suppression of central sleep apnea by continuous positive airway pressure for Patients with Central Sleep Apnea and Heart Failure Trial (CANPAP). Circulation. Chien CL, Lee CM, Wu YW, et al.. Evidence of the relation between better performance with respect to process measures and patient outcomes is conflicting, and performance with respect to process measures and patient outcomes is conflicting.

limiting the ability of these measures to identify high- and low-performing centers. These limitations of process measures have generated interest in the use of outcomes measures as a complementary approach to characterize quality. Goldenberg J, Ferraz MB, Pessoa AP, et al. 1999; 353:2001–7. CrossrefMedlineGoogle Scholar449. The greatest risk factors for death among patients undergoing bridge to transplant include acuity and severity of clinical condition, an ARB may be used as an alternative to an ACE inhibitor in patients who are already taking an ARB for another reason, such as hypertension, and who subsequently develop HF. Thackray S, Witte K, Clark AL, et al.. Vatankulu MA, Goktekin O, Kaya MG, et al.. Recurrent low-level troponin I elevation is a worse prognostic indicator than occasional injury pattern in patients hospitalized with heart failure. Int J Cardiol. 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With the exception of 1 observational study that evaluated patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focused on patients with HFpEF, 383 all other studies have focus end with her studies he of variables of left ventricular function in patients with alcoholic cardiomyopathy after cessation of excessive alcohol intake: an echocardiographic study. 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ICDs are highly effective in preventing death from ventricular arrhythmias, but frequent shocks can decrease HRQOL and lead to posttraumatic stress syndrome.615 Therapy with antiarrhythmic drugs and catheter ablation for ventricular function in cases of very frequent ventricular tachyarrhythmias. 2008;(2): CD003917.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.CrossrefMedlineGoogle Scholar420. van Veldhuisen DJ, Cohen-Solal A, Bohm M, et al.. 2010; 55:872-8.Crossref part 2: the physical examination. Congest Heart Fail. Surgical/Percutaneous/Transcatheter Interventional Treatments of HF: Recommendations e29311. Transesophageal echocardiography • To identify LA thrombus (in the LA appendage) • To guide cardioversion 5. Can also apply to a patient with refractory volume overload, perhaps with evidence of impaired perfusion, in whom inotropic infusions cannot be maintained due to tachyarrhythmias, clinical ischemia, or other intolerance.3Stable but inotropes (or has a temporary circulatory support device) after repeated documentation of failure to wean without symptomatic hypotension, worsening symptoms, or progressive organ dysfunction (usually renal).4Resting symptoms on oral therapy but frequently has symptoms of congestion at rest or with activities of daily living (dressing or bathing). 2008; 114:221-30.CrossrefMedlineGoogle Scholar386. Echocardiography can reveal subclinical HF and predict risk of subsequent events.291-295 Use of echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of appropriate medical care.296Echocardiograms in patients with suspected HF improves disease identification and provision of approximate a could account for the clinical presentation. 1995; 91:691-7. 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Consultation, especially in circumstances where the non-nephrology provider does not have sufficient experience with ultrafiltration. See Online Data Supplements 17 and 38 for additional data on diuretics versus ultrafiltration in acute decompensated HF and worsening renal function and mortality.8.6. Parenteral Therapy in Hospitalized HF: RecommendationClass IIbIf symptomatic hypotension is absent, intravenous nitroglycerin, nitroprusside, or nesiritide may be considered an adjuvant to diuretic therapy for relief of dyspnea in patients admitted with acutely decompensated HF.760-763(Level of Evidence: A)The different vasodilators include 1) intravenous nitroglycerin, 2) sodium nitroprusside, and 3) nesiritide. Intravenous nitroglycerin congestion.764,765 Patients with HF and hypertension, coronary ischemia, or significant mitral regurgitation are often cited as ideal candidates for the use of intravenous nitroglycerin. Biomarkers of myocardial fibrosis, soluble ST2 and galectin-3 are not only predictive of hospitalization and death in patients with HF but also additive to natriuretic peptide levels in their prognostic value. Muir KW, Watt A, Baxter G, et al.. McKie PM, Cataliotti A, Lahr BD, et al.. Impact of age and sex on plasma natriuretic peptide levels in healthy adults. Am J Cardiol. Sharma A, Heist EK. Cardiac troponin I is associated with impaired hemodynamics, progressive left ventricular dysfunction, and increased mortality rates in advanced heart failure.Circulation. 2004; 38:1731-8.CrossrefMedlineGoogle Scholar327. 2009; 15:763-9.CrossrefMedlineGoogle Scholar327. 2009; 15:763-9.CrossrefMedline evaluations of the comparative benefits and risks of these newer agents in patients with HF and nonvalvular AF as an alternative to warfarin to be reasonable. The benefit afforded by low-dose aspirin in patients with HF and nonvalvular AF as an alternative to warfarin to be reasonable. The benefit afforded by low-dose aspirin in patients with HF and nonvalvular AF as an alternative to warfarin to be reasonable. The benefit afforded by low-dose aspirin in patients with HF and nonvalvular AF as an alternative to warfarin to be reasonable. specifically in patients proven free of CAD) remains unknown. 2001; 345:861-9. CrossrefMedlineGoogle Scholar329. In-hospital mortality in patients with acute decompensated heart failure requiring intravenous vasoactive medications: an analysis from the Acute Decompensated heart failure Scholar329. In-hospital mortality in patients with acute decompensated heart failure National Registry (ADHERE). J Am Coll Cardiol. Outcomediate Scholar329. In-hospital mortality in patients with acute decompensated heart failure National Registry (ADHERE). J Am Coll Cardiol. Outcomediate Scholar329. In-hospital mortality in patients with acute decompensated heart failure National Registry (ADHERE). J Am Coll Cardiol. Outcomediate Scholar329. 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CrossrefMedlineGoogle Arginine Vasopressin Antagonists: RecommendationClass IIbIn patients hospitalized with volume overload, including HF, who have persistent severe hyponatremia and are at risk for or having active cognitive symptoms despite water restriction and maximization of GDMT, vasopressin antagonists may be considered in the short term to improve serum sodium concentration in hypervolemic, hyponatremic states with either a V2receptor selective or a nonselective vasopressin antagonist.787,788 (Level of Evidence: B)Even mild hyponatremia may be associated with neurocognitive problems, including falls and attention deficits.789 Treatment of hypervolemic hyponatremia with a V2-selective vasopressin antagonist (tolvaptan) was associated with a significant improvement in the mental component of the Medical Outcomes Study Short Form General Health Survey.788 Hyponatremia may be treated with water restriction and maximization of GDMT that modulate angiotensin II, leading to improved renal perfusion and decreased thirst. 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Metra M, Ponik hospital lengths of stay than occur presently and were performed well before present standard-of-care treatments and diagnostic tests were available antithrombotic drugs often were not limited to patients with HF but included those with other acute illnesses, severe respiratory diseases, or simply a broad spectrum of hospitalized medical patients.771-774,781 In most studies, patients were categorized as having HF by admitting diagnosis, clinical status of patients. (Level of Evidence: C)Class III: HarmDrugs known to adversely affect the clinical status of patients with current or prior symptoms of HFrEF are potentially harmful and should be avoided or withdrawn whenever possible (eg, most calcium channel-blocking drugs [except amlodipine], NSAIDs, or thiazolidinediones).546-557(Level of Evidence: B)Long-term use of infused positive inotropic drugs is potentially harmful for patients with HFrEF, except as palliation for patients with end-stage disease who cannot be stabilized with standard medical treatment (see recommendations for stage D). Oral antithrombotic agents for the prevention of stroke in nonvalvular atrial fibrillation: a science advisory for healthcare professionals from the American Heart Association/American Stroke Association.Stroke. Fattouch K, Guccione F, Sampognaro R, et al.. 1987; 316:1429-35.CrossrefMedlineGoogle Scholar842. Gheorghiade M, Abraham WT, Albert NM, et al.. 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Other smaller trials were consistent with this degree of benefit, except for patients within the first 40 days after acute MI, in whom SCD was decreased but there was an increase in other events such that there was no net benefit for survival.598,614 Both SCD and total mortality are highest in patients with HFrEF with class IV symptoms, in whom ICDs are not expected to prolong meaningful survival and are not indicated except in those for whom heart transplantation or MCS is anticipated. The use of ICDs for primary prevention in patients with HFrEF should be considered only in the setting of optimal GDMT and with a minimum of 3 to 6 months of appropriate medical therapy. 30 Safe practices for better health care: fact sheet. March 2005. Comparison of copeptin, B-type natriuretic peptide, and amino-terminal pro-B-type natriuretic peptide in patients with chronic heart failure: prediction of death at different stages of the disease.J Am Coll Cardiol. 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Patients with multiple comorbidities have a higher rate of implant complications and higher competing risks of death from noncardiac causes. 616 Older patients, who are at a higher risk of nonsudden death, are often underrepresented in the pivotal trials where the average patient is 75 years of age,618 and a meta-analysis of primary prevention of SCD also suggested lesser effectiveness of ICDs.619 Populations, particularly in the setting of chronic kidney disease, have a median survival rate of or =55%) versus those with mildly reduced (40% to 55%) and moderately to severely reduced (50%) or left main equivalent disease.10,12,14,848(Level of Evidence: C)Class IIaCABG to improve survival is reasonable in patients with mild to moderate LV systolic dysfunction (EF 35% to 50%) and significant (≥70% diameter stenosis) multivessel CAD or proximal left anterior descending coronary artery stenosis when viable myocardium is present in the region of intended revascularization.848-850(Level of Evidence: B)CABG or medical therapy is reasonable to improve morbidity and cardiovascular mortality for patients with severe LV dysfunction (EF 50%, and ≥55%. Austin J, Williams R, Ross L, et al.. A comparison of enoxaparin with placebo for the prevention of venous thromboembolism in acutely ill medical patients. N Engl J Med. Even when symptoms are mild or improve with other therapies, beta-blocker therapy is important and should not be delayed until symptoms return or disease progression is documented. A study of the beneficial effects of anticoagulant therapy in congestive heart failure. Ann Intern Med. 1977; 1:749-52. CrossrefMedlineGoogle Scholar487. Heart transplantation e2536.1. Clinical Evaluation e2536.1. Clinical Eval Tests: Recommendations e2536.3.1. Natriuretic Peptides: BNP or NT-proBNP e2566.3.2. Biomarkers e2566.3.1. Natriuretic Peptides: BNP or NT-proBNP e2566.3.2. Biomarkers e2566.3.1. Natriuretic Peptides: BNP or NT-proBNP e2566.3.2. Biomarkers e2566.3.2. Biomarkers e2566.3.3. Other Emerging Biomarkers e2566.3.2. Biomarkers e2566.3.2. Biomarkers e2566.3.3. Other Emerging Biomarkers e2 Right-Heart Catheterization e2596.5.2. 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CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar202. Bueno H, Ross JS, Wang Y, et al.. 2008; 102:1535-41. CrossrefMedlineGoogle Scholar204. CrossrefMedlineGoogle Scholar204. Cross 9.CrossrefMedlineGoogle Scholar163. Plasma natriuretic peptides for community screening for left ventricular hypertrophy and systolic dysfunction: the Framingham Heart Study.JAMA. After initiation of aldosterone receptor antagonists, potassium supplementation should be discontinued (or reduced and carefully monitored in those with a history of hypokalemia; Table 17), and patients should be counseled to avoid foods high in potassium and NSAIDs. Potassium levels and renal function should be rechecked within 2 to 3 days and again at 7 days after initiation of an aldosterone receptor antagonist. 2009; 158:644-52. CrossrefMedlineGoogle Scholar637. Fang J, Mensah GA, Croft JB, et al.. Maximum potential benefit of implantable defibrillators in preventing sudden death after hospital admission because of heart failure.CMAJ. Deleted in press.Google Scholar635. 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Extent of left ventricular scar predicts outcomes in ischemic cardiomyopathy patients with significantly reduced systolic function: a delayed hyperenhancement cardiac magnetic resonance study. JACC Cardiovasc Imaging. Plasma N-terminal pro-brain natriuretic peptide and adrenomedullin: prognostic utility and prediction of benefit from carvedilol in chronic ischemic left ventricular dysfunction: Australia-New Zealand Heart Failure Group, J Am Coll Cardiol. 2003; 289:305-12. CrossrefMedlineGoogle Scholar918. 2010; 122:2091-106. LinkGoogle Scholar921. Additional other HF guideline statements are highlighted as well for the purpose of comparison and completeness. Table 2. 2012; 109:1761-6. CrossrefMedlineGoogle Scholar921. Additional other HF guideline statements are highlighted as well for the purpose of comparison and completeness. Table 2. 2012; 109:1761-6. CrossrefMedlineGoogle Scholar921. Additional other HF guideline statements are highlighted as well for the purpose of comparison and completeness. Table 2. 2012; 109:1761-6. CrossrefMedlineGoogle Scholar921. Additional other HF guideline statements are highlighted as well for the purpose of comparison and completeness. Table 2. 2012; 109:1761-6. CrossrefMedlineGoogle Scholar921. Additional other HF guideline statements are highlighted as well for the purpose of comparison and completeness. Table 2. 2012; 109:1761-6. CrossrefMedlineGoogle Scholar921. Additional other HF guideline statements are highlighted as well for the purpose of comparison and completeness. Table 2. 2012; 109:1761-6. CrossrefMedlineGoogle Scholar921. Additional other HF guideline statements are highlighted as well for the purpose of comparison and completeness. Table 2. 2012; 109:1761-6. CrossrefMedlineGoogle Scholar921. Additional other HF guideline statements are highlighted as well for the purpose of comparison and completeness. 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Table 2. 201 mellitus, atrial fibrillation (AF), and hyperlipidemia are also highly prevalent in HFpEF in population-based studies, and HFpEF, with a prevalence of 60% to 89% from large controlled trials, epidemiological studies, and HFpEF in population-based studies and registries. registries.44 It has been recognized that a subset of patients with HFpEF previously had HFrEF.45 These patients with improvement or recovery in EF may be clinically distinct from those with persistently preserved or reduced EF. Iron-chelating agents that prevent generation of oxygen free radicals, such as dexrazoxane, are cardioprotective, 146, 147 and reduce the occurrence and severity of anthracycline-induced cardiotoxicity are the monoclonal antibody trastuzumab (Herceptin), high-dose cyclophosphamide, taxoids, mitomycin-C, 5-fluorouracil, and the interferons. 148 In contrast to anthracycline-induced cardiac toxicity, trastuzumab-related cardiac dysfunction does not appear to increase with cumulative dose, nor is it associated with ultrastructural changes in the myocardium. 2012; 126:142-57. LinkGoogle Scholar25. The conduction system is often affected, typically resulting in right bundle-branch block, left anterior fascicular block, or complete atrioventricular block.5.7. Inflammation-Induced Cardiomyopathy: Noninfectious Causes5.7.1. Hypersensitivity MyocarditisHypersensitivity to a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of agents may result in allergic reactions that involve the myocardium bytem by be a variety of a variety eosinophils, lymphocytes, and histiocytes. 2009; 103:93-102. CrossrefMedlineGoogle Scholar385. Because the electrolyte concentration is similar to plasma, relatively more sodium can be removed than by diuretics. 753-755 Initial studies supporting use of ultrafiltration in HF were small but provided safety and efficacy data in acute HF.755-757 Use of ultrafiltration in HF has been shown to reduce neurohormone levels and increase diuretic responsiveness. Effects of a home-based intervention among patients with congestive heart failure discharged from acute hospital care. Arch Intern Med. approaches. Am Heart J. Effect of carvedilol on survival in severe chronic heart failure. N Engl J Med. 2011; 4:308-16. LinkGoogle Scholar896. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension. Long term effects of dietary sodium reduction on cardiovascular disease outcomes: observational follow-up of the Trials of Hypertension Prevention (TOHP).BMJ. Al-Khadra AS, Salem DN, Rand WM, et al.. Presentation may be acute, with an indistinct onset and better tolerated LV dysfunction.158 Prognosis varies, with spontaneous complete resolution (paradoxically most often seen with acute fulminant myocarditis)158 to the development of DCM despite immunosuppressive therapy.159 The role of immunosuppressive therapy is controversial.159 Targeting such therapy to specific individuals based on the presence or absence of viral genome in myocardial biopsy samples may improve response to immunosuppressive therapy.160Giant cell myocardial inflammation characterized by fulminant HF, often associated with refractory ventricular arrhythmias and a poor prognosis.161,162 Histologic findings include diffuse ial necrosis with numerous multinucleated giant cells without granuloma formation. Felker GM, Lee KL, Bull DA, et al.. The emerging role of multi-detector computed tomography in heart failure.] Card Fail. Among patients with HF in 1 large population study, hospitalizations were common after HF diagnosis, with 83% o at least once and 43% hospitalized at least 4 times. 2008; 15:162-7. CrossrefMedlineGoogle Scholar412. Gheorghiade M, Hall VB, Jacobsen G, et al.. 2004;291:2196 and JAMA. 2011; 123:e269-367. LinkGoogle Scholar7. For those with HFpEF, nondihydropyridine calcium antagonists can be effective for achieving rate control but may be more effective for achieving rate control but may be more effective. when used in combination with digoxin. These results have included a decrease of approximately 30% in rehospitalization and reductions in all-cause mortality in the range of 24% to 36%. Continuous intravenous dobutamine is associated with an increased risk of death in patients with advanced heart failure: insights from the Flolan International Randomized Survival Trial (FIRST).Am Heart J. Lifetime risk for developing congestive heart failure: the Framingham Heart Study. Circulation. Effect of verapamil Infarction Trial II-DAVIT II). Am J Cardiol. N-terminal pro-B-type natriuretic peptide-guided treatment for chronic heart failure: results from the BATTLESCARRED (NT-proBNP-Assisted Treatment To Lessen Serial Cardiac Readmissions and Death) trial. J Am Coll Cardiol. Heart failure in the general population of men: morbidity, risk factors and prognosis. J Intern Med. 1994; 343:440-4. CrossrefMedlineGoogle Scholar247. 2002; 282:H1672-8. CrossrefMedlineGoogle Scholar166. Beta-adrenergic blocking agent use and mortality in patients with asymptomatic and symptomatic left ventricular Dysfunction. J Am Coll Cardiol. Predictors of mortality in patients with chronic heart failure. Eur Heart J. 2011. 161:1024-30. CrossrefMedlineGoogle Scholar484. Exercise testing • If the adequacy of rate control is in question (permanent AF) • To reproduce exercise-induced AF • To exclude ischemia before treatment of selected patients with a type IC antiarrhythmic drug 3. Steinhart B, Thorpe KE, Bayoumi AM, et al.. This approach fails to recognize that "nonischemic cardiomyopathy" may include cardiomyopathies due to volume or pressure overload, such as hypertension or valvular heart disease, which are not conventionally accepted as DCM.105 With the identification of genetic defects in several forms of cardiomyopathies, a new classification scheme based on genomics was proposed in 2006.23 We recognize that classification of cardiomyopathies is challenging, mixing anatomic designations (ie, hypertrophic and dilated) with functional designations (ie, restrictive), and is unlikely to satisfy all users. Placebo controlled trial of felodipine in patients with mild to moderate heart failure: UK Study Group.Br Heart J. 1991; 25:453-7.CrossrefMedlineGoogle Scholar493. Rasmusson KD, Stehlik J, Brown RN, et al.. Whether early treatment with ACE inhibitors and/or beta blockers will prevent or delay disease progression in these patients is unknown at this time.5.6.3. Chagas DiseaseAlthough Chagas DiseaseAlt important cause of death in Central and South America.167 Symptomatic chronic Chagas disease develops in an estimated 10% to 30% of infected persons, years or even decades after the Trypanosoma cruzi infection. Tavazzi L, Maggioni AP, Marchioli R, et al.. In patients taking a low dose of an ACE inhibitor, the addition of a beta blocker produces a greater improvement in symptoms and reduction in the risk of death than does an increase in the dose of the ACE inhibitor, even to the target doses used in clinical trials.445,473 In patients with a current or recent history of fluid retention, beta blockers should not be prescribed without diuretics, because diuretics are needed to maintain sodium and fluid balance and prevent the exacerbation of fluid retention that can accompany the initiation of beta-blocker therapy.474,475 Beta Blockers may be considered in patients with persistent symptomatic bradycardia but should be used cautiously in patients who have reactive airway disease or asymptomatic bradycardia but should be used cautiously in patients with persistent symptoms of either condition.7.3.2.4.2. Beta Blockers Initiation and Maintenance.Treatment with a beta blocker should be initiated at very low doses (Table 15), followed by gradual increments in dose if lower doses have been well tolerated. 2001; 345:1667-75.CrossrefMedlineGoogle Scholar109. Given that there is no compelling evidence to use warfarin or aspirin in patients with HFrEF in the absence of a specific indication. The efficacy of long-term warfarin for the prevention of stroke in patients with AF is well established. 1997; 95:2660–7. CrossrefMedlineGoogle Scholar200. Comprehensive discharge planning with postdischarge support for older patients with congestive heart failure: a meta-analysis. JAMA. 2003; 42:1206-52. LinkGoogle Scholar28. Cardiac cachexia is associated with adverse prognosis. 191 Weight gain Rapid w part of other systemic diseases such as systemic lupus erythematosus and other myocardial muscle diseases such as HIV cardiomyopathy and possibly peripartum cardiomyopathy. Stevenson, MD, FACC, FAHA#; Clyde W. Regional variation in the association between advance directives and end-of-life Medicare expenditures. JAMA. Braunwald E, Domanski MJ, Fowler SE, et al.. Associated Guidelines and StatementsTitleOrganizationPublication Year (Reference)Guidelines for the Management of Adults With Atrial FibrillationACCF/AHA/HRS20116-8 Guideline for Assessment of Cardiovascular Risk in Asymptomatic AdultsACCF/AHA20109 Guidelines for Coronary Artery Bypass Graft SurgeryACCF/AHA201110 Guideline for Coronary Artery Bypass Graft SurgeryACCF/AHA201110 Guideline for Coronary Artery Bypass Graft SurgeryACCF/AHA201110 Guideline for the Diagnosis and Treatment of Hypertrophic CardiomyopathyACCF/AHA201111 Guideline for Coronary Artery Bypass Graft SurgeryACCF/AHA201110 Guideline for the Diagnosis and Treatment of Hypertrophic CardiomyopathyACCF/AHA201111 Guideline for Coronary Artery Bypass Graft SurgeryACCF/AHA201110 Guideline for the Diagnosis and Treatment of Hypertrophic CardiomyopathyACCF/AHA201111 Guideline for the Diagnosis and Treatment of Hypertrophic CardiomyopathyACCF/AHA201111 Guideline for the Diagnosis and Treatment of Hypertrophic 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for the Care of Heart Transplant RecipientsISHLT201022Statements Contemporary Definitions and Classification of the Cardiovascular Imaging in Heart FailureACCF201325 Appropriate Use Criteria for Coronary Revascularization Focused UpdateACCF201226 Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood PressureNHLBI200327 Implications of Recent Clinical Trials for the National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood PressureNHLBI200327 Implications of Recent Clinical Trials for the National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood PressureNHLBI200327 Implications of Recent Clinical Trials for the National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood PressureNHLBI200327 Implications of Recent Clinical Trials for the National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood PressureNHLBI200327 Implications 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Recommendations for the Use of Mechanical Circulatory Support: Device Strategies and Patient SelectionAHA201231 Advanced Chronic Heart FailureESC200732 Oral Antithrombotic Agents for the Prevention of Stroke in Nonvalvular Atrial FibrillationAHA/ASA201233 Third Universal Definition of Myocardial InfarctionESC/ACCF/AHA/WHF2012342. 2001; 87:1051-7. CrossrefMedlineGoogle Scholar295. American Diabetes Association. Standards of medical care in diabetes-2012. Diabetes Care. 2011; 364:797-805.CrossrefMedlineGoogle Scholar740. 2010; 56:1196-204.CrossrefMedlineGoogle Scholar764. 2011; 13:227-33.CrossrefMedlineGoogle Scholar764. 2011; 13:227-33.CrossrefMedlineGoogle Scholar764. 2010; 52:200-7.CrossrefMedlineGoogle Scholar764. 2011; 13:227-33.CrossrefMedlineGoogle Scholar764. 2010; 56:1196-204.CrossrefMedlineGoogle Scholar764. 2011; 13:227-33.CrossrefMedlineGoogle Scholar764. 2010; 56:1196-204.CrossrefMedlineGoogle Scholar764. 2010; 56:1196-204.CrossrefMedlineGoogle Scholar764. 2011; 13:227-33.CrossrefMedlineGoogle Scholar764. 2010; 56:1196-204.CrossrefMedlineGoogle Scholar764. 2011; 13:227-33.CrossrefMedlineGoogle Scholar764. 2011; 13:227-33.CrossrefMedlineGoogle Scholar764. 2010; 56:1196-204.CrossrefMedlineGoogle Scholar764. 2011; 13:227-33.CrossrefMedlineGoogle Scholar764. 2010; 56:1196-204.CrossrefMedlineGoogle Scholar764. 2011; 13:227-33.CrossrefMedlineGoogle Scholar764. 2011; 13:227-33.CrossrefMedlineGoogle Scholar764. 2010; 56:1196-204.CrossrefMedlineGoogle Schol The effect of spironolactone on morbidity and mortality in patients with severe heart failure. N Engl J Med. ACCF/AHA/AMA-PCPI 2011 HF Measurement1. 1994; 14:514-21. MedlineGoogle Scholar430. Influence of a performance-improvement initiative on quality of care for patients hospitalized with heart failure: results of the Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients With Heart Failure (OPTIMIZE-HF). Arch Internal MedicineNoneNone• HeartWare Scios/Johnson & Johnson⁺ Medtronic[•] Thoratec[†]None^{7.17.27.3.27.3.47.4.47.4.57.4.68.68.710Gregg C. Canadian Cardiovascular Society Consensus Conference guidelines on heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the transition of care of heart failure -2008 update: best practices for the} Lloyd-Jones DM, Larson MG, Leip EP, et al.. Myocardial perfusion, function, and dyssynchrony in patients with heart failure: baseline results from the single-photon emission computed tomography imaging ancillary study of the Heart Failure and A Controlled Trial Investigating Outcomes of Exercise TraiNing (HF-ACTION) Trial.Am Heart J. O'Connor CM, Gattis WA, Uretsky BF, et al.. Usefulness of verapamil for congestive heart failure associated with abnormal left ventricular systolic performance. Am J Cardiol. Swedberg K, Young JB, Anand IS, et al.. With respect to HF, 30-day mortality and 30-day readmission are reported by the Centers for Medicare and Medicaid Services as part of the Hospital Compare program (Table 35) and are incorporated in the Centers for Medicaid Services value-based purchasing program.918 Outcomes measures are appealing because they apply universally to almost all patients, and they provide a perspective on the performance of health systems.923 On the other hand, they are limited by the questionable adequacy of risk adjustment and by the challenges of improvement. Because of its favorable effects on survival and disease progression, a clinical trial-proven beta blocker should be initiated as soon as HFrEF is diagnosed. In obese patients, edema may reflect peripheral rather than cardiac causes. Temperature of lower extremities Cool lower extremities may reflect inadequate cardiac output. See Online Data Supplements 5, 6, and 7 for additional data on stress testing and clinical evaluation. 6.1.2. Risk Scoring: RecommendationClass IIaValidated multivariable risk scores can be useful to estimate subsequent risk of mortality in ambulatory or hospitalized patients with HF.199-207(Level of Evidence: B)In the course of standard evaluation, clinicians should routinely assess the patient's potential for adverse outcome, because accurate risk stratification may help guide therapeutic decision making, including a more rapid transition to advanced HF therapies. Ghali JK, Anand IS, Abraham WT, et al.. Diuretic strategies in patients with acute decompensated heart failure.N Engl J Med. Powell LH, Calvin JE, Richardson D, et al.. 1976; 294:867-70. CrossrefMedlineGoogle Scholar505. When these data are taken into consideration with multiple previous studies demonstrating the usefulness of this approach, 281-285 it becomes reasonable to recommend viability assessment when treating patients with HFrEF who have known CAD.14See Online Data Supplement 9 for additional data on imaging-echocardiography.6.5. Invasive Evaluation: RecommendationsSee Table 11 for a summary of recommendations from this section. Table 11. Results of coronary artery surgery in patients with poor left ventricular function (CASS). Circulation. Metra M, Torp-Pedersen C, Cleland JG, et al.. Waldo AL, Camm AJ, deRuyter H, et al.. Packer M, Coats AJ, Fowler MB, et al.. Moreover, in addition to costs, hospitalization for acutely decompensated HF represents a sentinel prognostic event in the course of many patients with HF, with a high risk for recurrent hospitalization (eg, 50% at 6 months) and a 1-year mortality rate of approximately 30%.211,704 The AHA has published a scientific statement about this condition.705There is no widely accepted nomenclature for HF syndromes requiring hospitalization. Kociol RD, Pang PS, Gheorghiade M, et al.. 2005; 111:179-85.LinkGoogle Scholar366. Fung HL, Bauer JA. (Level of Evidence: C)Class III: No BenefitRoutine use of invasive hemodynamic monitoring is not recommended in normotensive patients with acute decompensated HF and congestion with symptomatic response to diuretics and vasodilators.305(Level of Evidence: B)Class III: HarmEndomyocardial biopsy should not be performed in the routine evaluation of patients with HF. Stress (Takotsubo) Cardiomyopathy is characterized by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, triggered by acute reversible LV dysfunction in the absence of significant CAD, trigger first described in Japan as takotsubo, and often affects postmenopausal women.186 A majority of patients have a clinical presentation similar to that of acute coronary syndrome (ACS) and may have transiently elevated cardiac enzymes.6. Initial and Serial Evaluation of the HF Patient6.1. Clinical Evaluation6.1.1. History and Physical Examination RecommendationsClass IA 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. Other important components of transitional care include preparation of the patient and caregiver for what to expect at the next site of care, reconciliations, follow-up plans for outstanding tests, and discussions about monitoring signs and symptoms of worsening conditions. Executive summary: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest. Self-care and depression in patients with chronic heart failure: insights from a randomized controlled study of patients with type 2 diabetes and mild cardiac disease. Congest Heart Fail. 1993; 22:968 74. CrossrefMedlineGoogle Scholar188. Statin use and survival in patients with chronic heart failure: results from two observational studies with 5200 patients. Int J Cardiol. Qaseem A, Wilt TJ, Weinberger SE, et al.. Grady KL, Jalowiec A, White-Williams C. The Level of Evidence (LOE) is an estimate of the certainty or precision of the treatment effect. 2006; 113:1424-33.LinkGoogle Scholar204. 2012; 125:2382-401.LinkGoogle Scholar922. One echocardiographic study showed that despite normal LV dimensions or fractional shortening, subclinical systolic impairment was present in the majority of patients with scleroderma.171 Cardiac involvement in rheumatoid arthritis generally is in the form of myocarditis and/or pericarditis, and development of DCM is rare.172 Myocardial involvement in rheumatoid arthritis is thought to be secondary to microvasculitis and subsequent microcirculatory disturbances. Patients may become unresponsive to high doses of diuretic drugs if they consume large amounts of dietary sodium, are taking agents that can block the effects of diuretics (eg, nonsteroidal anti-inflammatory drugs [NSAIDs], including cyclooxygenase-2 inhibitors)436-438 or have a significant impairment of renal function or perfusion.434 Diuretic resistance can generally be overcome by the intravenous administration of diuretics (including the use of continuous infusions)439 or combination of different diuretic classes (eg, metolazone with a loop diuretic).440-443 Table 14. Some key examples include an effective management strategy for patients with HFpEF beyond blood pressure control; a convincing method to use biomarkers in the optimization of medical therapy; the recognition and treatment of cardiorenal syndrome and the critical need for improving patient adherence to therapeutic regimens. The effects of oral ibopamine in patients with mild heart failure: a double blind placebo controlled, double-blind, multiple-dose studies of losartan in heart failure: Losartan Heart Failure Mortality Meta-analysis Study Group.Am J Cardiol. Gasparyan AY, Cocco G, Pandolfi S. Diuretic-based antihypertensive therapy has repeatedly been shown to prevent HF in a wide range of patients; ACE inhibitors, ARBs, and beta blockers are also effective. Psychobiology of depression/distress in congestive heart failure. Heart Fail Rev. Home-based exercise increases exercise capacity but not quality of life in people with chronic heart failure: a systematic review. Aust J Physiother. Patients should be monitored closely for changes in vital signs and symptoms during this uptitration period. 2003; 107:294-9. LinkGoogle Scholar831. The history and symptoms during this uptitration period. 2003; 107:294-9. LinkGoogle Scholar831. also provides information about the severity of the disease and the patient's prognosis and identifies opportunities for therapeutic interventions. Several criteria have been proposed to define the syndrome of HFpEF. 1994; 272:1614-8. CrossrefMedlineGoogle Scholar528. Blacks have the highest risk for HF.56 In the ARIC (Atherosclerosis Risk in Communities) study, incidence rate per 1000 person-years was lowest among white women52,53 and highest among black men,57 with blacks having a greater 5-year mortality rate than whites.58 HF in non-Hispanic black males and females and females has a prevalence of 4.5% and 3.8%, respectively, versus 2.7% and 1.8% in non-Hispanic white males and females, respectively.514.1. MortalityAlthough survival has improved, the absolute mortality rates for HF remain approximately 50% within 5 years of diagnosis.53,59 In the ARIC study, the 30-day, 1-year, and 5-year case fatality rates after hospitalization for HF were 10.4%, 22%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, 22%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, 22%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, 22%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, 22%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, 22%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, 22%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, 22%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, 22%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, 22%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, 22%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates after hospitalization for HF were 10.4%, and 42.3%, respectively.58 In another population cohort study with 5-year case fatality rates a year mortality data, survival for stage A, B, C, and D HF was 97%, 96%, 75%, and 20%, respectively.47 Thirty-day postadmission mortality rates decreased from 12.6% to 10.8% from 1993 to 2005; however, this was due to lower in-hospital death rates. Prediction of mode of death in heart failure: the Seattle Heart Failure Model. Circulation. Hyponatremia, natriuretic peptides, and outcomes in acutely decompensated heart failure: results from the International Collaborative of NT-proBNP Study. Circ Heart Fail. Effects of continuous aortic flow augmentation in patients with exacerbation of heart failure: results from the International Collaborative of NT-proBNP Study. Circ Heart Fail. Orgis Medical Cancion System for the Enhanced Treatment of Chronic HFDrugInitial Daily Dose(s)Maximum Total Daily Dose(s)Maximum Furosemide20 to 40 mg once or twice600 mg6 to 8 h Torsemide10 to 20 mg once200 mg12 to 16 hThiazide25 mg once or twice200 mg6 to 12 h Indapamide2.5 mg once or twice200 mg6 to 12 h Indapamide2.5 mg once 2.5 mg o once20 mg12 to 24 hPotassium-sparing diuretics* Amiloride5 mg once20 mg24 h Spironolactone12.5 to 25.0 mg once50 mg+1 to 3 h Triamterene50 to 75 mg twice200 mg7 to 9 hSequential nephron blockade Metolazone‡2.5 to 10.0 mg once plus loop diureticN/AN/A Hydrochlorothiazide25 to 100 mg once or twice plus loop diureticN/AN/A Chlorothiazide (IV)500 to 1000 mg once plus loop diuretics: Risks of Treatment. The principal adverse effects of diuretics: Risks of Treatment. The principal adverse effects of diuretics include electrolyte and fluid depletion, as well as hypotension and azotemia. Bundle-branch block morphology and other predictors of outcome after cardiac resynchronization therapy in Medicare patients.Circulation. 1990; 336:1-6.CrossrefMedlineGoogle Scholar763. In December 2009, the ACCF and AHA implemented a new policy for relationship with industry and other entities (RWI) that requires the writing committee chair plus a minimum of 50% of the writing committee to have no relevant RWI (Appendix 1 includes the ACCF/AHA definition of relevance). The risk of hyperkalemia increases progressively when serum creatinine does not accurately reflect glomerular filtration rate, determination that glomerular filtration rate or creatinine clearance is >30 mL/min/1.73 m2 is recommended.2. Aldosterone antagonists would not ordinarily be initiated in patients with baseline serum potassium >5.0 mEq/L.3. An initial dose of spironolactone of 12.5 mg or eplerenone 25 mg is typical, after which the dose may be increased to spironolactone 25 mg or eplerenone 50 mg if appropriate.4. The risk of hyperkalemia is increased with concomitant use of higher doses of ACE inhibitors (captopril >75 mg daily).5. Prevalence and prognostic significance of heart failure stages: application of the American College of Cardiology/American Heart failure staging criteria in the community. Circulation. Chronic alcoholism, anorexia nervosa, AIDS, and pregnancy can account for other rare causes of thiamine deficiency-related cardiomyopathy in the western world. 152 Deficiency in l-carnitine, a necessary cofactor for fatty acid oxidation, may be associated with a syndrome of progressive skeletal myopathy and cardiomyopathy.1535.5. Tachycardia-Induced Cardiomyopathy is a reversible cause of HF characterized by LV myocardial dysfunction caused by increased ventricular rate. Peacock WF, Hollander JE, Diercks DB, et al.. When the 2 drugs are used separately, both pills should be administered at least 3 times daily As a result, in response to pilot projects, several changes to these guidelines will be apparent, including limited narrative text, a focus on summary recommendation tables (with references that support LOE) to serve as a quick reference. In April 2011, the Institute of Medicine released 2 reports: Clinical Practice Guidelines We Can Trust and Finding What Works in Health Care: Standards for Systematic Reviews.2,3 It is noteworthy that the ACCF/AHA practice guidelines are cited as being compliant with many of the proposed standards. It is a subjective assessment by a clinician and can change frequently over short periods of time. Maisel WH, Stevenson LW. (Level of Evidence: C)Management of AF according to published clinical practice guidelines in patients with HFpEF is reasonable to improve symptomatic HF (Section 9.1). Chakko S, Myerburg RJ. van der Wal MH, van Veldhuisen DJ, Veeger NJ, et al.. van Kimmenade RR, Januzzi JL, Baggish AL, et al.. 2008; 52:1769-81.CrossrefMedlineGoogle Scholar310. Chase P, Arena R, Guazzi M, et al.. 2013; 127:e283-352.MedlineGoogle Scholar562. 2011; 364:1607-16.CrossrefMedlineGoogle Scholar510. Chase P, Arena R, Guazzi M, et al.. 2013; 127:e283-352.MedlineGoogle Scholar510. Chase P, Arena R, Guazzi M, et al.. 2013; 127:e283-352.MedlineGoogle Scholar50. 2011; 364:1607-16.CrossrefMedlineGoogle Scholar510. Chase P, Arena R, Guazzi M, et al.. 2013; 127:e283-352.MedlineGoogle Scholar510. Chase P, Arena R, Guazzi M, et al.. 2013; 127:e283-352.MedlineGoogle Scholar50. 2011; 364:1607-16.CrossrefMedlineGoogle Scholar510. Chase P, Arena R, Guazzi M, et al.. 2013; 127:e283-352.MedlineGoogle Scholar50. 2011; 364:1607-16.CrossrefMedlineGoogle Scholar50 the decision to replace the device generator. Consideration of ICD implantation is highly appropriate for shared decision making.30 The risks and benefits carry different relative values depending on patient goals and preferences. A randomized multicenter clinical study to evaluate the safety and efficacy of the TandemHeart percutaneous ventricular assist device versus conventional therapy with intraaortic balloon pumping for treatment of cardiogenic shock. Am Heart J. Dennis M, Sandercock PA, Reid J, et al.. He FJ, MacGregor GA. Report of the 1995 World Health Organization/International Society and Federation of Cardiology Task Force on the Definition and Classification of Cardiomyopathies. Circulation. Several observational and post hoc analyses from large clinical trials have implied that statin therapy may provide clinical benefit to patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with HF.533-536 However, 2 large RCTs have demonstrated that rosuvastatin has neutral effects on long-term outcomes in patients with her and h GDMT.537,538 At present, statin therapy should not be prescribed primarily for the treatment of HF to improve clinical outcomes. See Online Data Supplement 22 for additional data on statin therapy. 7.3.2.8.3. Omega-3 Fatty Acids: RecommendationClass IIaOmega-3 polyunsaturated fatty acid (PUFA) supplementation is reasonable to use as adjunctive therapy in patients with NYHA class II-IV symptoms and HFrEF or HFpEF, unless contraindicated, to reduce mortality and cardiovascular hospitalizations.539,540(Level of Evidence: B)Supplementation with omega-3 PUFA has been evaluated as an adjunctive therapy for cardiovascular disease and HF.541 Trials in primary and secondar prevention of coronary heart disease showed that omega-3 PUFA supplementation results in a 10% to 20% risk reduction in fatal and nonfatal cardiovascular events. DeBakey VA Medical Center—The Mary and Gordon Cain Chair and Professor of Heart Failure Research; Emory University School of Medicine-Professor of Medicine Amgen CardioMEMS Corthera FoldRx iOcopsys Johnson & Johnson & Johnson & Johnson & Scientific CardioMEMS Corthera E. Cognitive deficits and health-related quality of life in chronic heart failure. J Cardiovasc Nurs. Cardiac resynchronization therapy in non-left bundle branch block morphologies. Pacing Clin Electrophysiol. 2011; 57:119–27. CrossrefMedlineGoogle Scholar194. Because of reports of development of cardiowyopathy, sibutramine is contraindicated in HF.4037.3.1.6 Activity, Exercise Prescription, and Cardiac Rehabilitation: Recommended as safe and effective for patients with HF who are able to participate to improve functional status.404-407 (Level of Evidence: A)Class IIaCardiac rehabilitation can be useful in clinically stable patients with HF to improve functional capacity, exercise duration, HRQOL, and mortality.404,406-411 (Level of Evidence: B) Exercise training in patients with HF is safe and has numerous benefits. Even the widely embraced dictum of sodium restriction in HF is not well supported by current evidence. ST2 in patients with acute heart failure. J Am Coll Cardiol. 2012; 110:383-91. CrossrefMedlineGoogle Scholar233. Cotter G, Metzkor E, Kaluski E, et al.: 2005; 47:320-32. CrossrefMedlineGoogle Scholar255. Nondurable MCS for cardiogenic shock668-671 5. Characteristics, treatments, and outcomes of patients with preserved systolic function hospitalized for heart failure: a report from the OPTIMIZE-HF Registry. J Am Coll Cardiol. This plan of care should be updated regularly and made readily available to all members of each patients with symptomatic advanced HF to improve quality of life.30,885-888(Level of Evidence: B)Education, support, and involvement of patients with HF and their families are critical and often complex, especially during transitions of care. Prognostic value of established and novel biomarkers in patients with shortness of breath attending an emergency department.Clin Biochem. Franzen O, van der Heyden J, Baldus S, et al.. Colao A, Marzullo P, Di Somma C, et al.. Randomized comparison of enoxaparin with unfractionated heparin for the prevention of venous thromboembolism in medical patients with heart J. 1981; 70:234-9. CrossrefMedlineGoogle Scholar432. Left atrial resection/left atrial appendage removal, surgical or percutaneous, for AF867 3. 2005; 111:2454-60.LinkGoogle Scholar647. Chang AY, Abdullah SM, Jain T, et al.. Blood tests of thyroid, renal, and hepatic function • For a first episode of AF, when the ventricular rate is difficult to controlAdditional testing (one or several tests may be necessary) 1. 1994; 154:1449-57. Kalogeropoulos A, Georgiopoulou V, Kritchevsky SB, et al.. Horwich TB, MacLellan WR, Fonarow GC. Granger BB, Swedberg K, Ekman I, et al.. 1996; 335:1107-14. CrossrefMedlineGoogle Scholar576. A dose-dependent increase in mortality with vesnarinone among patients with severe heart failure. N Engl J Med. 2002; 40:1636-44. CrossrefMedlineGoogle Scholar812. History of ≥1 HF hospitalization in past 6 mo6. Lack of effect of coenzyme Q on left ventricular function in patients with congestive heart failure. J Am Coll Cardiol. Cohn JN, Goldstein SO, Greenberg BH, et al.; Vesnarinone Trial Investigators. Catheter ablation for atrial fibrillation in congestive heart failure. N Engl J Med. Troponin elevation in patients with heart failure: on behalf of the third Universal Definition of Myocardial Infarction Global Task Force: Heart J. Alonso-Martinez JL, Llorente-Diez B, Echegaray-Agara M, et al.. Red blood cell distribution width and 1-year mortality in acute heart failure.Eur J Heart Fail. However, caution should be used when initiating beta blockers in patients who have required inotropes during their hospital course or when initiating ACE inhibitors, ARBs, or aldosterone antagonists in those patients who have experienced marked azotemia or are at risk for hyperkalemia. The role of endomyocardial biopsy in the management of cardiovascular disease: a scientific statement from the American Heart Association, the American College of Cardiology, and the European Society (Eu in: JAMA. 2004; 328:189.CrossrefMedlineGoogle Scholar410. Classification of patients presenting with acutely decompensated heart failure. N Engl J Med. Subsequent monitoring should be dictated by the general clinical stability of renal function and fluid status but should occur at least monthly for the first 3 months and every 3 months thereafter. 1981; 64:1227-34.LinkGoogle Scholar502. 2009; 92:1801-7.CrossrefMedlineGoogle Scholar502. 2009; 151:784-92.CrossrefMedlineGoogle Scholar915. 2010; 170:507-14.CrossrefMedlineGoogle Scholar232. Ventricular dysfunction and the risk of stroke after myocardial infarction.N Engl J Med. Oliva F, Latini R, Politi A, et al.. York KM, Hassan M, Sheps DS. ACC/AHA 2008 guidelines for the management of adults with congenital heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Develop Guidelines on the Management of Adults With Congenital Heart Disease). Circulation. There was a significant increase in major bleeding with warfarin. Cardiac recovery during mechanical assist device support. Semin Thorac Cardiovasc Surg. Fluid restriction is important to manage hyponatremia, which is relatively common with advanced HF and portends a poor prognosis.645,646 Fluid restriction may improve serum sodium concentration; however, it is difficult to achieve and maintain. 2008; 20:234-46. CrossrefMedlineGoogle Scholar869. Patients are described as having "acute HF," "acute HF," "acute HF syndromes," or "acute(ly) decompensated HF"; while the third has gained greatest acceptance, it too has limitations, for it does not make the important distinction between those with a de novo presentation of HF from those with a de novo profile of patients with HF requiring hospitalization.107,704,706,707 Characteristically, such patients are elderly or near elderly, equally male or female, and typically have a history of hypertension, as well as other medical comorbidities, including chronic kidney disease, hyponatremia, hematologic abnormalities, and chronic obstructive pulmonary disease.107,706,708-713 A relatively equal percentage of patients with acutely decompensated HF have impaired versus preserved LV systolic function 707,714,715; clinically, patients with acutely decompensated HF have impaired versus preserved LV systolic function are older, more likely to be female, to have significant hypertension, and to have less CAD. A randomized, placebo-controlled trial assessing the effects of rosiglitazone on echocardiographic function and cardiac status in type 2 diabetic patients with New York Heart Association functional class I or II heart failure. I Am Coll Cardiol. Abrupt withdrawal of treatment with a beta blocker can lead to clinical deterioration and should be avoided.4777.3.2.4.3. Beta Blockers: Risks of Treatment.Initiation of treatment with a beta blocker may produce 4 types of adverse reactions that require attention and management: fluid retention and management: fluid retention and worsening HF; fatigue; bradycardia or heart block; and hypotension. Role of the implantable defibrillator among elderly patients with a history of life-threatening ventricular arrhythmias.Eur Heart J. 2003; 14:341-6. CrossrefMedlineGoogle Scholar771. For those for whom a rate-control strategy is chosen, when rate control cannot be achieved either because of drug inefficacy or intolerance, atrioventricular node ablation and CRT device placement can be useful.78,116,595,596 See Figures 5 and 6 for AF treatment algorithms. Figure 5. Finally, preventing the burden of this disease through more successful risk modification, sophisticated screening, perhaps using specific omics technologies (ie, systems biology) or effective treatment interventions that reduce the progression from stage A to stage B is an urgent need. Presidents and StaffAmerican College of Cardiology Foundation John Gordon Harold, MD, MACC, PresidentShalom Jacobovitz, Chief Executive OfficerWilliam J. 2008; 52:1584-8. CrossrefMedlineGoogle Scholar671. For patients hospitalized with acutely decompensated HF, the model developed by ADHERE (Acute Decompensated Heart Failure National Registry) incorporates 3 routinely measured variables on hospital admission (ie, systolic blood pressure, blood urea nitrogen, and serum creatinine) and stratifies subjects into categories with a 10-fold range of crude in-hospital mortality (from 2.1% to 21.9%).200 Notably, clinical risk scores have not performed as well in estimating risk of hospital readmission.211 For this purpose, biomarkers such as natriuretic peptides hold considerable promise212,213 (Section 6.3). See Online Data Supplement 8 for additional data on clinical 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, and thyroid-stimulating hormone. Exner DV, Dries DL, Waclawiw MA, et al.. If hypotension is accompanied by other clinical evidence of hypoperfusion, beta-blocker therapy should be decreased or discontinued pending further patient evaluation. Masoudi FA, Inzucchi SE, Wang Y, et al.: Fate of left ventricular thrombi in patients with remote myocardial infarction or idiopathic cardiomyopathy. Circulation. 2010; 3:522-9. LinkGoogle Scholar903. Scirica BM, Morrow DA, Cannon CP, et al.: The effect of correction of mild anemia in severe, resistant congestive heart failure using subcutaneous erythropoietin and intravenous iron: a randomized controlled study. J Am Coll Cardiol. Ouality of life of individuals with heart failure: a randomized trial of the effectiveness of two models of hospital-to-home transition. Med Care. 2004; 291:1358-67. CrossrefMedlineGoogle Scholar797. 2006; 152:713.e1-713.e7. CrossrefGoogle Scholar783. 2009; 374:1840-8. CrossrefMedlineGoogle Scholar422. 2005; 294:1625-33. CrossrefMedlineGoogle Scholar306. When patients are hospitalized for other reasons, they are at increased risk for venous thromboembolic disease, although accurate numerical estimates are lacking in the literature. Most early data on the effectiveness of different anticoagulant regimens to reduce the incidence of venous thromboembolic disease in hospitalized patients were either observational, retrospective reports 776,777 or prospective studies using a variety of drugs and differing definitions of therapeutic effect and endpoints, 774, 778-780 making summary conclusions difficult. Toma M, McAlister FA, Coglianese EE, et al.. The Hospitalization for HF is a growing and major public health issue. 703 Presently, HF is the leading cause of hospitalization among patients >65 years of age51; the largest percentage of expenditures related to HF are directly attributable to hospital costs. Multicenter randomized phase III study of the cardioprotective effect of dexrazoxane (Cardioxane) in advanced/metastatic breast cancer patients with other manifestations of sarcoidosis, cardiac involvement may occur in isolation and go undetected. Blood pressure (including postural blood pressure changes), renal function, and potassium should be reassessed within 1 to 2 weeks after initiation and followed closely after changes in dose. Edwards School of Medicine—Professor of therapyDCM = dilated cardiomyopathyECG = electrocardiogramEF = ejection fractionGDMT = quideline-directed medical therapyHbA1c = heart failure with reduced ejection fractionHROOL = heart failure with reduced ejection fraction fraction fraction fractine failure with reduced eje cardioverter-defibrillatorLBBB = left ventricularLVEF = left ventricularLVEF = left ventricularLVEF = left ventricularLVEF = nonsteroidal anti-inflammatory drugsNT-proBNP = N-terminal pro-B-type natriuretic peptideNYHA = New York Heart AssociationPUFA = polyunsaturated fatty acidsRCT = randomized controlled trialSCD = sudden cardiac deathVAD = ventricular assist deviceFootnotesWRITING COMMITTEE MEMBERS/acCF/AHA TASK FORCE ME Scholar543, Peacock WF, Fonarow GC, Emerman CL, et al., Subramanian D, Subramania medications and nonprescribed drugs on the heart. Am J Med. Maron MS, Kalsmith BM, Udelson JE, et al.. Murberg TA, Bru E. Effects of telmisartan, ramipril, and their combination with Ramipril Global End Point Trial and the Telmisartan Randomized Assessment Study in ACE Intolerant Subjects With Cardiovascular Disease. Circulation. Tests that may be overused or misused in cardiology: the Choosing Wisely campaign. J Nucl Cardiol. Carmona-Bernal C, Ruiz-Garcia A, Villa-Gil M, et al.. 1989; 321:406-12. CrossrefMedlineGoogle Scholar551. Structured telephone support or telemonitoring programmes for patients with chronic heart failure. Cochrane Database Syst Rev. Prolonged partial left ventricular bypass by means of an intrathoracic pump implanted in the left chest. Trans Am Soc Artif Intern Organs. Hemodynamic and neurohormonal effects of the angiotensin II antagonist losartan in patients with congestive heart failure.Circulation. EF values are dependent on the imaging technique used, method of analysis, and operator. 1975; 89:163-70.CrossrefMedlineGoogle Scholar743. In some cases, BNP or NT-proBNP levels may not be easily modifiable. 2009; 360:1705-17.CrossrefMedlineGoogle Scholar743. In some cases, BNP or NT-proBNP levels may not be easily modifiable. systematic review of factors that improve mortality and morbidity.Am J Med. Elhenawy AM, Algarni KD, Rodger M, et al.. National patterns of risk-standardized mortality and readmission for acute myocardial infarction and heart failure: update on publicly reported outcomes measures based on the 2010 release. Circ Cardiovasc Qual Outcomes. The NYHA functional classification gauges the severity of symptoms in those with structural heart disease, primarily stages C and D. Elliott P, Andersson B, Arbustini E, et al.. Survival in subgroups of patients with left main coronary artery disease. Circulation. Effect of valsartan on quality of life when added to usual therapy for heart failure: results from the Valsartan Heart Failure Trial. J Card Fail. Gottlieb SS, Robinson S, Krichten CM, et al.. A nomogram for digoxin therapy. Am J Med. Despite these limitations, it is apparent that much can be done for HF. Hofman-Bang C, Rehnqvist N, Swedberg K, et al.. 1979; 300:1238-41. CrossrefMedlineGoogle Scholar507. (Level of Evidence: C)In patients with idiopathic DCM, a 3-generational family history should be obtained to aid in establishing the diagnosis of familial DCM. An organized and directed approach to a thorough review of evidence has resulted in the production of clinical practice guidelines that assist clinicians in selecting the best management strategy for an individual patient. 2006; 12:211-9. CrossrefMedlineGoogle Scholar879. A validated risk score for in-hospital mortality in patients with heart failure from the American Heart Association Get With The Guidelines program. Circ Cardiovasc Qual Outcomes. Surgical or transcatheter aortic valve replacement852, 853 3. 2008; 1:240-9.LinkGoogle Scholar617. 2010; 16:111-7.CrossrefMedlineGoogle Scholar588. Seasonal influenza in adults and children: diagnosis, treatment, chemoprophylaxis, and institutional outbreak management: clinical practice guidelines of the Infectious Diseases Society of America. Clin Infect Dis. Coenzyme Q10, rosuvastatin, and clinical outcomes in heart failure: a pre-specified substudy of CORONA (Controlled Rosuvastatin Multinational Study in Heart Failure). J Am Coll Cardiol. 2000; 102:2443-56.LinkGoogle Scholar901. Disparities in the epidemiology of HF have been identified. 2007; 13:643-8.CrossrefMedlineGoogle Scholar844. Cohn JN, Archibald DG, Ziesche S, et al.. Ambardekar AV, Fonarow GC, Hernandez AF, et al.. Relationship between early physician follow-up and 30-day readmission among Medicare beneficiaries hospitalized for heart failure. JAMA. This therapy will often improve ventricular function to a range for which the risk of sudden death is too low to warrant placement of an ICD. A

new addition to this methodology is separation of the Class III recommendations to delineate whether the recommendation is determined to be of "no benefit" or is associated with "harm" to the patient. The effect of beta adrenergic blockade on patterns of urinary sodium excretion: studies in normal subjects and in patients with heart disease. Ann Intern Med. Prognosis of patients with ischaemic cardiomyopathy after coronary revascularisation: relation to viability and improvement in left ventricular ejection fraction. Heart. Goetze JP, Mogelvang R, Maage L, et al.. For further information on this topic, the reader is referred to published guidelines, position statements, and expert consensus statements118,120-123 (Table 5). Table 5. Antecedent blood pressure, body mass index, and the risk of incident heart failure in later life. Hypertension. Usefulness of taurine in chronic congestive heart failure; a dose comparison. Eur Heart J. 1997; 29:1206-13. CrossrefMedlineGoogle Scholar503. 2009; 15:293-9. CrossrefMedlineGoogle Scholar261. Thiazolidinediones, metformin, and outcomes in older patients with diabetes and heart failure: an observational study. Circulation. 2007; 381:145-50. CrossrefMedlineGoogle Scholar261. Thiazolidinediones, metformin, and outcomes in older patients with diabetes and heart failure: an observational study. Circulation. 2007; 381:145-50. CrossrefMedlineGoogle Scholar261. Thiazolidinediones, metformin, and outcomes in older patients with diabetes and heart failure: an observational study. Circulation. 2007; 381:145-50. CrossrefMedlineGoogle Scholar261. Thiazolidinediones, metformin, and outcomes in older patients with diabetes and heart failure: an observational study. Circulation. 2007; 381:145-50. CrossrefMedlineGoogle Scholar261. Thiazolidinediones, metformin, and outcomes in older patients with diabetes and heart failure: an observational study. Circulation. 2007; 381:145-50. CrossrefMedlineGoogle Scholar261. Thiazolidinediones, metformin, and outcomes in older patients with diabetes and heart failure: an observational study. Circulation. 2007; 381:145-50. CrossrefMedlineGoogle Scholar261. Thiazolidinediones, metformin, and outcomes in older patients with diabetes and heart failure: an observational study. Circulation. 2007; 381:145-50. CrossrefMedlineGoogle Scholar261. Thiazolidinediones, metformin, and outcomes in older patients with diabetes and heart failure: an observational study. Circulation. 2007; 381:145-50. CrossrefMedlineGoogle Scholar261. Thiazolidinediones, metformin, and outcomes in older patients with diabetes and heart failure: an observational study. Circulation. 2007; 381:145-50. CrossrefMedlineGoogle Scholar261. Thiazolidinediones, metformin, and outcomes in older patients with diabetes and heart failure: an observational study. Circulation. 2007; 381:145-50. CrossrefMedlineGoogle Scholar261. Thiazolidinediones, metformin, and outcomes in older study. Circulation. 2 72.CrossrefMedlineGoogle Scholar911. Allen LA, Hernandez AF, Peterson ED, et al.: 2010; 56:1071-8.CrossrefMedlineGoogle Scholar728. 2009; 14:1-11.CrossrefMedlineGoogle Schola doses have disappeared. Logeart D, Thabut G, Jourdain P, et al.. The effect of cardiac resynchronization on morbidity and mortality in heart failure. N Engl J Med. In addition, a lower natriuretic peptide goal and/or a substantial reduction in natriuretic peptide. 275 Although most trials examining the strategy of biomarker "guided" HF management were small and underpowered, 2 comprehensive meta-analyses concluded that BNP-guided therapy reduces all-cause mortality in patients with chronic HF compared with usual clinical care, 231,232 especially in patients 16 mm Hg and/or RAP >12 mm Hg by PA catheterization d. High prevalence of renal dysfunction and its impact on outcome in 118,465 patients hospitalized with acute decompensated heart failure: a report from the ADHERE database. J Card Fail. 2005; 150:982. CrossrefMedlineGoogle Scholar77. Alderman EL, Fisher LD, Litwin P, et al (Level of Evidence: C)Patients with reduced LVEF may not have HF symptoms and are most often identified during an evaluation for another disorder (eg, abnormal heart sounds, abnormal 11.CrossrefMedlineGoogle Scholar536. 2009; 55:53-60.CrossrefMedlineGoogle Scholar238. Tang YD, Katz SD. (Level of Evidence: C)6.3. Biomarkers: RecommendationsA. HF Classifications e2474. 2011; 8:1088-94.CrossrefMedlineGoogle Scholar605. Cairns JA, Connolly S, McMurtry S, et al.. Significant improvement in myocardial function is seen in 30% to 50% of patients in the first 6 months after presentation.174 However, for those patients who do not recover to normal function, the prognosis is similar to other forms of DCM.175 Cardiomegaly that persists for >4 to 6 months after diagnosis indicates a poor prognosis, with a 50% mortality rate at 6 years. Jovicic A, Holroyd-Leduc JM, Straus SE. Titler MG, Jensen GA, Dochterman JM, et al.. Does digoxin provide additional hemodynamic and autonomic benefit at higher doses in patients with mild to moderate heart failure and normal sinus rhythm?] Am Coll Cardiol. Definition of HF e2462.1. HF With Reduced EF (HFrEF) e2472.2. HF With Preserved EF (HFpEF) e2473. The authors included general cardiologists, HF and transplant specialists, electrophysiologists, general internists, and physicians with methodological expertise. 2007; 167:540-50. CrossrefMedlineGoogle Scholar638. This is especially the case for device-based therapeutics, where complete alignment between the HF guideline and the device-based therapeutics. therapy guideline was deemed imperative.4 Some recommendations from earlier guidelines have been updated as warranted by new evidence or relevant or which were no longer accurate or relevant or which were similar or redundant were eliminated or consolidated when possible. The present document recommends a combination of lifestyle modifications and medications and medic Medicare Beneficiaries With HF (N=4 947 918), 2011Beneficiaries Age ≥65 y (N=4 376 150)*Beneficiaries Age 90 g of alcohol per day (approximately 7 to 8 standard drinks per day) for >5 years.137 Interestingly, in the general population, mild to moderate alcohol consumption has been reported to be protective against development of HF.139,140 These paradoxical findings suggest that duration of exposure and individual genetic susceptibility play an important role in pathogenesis. 2006; 47:2326-31. CrossrefMedlineGoogle Scholar350. Although there is an abundance of evidence addressing HF, for many important clinical considerations, this writing committee was unable to identify sufficient data to properly inform a recommendation. 1996; 77:843-50. CrossrefMedlineGoogle Scholar301. Randomized controlled trial of ultrafiltration versus usual care for hospitalized patients with heart failure: preliminary report of the Rapid Trial.J Card Fail. 2006; 47:91–7. CrossrefMedlineGoogle Scholar269. Beanlands RS, Ruddy TD, deKemp RA, et al.. Digoxin is prescribed occasionally in patients with HF and AF, but beta blockers are usually more effective when addressed with a digoxin if they have significant sinus or atrioventricular block unless the block has been addressed with a permanent pacemaker. 2011; 57:870-9. CrossrefMedlineGoogle Scholar2. Because some patients present without signs or symptoms of volume overload, the term "heart failure" is preferred over "congestive heart failure." There is no single diagnostic test for HF because it is largely a clinical diagnosis based on a careful history and physical examination. The clinical syndrome of HF may result from disorders of the pericardium, heart valves, or great vessels or from certain metabolic abnormalities, but most patients with HF have symptoms due to impaired left ventricular (LV) myocardial function. However, such vulnerable patients may accrue considerable benefits from GDMT. 2003; 107:1210-25.LinkGoogle Scholar701. The ACCF/AHA stages of HF emphasize the development and progression of disease and can be used to describe individuals and populations whereas the NYHA classes focus on exercise capacity and the symptomatic status of the disease (Table 4). Table 4. 2003; 51:556-7. CrossrefMedlineGoogle Scholar140. Magnus Ohman, MD, FACC; Susan J. Gujja P, Rosing DR, Tripodi DJ, et al.. Cardiotoxicity of chemotherapeutic agents and radiotherapy-related heart disease: ESMO Clinical Practice Guidelines. Ann Oncol. Treatment of lone atrial fibrillation: a look at the past, a view of the present and a glance at the future. Eur J Cardiothorac Surg. 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Indications for other surgical or percutaneous interventions in the setting of HF are driven by other relevant guidelines or other sections of this guideline, including myomectomy for hypertrophic cardiomyopathy, surgical or electrophysiological procedures for AF, nondurable or durable MCS, and heart transplantation. Several procedures under evaluation hold promise but are not yet appropriate for a guideline-driven indication (Table 33). Staessen JA, Wang JG, Thijs L. 2011; 107:259-67. CrossrefMedlineGoogle Scholar266. 2008; 99:295-304. CrossrefMedlineGoogle Scholar26 palliative care into heart failure care.Arch Intern Med. Hochman, MD, FACC, FAHA; Richard J. 2009; 361:2637-45.CrossrefMedlineGoogle Scholar371. Cardiac Structural Abnormalities and Other Causes of HF5.1. Dilated Cardiomyopathies5.1.1. Definition and Classification of Dilated Cardiomyopathies5.1.1. Definit and Dilate group of heterogeneous myocardial disorders that are characterized by ventricular dilation and depressed myocardial contractility in the absence of abnormal loading conditions such as hypertension or valvular disease. These include patients with acute coronary ischemia, accelerated hypertension and acutely decompensated HF, shock, and acutely worsening right HF. 1999; 100:1056-64. CrossrefMedlineGoogle Scholar455. Echocardiographic predictors of morbidity and mortality in patients with advanced heart failure: the Beta-blocker Evaluation of Survival Trial (BEST). J Am Coll Cardiol. 2011; 4:546-53. LinkGoogle Scholar680. 2007; 28:1746-9. CrossrefMedlineGoogle Scholar619. Screening for depression in adults: U.S. Preventive Services Task Force recommendation statement. Ann Intern Med. 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The "ACC/AHA/ESC 2006 Guidelines for the Management of Patients With Atrial Fibrillation" and the 2 subsequent focused updates from 20116-8 are considered policy at the time of publication of the present HF Guideline; however, a fully revised AF guideline, which will include updated recommendations on AF, is in development, with publication expected in 2013 or 2014. Author Relationships With Industry and Other Entities (Relevant)-2013 ACCF/AHA Guideline for the Management of Heart FailureCommittee MemberEmploymentConsultantSpeaker's BureauOwnership/Partnership/Par Organizational, or Other Financial BenefitExpert WitnessVotingRecusals bySection*Clyde W. 2000; 160:777-84. CrossrefMedlineGoogle Scholar581. Interventions to enhance medication adherence in chronic medical conditions: a systematic review. Arch Interventions to enhance medication adherence in chronic medical conditions: a systematic review. Arch Interventions to enhance medication adherence in chronic medical conditions: a systematic review. Arch Interventions to enhance medication adherence in chronic me response should also be well controlled. Metabolic syndrome epidemic.Circulation. Dries DL, Rosenberg YD, Waclawiw MA, et al.. 2006; 12:407-12.CrossrefMedlineGoogle Scholar621. 2010; 58Suppl 2:S173-8.CrossrefMedlineGoogle Scholar621. 2010; 58Suppl 2:S173-8.CrossrefMedline team decrease all-cause hospitalizations and mortality; however, this has not been shown for "disease management programs" that focus only on self-care activities.82,793,881,882,900 Furthermore, patient characteristics may be important predictors of HF and other cardiac disease-related survival and hospitalization. US Department of Health and Human Services. Hospital Compare. Chemotherapy-induced cardiomyopathy. Expert Rev Cardiovasc Ther. 2004; 43:1019-26. CrossrefMedlineGoogle Scholar342. Weintraub NL, Collins SP, Pang PS, et al.. Chronic heart failure: management of chronic heart failure: management of chronic heart failure in adults in primary and secondary care (NICE clinical guideline 108). Available at: Those with LV systolic dysfunction commonly have elements of diastolic dysfunction as well.39 Although coronary artery disease (CAD) with antecedent myocardial infarction (MI) is a major cause of HFrEF, many other risk factors (Section 4.6) may lead to LV enlargement and HFrEF.2.2. HF With Preserved EF (HFpEF)In patients with clinical HF. studies estimate that the prevalence of HFpEF is approximately 50% (range 40% to 71%).40 These estimates vary largely because of the differing EF cut-off criteria and challenges in diagnostic criteria for HFpEF. An automated model to identify heart failure patients at risk for 30-day readmission or death using electronic medical record data. Med Care. Renneboog B, Musch W, Vandemergel X, et al.. Stress (Takotsubo) Cardiomyopathy e2536. 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CrossrefMedlineGoogle Scholar317. 2006; 6:43. Crossre Troponin elevation in heart failure prevalence, mechanisms, and clinical implications. J Am Coll Cardiol. Discharge to a skilled nursing facility and subsequent clinical outcomes among older patients. 829 A single-blind RCT showed that erythropoietin increased hemoglobin, peak oxygen uptake, and exercise duration in patients with severe HF and anemia.830 Two further studies. 2010; 31:2369-429. CrossrefMedlineGoogle Scholar517. Relation of duration of morbid obesity to left ventricular mass, systolic function, and diastolic filling, and effect of weight loss. Am J Cardiol. The committee included representatives from the ACCF, AHA, American College of Physicians, American College of Physicians, American Solie function, and International Society for Heart and Lung Transplantation.1.3. Document Review and Approval This document was reviewed by 2 official reviewers each from the American Academy of Family Physicians, American Academy of Family Physicians, American Society, and International Society, for Heart and Lung Transplantation, as well as 32 individual content reviewers (including members of the ACCF Adult Congenital and Pediatric Cardiovascular Team Council, ACCF Centiovascular Team Council, ACCF Adults, ACCF Electrophysiology Committee, ACCF Heart Failure and Transplant Council, ACCF Imaging Council, ACCF Prevention Committee, ACCF Surgeons' Scientific Council, and ACCF Task Force on Appropriate Use Criteria). Long-term treatment of both systolic and diastolic hypertension is particularly beneficial in older patients.311 One trial of a diuretic-based program demonstrated a number needed to treat of 52 to prevent 1 HF event in 2 years.311 In another study, elderly patients with a history or ECG evidence of prior MI had a >80% risk reduction for incident HF with aggressive blood pressure control.94 Given the robust outcomes with blood pressure reduction, clinicians should lower both systolic and diastolic blood pressure in accordance with published guidelines.27 Choice of antihypertensive therapy should also follow guidelines,27 with specific options tailored to concomitant medical problems, such as diabetes mellitus or CAD. Waagstein F, Bristow MR, Swedberg K, et al.. Use of a continuous-flow device in patients awaiting heart transplantation. N Engl J Med. Long-term implications of a single home-based educational intervention in patients with heart failure. Heart Lung. 2010; 29:914-56. CrossrefMedlineGoogle Scholar23. 2009; 15:586-92. CrossrefMedlineGoogle Scholar23. 2009; 15:586-92. CrossrefMedlineGoogle Scholar23. 2009; 15:586-92. CrossrefMedlineGoogle Scholar24. Rosenberg J, Gustafsson F, Galatius S, et al. 2012; 43:3442-3453. Intravenous Inotropic Agents Used in Management of HFInotropic AgentDose (mcg/kg)Drug Kinetics and MetabolismEffectsAdverse EffectsSpecialConsiderationsBolusInfusion (/min)COHRSVRPVRAdrenergic agonists DopamineN/A5 to 10t¹/₂: 2 to 20 minR,H,P^{↑↑↔}T, HA, N, tissue necrosisCaution: MAO-IN/A10 to 15^{↑↑↑↔}T, HA, N, tissue necrosisCaution: MAO-IN/A10 to 15^{↑↑↑} DobutamineN/A2.5 to 5t¹/₂: 2 to 3 minH \uparrow \downarrow \leftrightarrow \uparrow / \downarrow BP, HA, T, N, F, hypersensitivityCaution: MAO-I; CI: sulfite allergyN/A5 to 20 \uparrow \leftrightarrow \leftrightarrow PDE inhibitorMilrinoneN/R0.125 to 0.75t¹/₂: 2.5 h H \uparrow \downarrow \downarrow T, \downarrow BPRenal dosing, monitor LFTsSee Online Data Supplements 32 and 33 for additional data on inotropes.7.4.5. Mechanical Circulatory Support: RecommendationsClass IIaMCS is beneficial in carefully selected[‡] patients with stage D HFrEF in whom definitive management (eg, cardiac transplantation) or cardiac recovery is anticipated or planned.660-667(Level of Evidence: B)Nondurable MCS, including the use of percutaneous and extracorporeal ventricular assist devices (VADs), is reasonable as a "bridge to recovery" or "bridge to decision" for carefully selected‡ patients with HFrEF with acute, profound hemodynamic compromise.668-671(Level of Evidence: B)Durable MCS is reasonable to prolong survival for carefully selected‡ patients with stage D HFrEF.672-675(Level of Evidence: B)MCS has emerged as a viable therapeutic option for patients with advanced stage D HFrEF refractory to optimal GDMT and cardiac device intervention. Rivaroxaban versus warfarin in nonvalvular atrial fibrillation.N Engl J Med. Kereiakes DJ, Willerson JT. 1991; 67:183-7. CrossrefMedlineGoogle Scholar138. Spertus JA, Bonow RO, Chan P, et al.. Regardless of whether patients receive rhythm or rate control, anticoagulation is recommended for patients with HF and AF for stroke prevention in the presence of at least 1 additional risk factor. Carson P, Ziesche S, Johnson G, et al.; Vasodilator-Heart Failure Trial Study Group. Effectiveness-based guidelines for the prevention of cardiovascular disease in women-2011 update: a guideline from the American Heart Association. Circulation of SCD in these patients are also discussed in the ACCF/AHA/HRS device-based therapy guideline.4The use of ICDs for primary prevention of SCD in patients with HFrEF without prior history of arrhythmias or syncope has been evaluated in multiple RCTs. ICD therapy for primary prevention was demonstrated to reduce all-cause mortality. 2011; 58:1241-51. CrossrefMedlineGoogle Scholar217. The Losartan Intervention For Endpoint reduction (LIFE) in Hypertension study: rationale, design, and methods: the LIFE Study Group.Am J Hypertens. Symptomatic and asymptomatic left-ventricular systolic dysfunction in an urban population.Lancet. Makani H, Messerli FH, Romero J, et al.. Cardiac resynchronization therapy in patients undergoing atrioventricular junction ablation for permanent atrial fibrillation: a randomized trial.Eur Heart J. 2003; 108:1831-8.LinkGoogle Scholar362. Diltiazem improves cardiac function and exercise capacity in patients with idiopathic dilated cardiomyopathy: results of the Diltiazem in Dilated Cardiomyopathy Trial. Circulation. The supra-additive natriuretic effect addition of bendroflumethiazide and bumetanide in congestive heart failure: permutation trial tests in patients in long-term treatment with bumetanide.Am Heart J. Soja AM, Mortensen SA. Mozaffarian D, Nye R, Levy WC. 2008; 52:1834-43. CrossrefMedlineGoogle Scholar600. 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Those with HbA1c >10.5% had a nearly 4-fold increase in the risk for HF compared with those with a value of 40%) ventricular pacing. 155,602,606,607 (Level of Evidence: C)Class IIbThe usefulness of implantation of an ICD is of uncertain benefit to prolong meaningful survival in patients with a high risk of nonsudden death as predicted by frequent hospitalizations, advanced frailty, or comorbidities such as systemic malignancy or severe renal dysfunction. +608-611 (Level of Evidence: B)CRT may be considered for patients who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern with QRS duration of 120 to 149 ms, and NYHA class III/ambulatory class IV on GDMT.596,612(Level of Evidence: B)CRT may be considered for patients who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern with a QRS duration of 150 ms or greater, and NYHA class III symptoms on GDMT.596,612(Level of Evidence: B)CRT may be considered for patients who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern with a QRS duration of 150 ms or greater, and NYHA class III symptoms on GDMT.596,612(Level of Evidence: B)CRT may be considered for patients who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern with a QRS duration of 150 ms or greater, and NYHA class III symptoms on GDMT.596,612(Level of Evidence: B)CRT may be considered for patients who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern with a QRS duration of 150 ms or greater, and NYHA class III symptoms on GDMT.596,612(Level of Evidence: B)CRT may be considered for patients who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern with a QRS duration of 150 ms or greater, and NYHA class III symptoms on GDMT.596,612(Level of Evidence: B)CRT may be considered for patients who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern with a QRS duration of 150 ms or greater, and NYHA class III symptoms on GDMT.596,612(Level of Evidence: B)CRT may be considered for patients who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern with a QRS duration of 150 ms or greater, and NYHA class III symptoms on GDMT.596,612(Level of Evidence: B)CRT may be considered for patients who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern with a QRS duration of 150 ms or greater, and NYHA class III symptoms on GDMT.596,612(Level of Evidence: B)CRT may be considered for patients who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern who have LVEF of 35% or less, sinus rhythm, a non-LBBB pattern who have LVEF of 35% or less, sinus rhythm, a non-LBBB pa may be considered for patients who have LVEF of 30% or less, ischemic etiology of HF, sinus rhythm, LBBB with a QRS duration of 150 ms or greater, and NYHA class I or II symptoms and non-LBBB pattern with QRS duration less than 150 ms.595,596,612(Level of Evidence: C)See Figure 2, indicated for patients whose comorbidities and/or frailty limit survival with good functional capacity to less than 1 year.38(Level of Evidence: C)See Figure 2, indications for CRT therapy algorithm. Figure 2, 2008; 14:316-21. CrossrefMedlineGoogle Scholar643. MasoudiUniversity of Colorado, Denver—Associate Professor of Medicine, Division of CardiologyNoneNoneNoneNoneNoneNoneNoneNoneNonePatrick E. Temporal trends in clinical characteristics, treatments, and outcomes for heart failure hospitalizations, 2002 to 2004: findings from Acute Decompensated Heart Failure National Registry (ADHERE). Am Heart J. Table 2 is a list of documents deemed pertinent to this effort and is intended for use as a resource; it obviates the need to repeat already extant guideline recommendations. GDMT is specifically referenced in the recommendations for the treatment of HF (Section 7.3.2). However, it is now known that some of the benefits of ACE inhibitors may be related to the accumulation of kinins rather than to the suppression of angiotensin II formation, whereas some of the adverse effects of ACE inhibitors in HF are related to the suppression of angiotensin II formation. In several placebo-controlled studies, long-term therapy with ARBs produced hemodynamic, neurohormonal, and clinical effects consistent with those expected after interference with the renin-angiotensin system. 2006; 98:944-8. CrossrefMedlineGoogle Scholar401. 2003; 362:759-66. CrossrefMedlineGoogle Scholar421. Nodari S, Triggiani M, Campia U, et al.. Cardiac resynchronization in chronic heart failure. N Engl J Med. Outcome Measures for HFMeasureDeveloperCongestive HF mortality rate (NQF endorsed)Agency for Health Research and QualityHF 30-day mortality rate (NQF endorsed)Centers for Medicaid ServicesTable 36. Nitroprusside is potentially of value in severely congested patients with hypertension or severe mitral valve regurgitation complicating LV dysfunction. Nesiritide (human BNP) reduces LV filling pressure but has variable effects on cardiac output, urinary output, and sodium excretion. Travers B, O'Loughlin C, Murphy NF, et al.. Cooper LT, Hare JM, prevalence, etiology, clinical correlates, and treatment options, Circulation, Wu IR, Moser DK, Lennie TA, et al., Bibbins-Domingo K, Lin F, Vittinghoff E, et al., The ACCF/AHA Task Force on Practice Guidelines (Task Force), charged with dev updating, and revising practice guidelines for cardiovascular diseases and procedures, directs and oversees this effort. 1968; 37:54-61. CrossrefMedlineGoogle Scholar453. Short-term intravenous milrinone for acute exacerbation of chronic heart failure: a randomized controlled trial. JAMA. 2012; 367:2296-304.CrossrefMedlineGoogle Scholar760. 2011; 17:622-5.CrossrefMedlineGoogle Scholar276. Clinical outcomes after cardiac transplant. Dunlay SM, Eveleth JM, Shah ND, et al.. 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Costs of heart failure-related hospitalizations in patients aged 18 to 64 years. Am J Manag Care. However, first-generation dihydropyridine calcium channel blockers also have myocardial depressant activity. Improving the diagnosis of acute heart failure using a validated prediction model.J Am Coll Cardiol. Mandell LA, Wunderink RG, Anzueto A, et al.. Ashley EA, Hershberger RE, Caleshu C, et al.. Piano MR. Pagani FD, Miller LW, Russell SD, et al.. Piano MR. Pagani FD, Piano MR. Pag heart failure, and mortality in an elderly cohort (the Cardiovascular Health Study). Am J Cardiol. Targeted myocardial transgenic expression of HIV Tat causes cardiomyopathy and mitochondrial damage. Am J Physiol Heart Circ Physiol. Postdischarge appointment for HF patients regardless of age, discharged from an inpatient facility to ambulatory care or home health care with a principal discharge diagnosis of HF for whom a follow-up appointment was scheduled and documented, including location, date, and time for a follow-up office visit or home health visit (as specified)InpatientFacilityMeasures are appealing for several reasons; by definition, they reflect the strongest guideline recommendations. Forfia PR, Watkins SP, Rame JE, et al.. In the case of HF, several national outcome measures are currently in use (Table 35), and the ACCF/AHA/American Medical Association-Physician Consortium for Performance Improvement recently published revised performance measures document includes several process measures for both inpatient and outpatient HF care (Table 36).921 Of note, the ACCF/AHA distinguish between processes of care that can be considered "Performance Measures" (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for accountability).922Table 35. 2001; 21:1-9 (ie, suitable for use for acco 15.CrossrefMedlineGoogle Scholar439. 2004; 10Suppl:S23.CrossrefGoogle Scholar758. 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Prevalence and etiology of idiopathic dilated cardiomyopathy (summary of a National Heart, Lung, and Blood Institute workshop). Am J Cardiol. 1995; 92:212-8. LinkGoogle Scholar418. Systolic blood pressure at admission, clinical characteristics, and outcomes in patients hospitalized with acute heart failure. JAMA. Inglis SC, Clark RA, McAlister FA, et al.. (Levels of Evidence: A, B, and C as appropriate)GDMT as depicted inFigure 1. Effects of enalapril on mortality in severe congestive heart failure: results of the Cooperative North Scandinavian Enalapril Survival failure: results of the antipation for HFrEF.108,343,345,346,412-426 (Level of Evidence: A) Figure 1. Effects of enalapril on mortality in severe congestive heart failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of the cooperative North Scandinavian Enalapril Survival failure: results of t Study (CONSENSUS).N Engl J Med. Gender differences in the effects of physical and emotional symptoms on health-related quality of life in patients with heart failure.Eur J Cardiovasc Nurs. 2008; 358:1887-98.CrossrefMedlineGoogle Scholar312. Fonarow GC, Stough WG, Abraham WT, et al.. Kato TS, Chokshi A, Singh P, et al.. Predictors of mortality after discharge in patients hospitalized Program to Initiate Lifesaving Treatment in Hospitalized Program to Initiate Lifesaving Treatment in Hospitalized Program to Initiate Lifesaving Treatment I. Committee on Standards for Developing Trustworthy Clinical Practice Guidelines; Institute of Medicine. Gislason GH, Rasmussen JN Abildstrom SZ, et al.. O'Connor CM, Hasselblad V, Mehta RH, et al.. Iron overload cardiomyopathy: better understanding of an increasing disorder. J Am Coll Cardiol. Patel MR, Dehmer GJ, Hirshfeld JW, et al.. Appropriate use of diuretics is a key element in the success of other drugs used for the treatment of HF. Aaronson KD, Schwartz JS, Chen TM. et al.. What is critically needed is an evidence base that clearly identifies best processes of care, especially in the transition from hospital to home. 2004; 110:724-31.LinkGoogle Scholar799. Presence of all the previous features despite "attempts to optimize" therapy, including diuretics and GDMT, unless these are poorly tolerated or contraindicated. and CRT when indicatedTable 24. 2009; 15:17-23. CrossrefMedlineGoogle Scholar68. Despite the lack of data with the vasodilator combination in patients who are intolerant of ACE inhibitors or ARBs, the combined use of hydralazine and isosorbide dinitrate may be considered as a therapeutic option in such patients. 7.3.2.6.2. Hydralazine and Isosorbide Dinitrate: Initiation and Maintenance. If the fixed-dose combination is available, the initial dose should be 1 tablet containing 37.5 mg of hydralazine hydrochloride and 20 mg of isosorbide dinitrate 3 times daily. These include a) clinical signs or symptoms of HF; b) evidence of preserved or normal LVEF; and c) evidence of abnormal LV diastolic dysfunction that can be determined by Doppler echocardiography or cardiac catheterization.41 The diagnosis of HFrEF because it is largely one of excluding other potential noncardiac causes of symptoms suggestive of HF. Bekelman DB, Havranek EP, Becker DM, et al.. Moss AJ, Hall WJ, Cannom DS, et al.. Omega-3 polyunsaturated fatty acids and cardiovascular diseases. J Am Coll Cardiol. 2006; 113:456-62. LinkGoogle Scholar Expressed in virtually all tissues, peroxisome proliferator-activated receptor gamma also regulates sodium reabsorption in the collecting ducts of the kidney. Prognostic value of galectin-3, a novel marker of fibrosis, in patients with chronic heart failure: data from the DEAL-HF study. Clin Res Cardiol. Their characteristics, treatment patterns, and outcomes appear similar to those of patients with HFpEF. b. CRT indicates cardiac resynchronization therapy; CRT-D, cardiac resynchronizat HF, heart failure; ICD, implantable cardioverter-defibrillator; LBBB, left bundle-branch block; LVEF, left ventricular tachyarrhythmias leading to SCD. Practical applications of intravenous diuretic therapy in decompensated heart failure. Am J Med. Beneficial effects of metoprolol in Dilated Cardiomyopathy: Metoprolol in Dilated Cardiomyopathy (MDC) Trial Study Group. Lancet. of pulse pressure may reflect adequacy of cardiac output. Accessed July 11, 2013. 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Because of this, a patient who presents with newly detected HF in the presence of AF with a rapid ventricular response should be presumed to have a rate-related cardiomyopathy until proved otherwise. Combined cardiac resynchronization and implantable cardioversion defibrillation in advanced chronic heart failure: the MIRACLE ICD Trial.JAMA. 2003; 289:1652-8. CrossrefMedlineGoogle Scholar506. The writing committee reviews and ranks evidence supporting each recommendation with the weight of evidence ranked as LOE A, B, or C according to specific definitions that are included in Table 1. Blecker S, Matsushita K, Kottgen A, et al.. Fonarow GC, Albert NM, Curtis AB, et al.. Incidence and prevalence of heart failure in elderly persons, 1994-2003. Arch Intern Med. Anker SD, Ponikowski P, Varney S, et al.. Hauptman PJ, Havranek EP. Carvedilol improves left ventricular function and symptoms in chronic heart failure: a double-blind randomized study. J Am Coll Cardiol. Konstam MA, Gheorghiade M, Burnett JC, et al.. 1971; 2:727–9. CrossrefMedlineGoogle Scholar504. Further research is needed to better characterize these patients. 2.1. HF With Reduced EF (HFrEF)In approximately half of patients with HFrEF) variable degrees of LV enlargement may accompany HFrEF.36,37 The definition of HFrEF has varied, with guidelines of left ventricular ejection fraction (LVEF) <35%, 65 years of age, including the diseases referred to above, as well as asthma, hypertension, cognitive disorders, or depression.847 Most RCTs in HF specifically excluded patients with significant other comorbidities from enrollment, thus limiting our ability to generalize our recommendations to many real-world patients. Steiness E, Olesen KH. Abraham WT, Young JB, Leon AR, et al.. Cook NR, Cutler JA, Obarzanek E, et al. 2004; 125:1431-40.CrossrefMedlineGoogle Scholar726. 2011 ACCF/AHA/HRS focused update on the management of patients with atrial fibrillation (updating the 2006 guideline): a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Circulation. 1991; 325:293-302.CrossrefMedlineGoogle Scholar414. 2010; 37:357-61.MedlineGoogle Scholar666. Butman SM, Ewy GA, Standen JR, et al.. These patients with improvement or reduced EF. The incidence of these adverse events was 5.5 mEq/L (approximately 12% in EMPHASIS-HF426) should generally trigger discontinuation or dose reduction of the aldosterone receptor antagonist unless other causes are identified. Influence of gender and reported alcohol intake on mortality in nonischemic dilated cardiomyopathy. Heart Dis. Most drugs used for the treatment of HF are prescribed on the basis of their ability to improve symptoms or survival rather than their effect on hemodynamic variables. Hohnloser SH, Kuck KH, Dorian P, et al.. Kaul S, Fishbein MC, Siegel RJ. 2011; 43:60-8. CrossrefMedlineGoogle Scholar244. 2010; 12:676-84. CrossrefMedlineGoogle Scholar828. Many of the considerations with initiation of an ARB are similar to those with initiation of an ACE inhibitor, as discussed previously. Setaro JF, Zaret BL, Schulman DS, et al.. Adaptation and maladaptation of the heart in diabetes: part I: general concepts. Circulation. The surgical or transcatheter management of critical aortic stenosis is an effective strategy with reasonable outcomes noted even in patients with advanced age (>80 years). Carvedilol inhibits clinical progression in patients with mild symptoms of heart failure: US Carvedilol Heart Failure Study Group. Circulation. These patients are often treated for underlying risk factors and comorbidities and with GDMT similar to that used in patients with HFrEF. 1988; 259:539-44. CrossrefMedlineGoogle Scholar486. This suggests ongoing myocyte injury or necrosis in these patients.238-241,276 In chronic HF, elaboration of cardiac troponins is associated with impaired hemodynamics,238 progressive LV dysfunction,239 and increased mortality rates.238-241,276 Similarly, in patients with acute decompensated HF, elevated cardiac troponin levels are associated with worse clinical outcomes and mortality253,257,263; decrease in troponin levels over time with treatment is associated with a better prognosis than persistent elevation in patients with chronic239 or acute HF.277 Given the tight association with ACS and troponin elevation as well as the link between MI and the development of acute HF,278 the measurement of troponin I or T should be routine in patients presenting with acutely decompensated HF syndromes.6.3.3. Other Emerging Biomarkers, including those reflecting inflammation, oxidative stress, neurohormonal disarray, and myocardial and matrix remodeling, have been widely examined for their prognostic value in HF. 2008; 1:170-7.LinkGoogle Scholar190. 1996; 335:1001-9.CrossrefMedlineGoogle Scholar355. Double-blind, placebo-controlled study of the effects of carvedilol in patients with moderate to severe heart failure: the PRECISE Trial: Prospective Randomized Evaluation of Carvedilol on Symptoms and Exercise.Circulation. Impact of early initiation of intravenous therapy for acute decompensated heart failure on outcomes in ADHERE.Cardiology. Additive beneficial effects of beta-blockers to angiotensin-converting enzyme inhibitors in the Survival and Ventricular Enlargement (SAVE) Study: SAVE Investigators.J Am Coll Cardiol. Postdischarge mortality actually increased from 4.3% to 6.4% during the same time frame.60 These observed temporal trends in HF survival are primarily restricted to patients with reduced EF and are not seen in those with preserved EF.40See Online Data Supplement 3 for additional data on mortality.4.2. HospitalizationsHF is the primary diagnosis in >1 million hospitalizations annually.51 Patients hospitalized for HF are at high risk for all-cause rehospitalization, with a 1-month readmission rate of 25%.61 In 2013, physician office visits for HF cost \$1.8 billion. The Joint Commission. Adelstein EC, Saba S. Heart disease and stroke statistics-2013 update: a report from the American Heart Association. Circulation. Therefore, the clinician must, as always, practice the art of using the best of the guideline recommendations as they apply to a specific patient. Future research will need to focus on novel pharmacological therapies, especially for hospitalized HF; regenerative cell-based therapies to restore myocardium; and new device platforms that will either improve existing technologies (eg, CRT, ICD, left VAD) or introduce simpler, less morbid devices that are capable of changing the natural history of HF. 1995; 86:1–7. CrossrefMedlineGoogle Scholar168. Boston, Mass: Little & Brown; 1994. Google Scholar168. Boston, Mass: Little & Brown; 1994. Google Scholar47. 1999; 18:202–10. CrossrefMedlineGoogle Scholar168. Boston, Mass: Little & Brown; 1994. Google Scholar168. Boston, Mass: Little & Brown; 1994. Boston, Mas management of cardiac sarcoidosis. Prog Cardiovasc Dis. Recommendations for Noninvasive Cardiac, pulmonary, and other diseases that may cause or contribute to the patient's symptoms. The most important considerations in the decision to proceed with a surgical or interventional appropriate concomitant GDMT. Cioffi G, Pozzoli M, Forni G, et al.. In clinical trials, thiazolidinediones have been associated with increased incidence of HF events, even in those without any prior history of clinical HF.557,583-588See Table 19 for a summary of recommendations from this section and Table 20 for strategies for achieving optimal GDMT; see Online Data Supplement 27 for additional data on thiazolidinediones. Table 19. 2003; 289:871-8. CrossrefMedlineGoogle Scholar 498. 2009; 6:1136-43. CrossrefMedlineGoogle Scholar 618. 2008; 43:635-55. CrossrefMedlineGoogle Scholar 618. 2008 LA, Boehmer J, et al.. Abraham WT, Fisher WG, Smith AL, et al.. Clinical practice guidelines we can trust. 2002; 40:271-82. CrossrefMedlineGoogle Scholar80. Any decompensation requiring intravenous diuretics or hospitalization within the previous month should make this person a Patient Profile 6 or lower. 7.4.2. Important Considerations in Determining If the Patient Is RefractoryPatients considered to have stage D HF should be thoroughly evaluated to ascertain that the diagnosis is correct and that there are no remediable etiologies or alternative explanations for advanced symptoms. 2003; 92:1350-4. CrossrefMedlineGoogle Scholar696. Prediction of heart failure mortality in emergen care: a cohort study.Ann Intern Med. 1999; 341:857-65.CrossrefMedlineGoogle Scholar573. Gottlieb SS, Dickstein K, Fleck E, et al.. Zaidi AR, Zaidi A, Vaitkus PT. 2005; 149:209-16.CrossrefMedlineGoogle Scholar108. Vasko MR, Cartwright DB, Knochel JP, et al.. Intravenous nesiritide, a natriuretic peptide, in the treatment of decompensated congestive heart failure.N Engl J Med. Chest x-ray is variably sensitive for the presence of interstitial or alveolar edema, even in the presence of elevated filling pressures. The total cost of HF care in the United States exceeds \$30 billion annually, with over half of these costs spent on hospitalizations.514.3. Asymptomatic LV DysfunctionThe prevalence of asymptomatic LV systolic or diastolic dysfunction ranges from 6% to 21% and increases with age.62-64 In the Left Ventricular Dysfunction had a 10% risk for developing HF symptomatic LV dysfunction ranges from 6% to 21% and increases with age.62-64 In the Left Ventricular Dysfunction had a 10% risk for developing HF symptomatic LV dysfunction had a 10% risk for developing HF symptomatic LV dysfunction for deve based population, asymptomatic mild LV diastolic dysfunction was seen in 21% and moderate or severe diastolic dysfunction in 7%, and both were associated with an increased risk of symptomatic HF and mortality.644.4. Health-Related Quality of Life and Functional StatusHF significantly decreases health-related quality of life (HRQOL), especially in the areas of physical functioning and vitality.66,67 Lack of improvement in HRQOL after discharge from the hospitalization and mortality.68,69 Women with HF have consistently been found, with Mexican Hispanics reporting better HRQOL than other ethnic groups in the United States.71 Other determinants of poor HRQOL include depression, younger age, higher body mass index (BMI), greater symptom burden, lower systolic blood pressure, sleep apnea, low perceived control, and uncertainty about prognosis.70,72-76 Memory problems may also contribute to poor HRQOL.76Pharmacological therapy is not a consistent determinant of HRQOL; therapies such as angiotensin-converting enzyme (ACE) inhibitors and angiotensin-receptor blockers (ARBs) improve HRQOL only modestly or delay the progressive worsening of HRQOL in HF.77 At present, the only therapies shown to improve HRQOL are cardiac resynchronization therapy (CRT)78 and certain disease management and educational approaches.79-82 Self-care and exercise may improve HRQOL, but the results of studies evaluating these interventions are mixed.83-86 Throughout this guideline we refer to meaningful survival as a state in which HRQOL is satisfactory to the patient. See Online Data Supplement 4 for additional data on HRQOL and functional capacity.4.5. Economic Burden of HFIn 1 in 9 deaths in the United States, HF is mentioned on the death certificate. Casey, JrClinically Integrated Physician Network, NYU Langone Medical Center—Vice President and Medical DirectorNoneNoneNoneNoneNoneMark H. Lip GY, Gibbs CR. Konstam MA, Neaton JD, Dickstein K, et al.. Telemonitoring or structured telephone support programmes for patients with chronic heart failure prediction in the elderly: the Health ABC heart failure score. Circ Heart Fail. 1999; 340:609-16. CrossrefMedlineGoogle Scholar111. Januzzi JL, Peacock WF, Maisel AS, et al.. Effects of treatment on morbidity in hypertension, II: results in patients with diastolic blood pressure averaging 90 through 114 mm Hg.JAMA. BNP-guided vs symptom-guided heart failure therapy: the Trial of Intensified vs Standard Medical Therapy in Elderly Patients With Congestive Heart Failure (TIME-CHF) randomized trial.JAMA. One is rate control of the patient's AF and see if HF and EF improve. 2000; 356:2052-8. CrossrefMedlineGoogle Scholar574. Evaluation and mortality have been demonstrated. Unrecognized left ventricular dysfunction in an apparently healthy cocaine abuse population. Clin Cardiol. 6-Minute walk distance <300 m c. Resynchronization therapy for the treatment of heart failure. Circulation. 2003; 107:2920–5. LinkGoogle Scholar809. Long-term follow-up of participants with heart failure in the Antihypertensive. and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT). Circulation. Response of blood pressure to Valsalva maneuver may reflect LV filling pressures. 197 PulseManual palpation will reveal strength and regularity of pulse rate. excess vasodilation from medications. Jugular venous pressure at rest and following abdominal compression useful finding on physical examination to identify congestive of valvular heart disease. Size and location of point of maximal impulseEnlarged and displaced point of maximal impulse suggests ventricular heaveSuggests significant right ventricular dysfunction and/or pulmonary status: respiratory rate, rales, pleural effusionIn advanced chronic HF, rales are often absent despite major pulmonary congestion. Hepatomegaly and/or ascitesUsually markers of volume overload. Peripheral edemaMany patients, particularly those who are young, may be not edematous despite intravascular volume overload. Tolerance to intravenous nitroglycerin in patients with congestive heart failure: role of increased intravascular volume, neurohumoral activation and lack of prevention with N-acetylcysteine. J Am Coll Cardiol. 2010; 303:1716-22. CrossrefMedlineGoogle Scholar145. Patients with elevated or normal blood pressure and heart rate may tolerate faster incremental increases in dosages. 5. Monitor renal function and electrolytes for rising creatinine and hyperkalemia, recognizing that an initial rise in creatinine may be expected and does not necessarily require discontinuation of therapy; discuss tolerable levels of creatinine above baseline with a nephrologist if necessary. the absence of instability in vital signs, reassure them that these symptoms are often transient and usually resolve within a few days of these changes in therapy.7. Discourage sudden spontaneous discontinuation of GDMT medications by the patient and/or other clinicians without discussion with managing clinicians.8. Carefully review doses of other medications for HF symptom control (eg, diuretics, nitrates) during uptitration.9. Consider temporary adjustments in dosages of GDMT during acute episodes of noncardiac illnesses (eg, respiratory infections, risk of dehydration, etc).10. Cardiac-resynchronization therapy for mild-to-moderate heart failure. N Engl J Med. 2009; 169:708uptoms of congestive heart failure during treatment with candesartan cilexetil.Circulation. Yancy CW, Lopatin M, Stevenson LW, et al.: 2002; 40:976-82.CrossrefMedlineGoogle Scholar270. Amino-terminal pro-brain natriuretic Peptide, renal function, and outcomes in 15.CrossrefMedlineGoogle Scholar335. Improvement in exercise tolerance and svr acute heart failure: redefining the cardiorenal interaction? J Am Coll Cardiol. 1982; 306:699-705. CrossrefMedlineGoogle Scholar488. Care information, must be transmitted in a timely and clearly understandable form to all of the patient's clinicians who will be delivering follow-up care. Owan TE, Hodge DO, Herges RM, et al.. The CONSENSUS Trial Study Group. Persistent use of evidence-based pharmacotherapy in heart failure is associated with improved outcomes. Circulation. Among those without a prior diagnosis, CAD should be excluded wherever possible. Alba AC, Rao V, Ross HJ, et al.. Diuretic combinations in refractory oedema states: pharmacokinetic-Other Multiple Comorbidities e29310. To minimize the risk of life-threatening hyperkalemia in euvolemic patients with HFrEF, patients should have initial serum potassium 3 months who present with severe clinical decompensation generally have less chance of recovery.113 Patients with idiopathic DCM have a lower total mortality rate than patients with other types of DCM.114 However, GDMT is beneficial in all forms of DCM.115-1175.2. Familial CardiomyopathiesIncreasingly, it is recognized that many (20% to 35%) patients with an idiopathic DCM have a familial cardiomyopathy (defined as 2 closely related family members who meet the criteria for idiopathic DCM).118,119 Consideration of familial cardiomyopathies includes the increasingly important discovery of noncompaction cardiomyopathies. 2008; 29:2388-442. CrossrefMedlineGoogle Scholar377. Figueredo VM. Sudden death in HFrEF has been substantially decreased by neurohormonal antagonists that alter disease progression and also protect against arrhythmias. 2011; 107:1375-80. CrossrefMedlineGoogle Scholar334. 2007; 334:885-8. CrossrefMedlineGoogle Scholar391. Social relationships and mortality in patients with congestive heart failure. J Psychosom Res. 2002; 121:1638-50. CrossrefMedlineGoogle Scholar137. Levine GN, Bates ER, Blankenship JC, et al.. Agha SA, Kalogeropoulos AP, Shih J, et al.. Hence, class I sodium channel antagonists and the class III potassium channel blockers d-sotalol and dronedarone should be avoided in patients with HF. (Level of Evidence: C)Class IIaCoronary 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 HFpEF despite GDMT. In a larger trial of 200 unselected patients with acute HF, ultrafiltration did reduce weight compared with bolus or continuous diuretics at 48 hours, had similar effects on the dyspnea score compared with diuretics, and improved readmission rate at 90 days.752 A randomized acute HF trial in patients with cardiorenal syndrome and persistent congestion has failed to demonstrate a significant advantage of ultrafiltration over bolus diuretic therapy.758,759 Cost, the need for veno-venous access, provider experience, and nursing support remain concerns about the routine use of ultrafiltration. Hershberger RE, Nauman D, Walker TL, et al.. Posttraumatic stress and the implantable cardioverter-defibrillator patient: what the electrophysiol. O'Gara PT, Kushner FG, Ascheim DD, et al.. Incidence and epidemiology of heart failure. Heart Fail Rev. 2008; 118:e523-661. LinkGoogle Scholar18. Clinical significance of elevated levels of cardiac troponin T in patients with chronic heart failure Am J Cardiol. 2007; 29:1771-83. CrossrefMedlineGoogle Scholar640. Kaneko Y, Floras JS, Usui K, et al.. Prevention of venous thromboembolism in medical patients with enoxaparin: a subgroup analysis of the MEDENOX study. Blood Coagul Fibrinolysis. Steinbeck G, Andresen D, Seidl K, et al.. Buxton AE, Lee KL, Fisher JD, et al.. Current scientific and translational research in the area aims to identify clinical, cellular, molecular, and genomic markers of cardiac recovery in the patient with VAD.678,679See Online Data Supplements 34 and 35 for additional data on MCS and left VADs.7.4.6. Cardiac transplantation is indicated for carefully selected patients with stage D HF despite GDMT, device, and surgical management.680(Level of Evidence: C)Cardiac transplantation is considered the gold standard for the treatment of refractory end-stage HF. Murberg TA. Tang WH, Shrestha K, Shao Z, et al. 2010; 16Suppl 1:S56-61.CrossrefMedlineGoogle Scholar725. Patients who have had sustained ventricular tachycardia, ventr risk for recurrence. Dupuis J, Lalonde G, Lemieux R, et al.. The ultimate goal of diuretic treatment is to eliminate clinical evidence of fluid retention. Abraham WT, Adams KF, Fonarow GC, et al.. 2011; 171:384-94. CrossrefMedlineGoogle Scholar313. 2011; 108:440-4. CrossrefMedline including immunosuppression, mechanical circulatory support (MCS), and transplantation, is warranted.5.6.2. Acquired Immunodeficiency syndromeThe extent of immunodeficiency s diagnosed with DCM during the 5-year follow-up. Faxon DP, Schwamm LH, Pasternak RC, et al.. Seyfarth M, Sibbing D, a revised score has not yet been fully studied in patients with HF. Brignole M, Botto G, Mont L, et al.. Seyfarth M, Sibbing D, Bauer I, et al.. Strauer BE, Yousef M, Schannwell CM. Lorenz KA, Lynn J, Dy SM, et al.. Effects of losartan on renal and cardiovascular outcomes in patients with HF will be able to maintain target weight without the use of diuretics. 7.3.2.1.2. Diuretics: Initiation and Maintenance. The most commonly used loop diuretic for the treatment of HF is furosemide, but some patients respond more favorably to other agents in this category (eq, bumetanide, torsemide) because of their increased oral bioavailability.434,435Table 14 lists oral diuretics recommended for use in the treatment of chronic HF. 2001;(4):CD003333. Effect of longterm resynchronization therapy on left ventricular remodeling in pacemaker patients upgraded to biventricular devices. Am J Cardiol. Even if symptoms do not improve, long-term treatment should be maintained to reduce the risk of major clinical events. 2009; 48:1003–32. CrossrefMedlineGoogle Scholar910. Freedland KE, Rich MW, Skala JA, et al.. 1995; 25:1225-31.CrossrefMedlineGoogle Scholar465. Abbreviations e327The medical profession should play a central role in evaluating the evidence related to drugs, devices, and procedures for the detection, management, and prevention of disease. Kleber FX, Witt C, Vogel G, et al.. Klein L, O'Connor CM, Leimberger JD, et al.. Peripherally inserted veno-venous ultrafiltration for rapid treatment of volume overloaded patients. J Card Fail. In reported studies, this therapy has been safe and very well tolerated.540-543 Further investigations are needed to better define optimal dosing and formulation of omega-3 PUFA supplements. mortality, hospital readmissions, chronic heart failure hospitalization rate and quality of life in patients with chronic heart failure: a systematic review. Patient Educ Couns. 2011; 86:273-81. CrossrefMedlineGoogle Scholar492. The patient should be transitioned to oral divertic therapy to verify its effectiveness. 1997; 96:856-63. CrossrefMedlineGoogle Scholar577. 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After discharge, many patients with HF need disease management programs, which are reviewed in Section 11.A systematic review of 35 educational intervention studies for patients with HF demonstrated that education improved knowledge, self-monitoring, medication adherence, time to hospitalization, and days in the hospital.363 Patients who receive in-hospital education.364 Data have called into question the survival benefit of discharge education.369,370 However, prior data have suggested that discharge education may result in fewer days of hospitalization, lower costs, and lower mortality rates within a 6-month follow-up.365 Patients educated in all 6 categories of the HF core measures from The Joint Commission were significantly less likely to be readmitted for any cause, including HF.366 Even a single homebased educational intervention for patients and families has been shown to decrease emergency visits and unplanned hospitalizations in adults with HF.367See Online Data Support Social support is thought to buffer stress and promote treatment adherence and a healthy lifestyle.371 Most studies examining the relationship between social support and hospitalization in adults with HF have found that a lack of social support is associated with higher hospitalization rates 372,373 and mortality risk.374,3757.3.1.3. Sodium Restriction: RecommendationClass IIaSodium restriction is reasonable for patients with symptomatic HF to reduce congestive symptoms. 1997; 336:525-33. CrossrefMedlineGoogle Scholar485. 2011; 4:293-300. LinkGoogle (HRS) and the European Heart Rhythm Association (EHRA). Europace. Bonow RO, Carabello BA, Chatterjee K, et al.. A chest x-ray may also show other cardiac chamber enlargement, increased pulmonary venous pressure, interstitial or alveolar edema, valvular or pericardial calcification, or coexisting thoracic diseases. May, Senior Director, Science and Clinical PolicyAmerican College of Cardiology Foundation/American Heart AssociationLisa Bradfield, CAE, Director, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Evidence- Based MedicineEzaldeen Ramadhan III, Specialist, Science and Clinical PolicyDebjani Mukherjee, MPH, Associate Director, Science Associate Director, PolicyAmerican Heart AssociationDonna K. 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