Practice Guidelines for the Diagnosis and Management of Systolic Heart Failure in Low- and Middle-Income Countries

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TABLE OF CONTENTS

Heart failure (HF) occurs when the cardiac output is not adequate to meet the metabolic demands of the tissues or is able to do so only at an elevated ventricular filling pressure.

CLINICAL ASSESSMENT

Symptoms of HF and relevant facets in history

Compiling the history of a patient with heart failure should focus on establishing the diagnosis; determining the etiology; evaluating functional status including shortness of breath, dizziness, history of hospitalizations, and fluid status; determining precipitating factors; and assessing comorbidities including thyroid function, sleep apnea, arthritis, and reviewing all medications.

History taking can often separate heart failure into ischemic cardiomyopathy and nonischemic cardiomyopathy, and the latter includes that due to hypertension, rheumatic heart disease, peripartum cardiomyopathy, human immunodeficiency virus (HIV) cardiomyopathy, alcoholic cardiomyopathy, and rarely chemotherapy-induced cardiomyopathy. The natural history of cardiomyopathy depends on the etiology (Figure 1) [1], with peripartum cardiomyopathy having the best prognosis and HIV cardiomyopathy having the worst prognosis.

Symptoms of heart failure such as edema, weight gain, and shortness of breath generally precede heart failure hospitalizations (Figure 2) [2]. Shortness of breath and orthopnea suggest left-sided heart failure. The presence of paroxysmal nocturnal dyspnea is due to alveolar edema and typically occurs 1 to 3 h after the patient retires to bed and resolves 10 to 30 min after the patient arises. In the EPICA (Epidemiologia da Insuficiência Cardiaca e Aprendizagem [Epidemiology of Heart Failure and Learning]) registry, the presence of paroxysmal nocturnal dyspnea, orthopnea, and shortness of breath suggested a high specificity (~99%) for heart failure [3]. Orthopnea has a sensitivity of 90% and specificity of 95% for elevated left ventricular (LV) filling pressure. In the ADHERE (Acute Decompensated Heart Failure National Registry) and OPTIMIZE-HF (Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients with Heart Failure) registries, approximately 90% of patients reported shortness of breath and about one-third of the patients had shortness of breath [4,5]. The severity of

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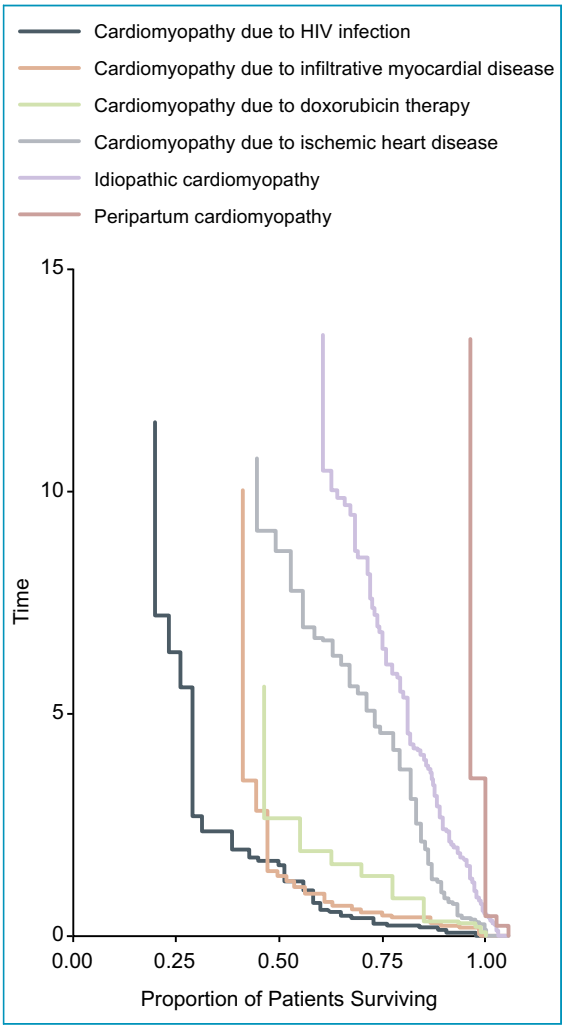

FIGURE 1. Adjusted Kaplan-Meier estimates of survival according to the underlying cause of cardiomyopathy. HIV, human immunodeficiency virus. Adapted, with permission, from Felker GM et al. [1]. Redrawn figure by Anthony Baker.

shortness of breath is used to determine the functional class. The New York Heart Association (NYHA) functional class sheds light not only on the prognosis, but it also determines therapy for systolic heart failure [6]. *In the SOLVD (Studies of Left Ventricular Dysfunction) database, 2-year mortality on optimal angiotensin-converting enzyme (ACE) inhibitor therapy in systolic heart failure patients with NYHA functional class IV was 40% to 50%, class III heart failure 30% to 40%, class II heart failure 20%, and NYHA class I was 10%* (Table 1). Cheyne-Stokes respiration, or periodic breathing, is common in advanced HF, is usually associated with low-output states, and may be perceived by the patient (and the patient's family) as either severe shortness of breath or transient cessation of breathing (often mistaken for sleep apnea). Shortness of breath can also be used to monitor response to therapy using the self-reported 7-point Likert dyspnea scale [7] (Table 2). A recent study using invasive hemodynamic measurements found that the short-term improvement of shortness of breath during therapy with vasodilators and diuretics depends on 2 hemodynamic variables: pulmonary capillary wedge pressure and mean pulmonary artery pressure (PAP). The improvement in shortness of breath correlated with both the absolute level and the magnitude of reduction of these 2 variables [8]. And the likelihood of achieving improvement in shortness of breath is particularly high when both pulmonary capillary wedge pressure and mean PAP were effectively reduced. However, there is no correlation between shortness of breath and improvements in other hemodynamic variables such as cardiac index and systemic vascular resistance. When patients are able to perform moderate levels of activity, shortness of breath is a relatively sensitive symptom of HF. However, it may not be prominent in patients who are inactive, and the diagnosis of HF is often delayed or overlooked. Also, shortness of breath may become less prominent with the onset of right ventricular (RV) failure and tricuspid regurgitation, which may lead to lower pulmonary venous pressures. It must be remembered that shortness of breath is also a common symptom of patients with pulmonary disease, obesity, or anemia and of sedentary individuals.

Chest pain is an important symptom that needs to be evaluated in all HF patients. The RESOLVD (Randomized Evaluation of Strategies for Left Ventricular Dysfunction) investigators [9] found that myocardial ischemia was the cause for hospitalization in 12% of the patients with systolic dysfunction, and in another study, the chest pain in HF patients was the presenting symptom for acute coronary syndrome in nearly one-third of the patients [10]. The presence of chest pain suggests demand ischemia, or in those without coronary artery disease, it suggests myocarditis, pulmonary embolism, pulmonary hypertension, or significant limitations in pericardial blood flow.

Fatigue in HF suggests low-flow state, but it may also be due to the presence of associated sleep apnea or depression. Patients with HF can be screened for depression with 2 questions: 1) Over the past 2 weeks, have you felt down, depressed, or hopeless? and 2) Over the past 2 weeks, have you felt little interest or pleasure in doing things [11,12]? According to the U.S. Preventive Services Task Force Recommendation Statement, these 2 simple questions are more sensitive and specific than lengthy statements or questionnaires [12]. The presence of depression is associated with increased likelihood of recurrent hospitalizations or mortality due to HF [13]. The presence of fatigue should also prompt evaluation for sleep apnea. Patients with HF may manifest either obstructive sleep apnea or central sleep apnea. The former is a comorbidity usually seen in overweight or obese patients, whereas central sleep apnea is a clinical manifestation of HF. Identification of central sleep apnea is important because treatment may benefit patients [14,15].

Lightheadedness or dizziness suggests that pulse pressure and/or systolic blood pressure (BP) is low or that