

Chronic Heart Failure: A Quality of Life Issue



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Hear failure (HF) is a complex clinical syndrome in which the heart is incapable of maintaining adequate cardiac output to accommodate metabolic requirements and venous return. It is characterized by impaired myocardial performance and progressive activation of the neuroendocrine system leading to circulatory insufficiency and congestion.

HF patients have a poor prognosis, with an average one-year mortality of 33%. In Canada, the incidence of hospitalization due to HF is estimated to increase three-fold over the next 30 years.¹

HF may affect the left, right, or both sides of the heart. Often, left HF leads to right HF causing biventricular failure. Table 1 provides the etiology of HF.

Symptoms and signs of HF

The term congestive HF is often overused to describe HF, but not all patients have congestion. Up to one-half of all patients with left ventricular (LV) systolic dysfunction are asymptomatic.

The spectrum of the clinical presentation varies markedly among patients. It can be acute, sub-acute or chronic. Two-thirds of HF is due to systolic dysfunction, characterized by impaired myocardial contractility and a reduction of LV

Robert's case

Robert, 63, has a history of hypertension and had an anterior wall MI 2 years ago that was treated with thrombolytic therapy. He presents with shortness of breath upon exertion for 2 weeks.

He also notes:

- increased swelling in his ankles,
- easy fatigability and
- poor appetite.

Medications

Robert's medications include:

- ACE inhibitor
- β -blocker
- Statin
- Acetylsalicylic acid

Physical examination

On physical examination, Robert's radial pulse is irregular and his jugular veins are distended. A heart and lung auscultation reveal a third heart sound (S3) and basilar rales.

A 12-lead ECG shows atrial fibrillation at a rate of 110 bpm. Chest x-rays reveal pulmonary edema and his B-type natriuretic peptide level is 854 pg/ml. An ECHO shows a dilated left ventricle (LV), hypokinesis consistent with the previous MI and a LV ejection fraction (EF) of 34%.

Turn to page 84 for more on Robert.

ejection fraction (EF). The other one-third have preserved systolic function but impaired diastolic function attributed to several underlying pathologies, such as myocardial ischemia,

Robert's case cont'd...

Discussion

Robert has underlying ischemic cardiomyopathy, presenting with typical features of congestive heart failure (HF). Appropriate chronic management of this condition includes:

- Education
- Lifestyle modification
- Low salt diet
- Fluid restriction

Treatment

Robert is treated with diuretics and anticoagulation is given with a target INR of 2.0 to 3.0. Digoxin and spironolactone may be added later if Robert's response to the previous measures is not adequate.

Cardiac resynchronization therapy and an implantable cardioverter defibrillator (ICD) should be considered if symptoms persist despite optimal medical therapy.

Table 1

Etiology of HF

- Ischemic heart disease
- Cardiomyopathy
- Congenital heart diseases
- Infection (e.g., viral)
- Toxins (e.g., alcohol)
- Severe anemia
- Valvular heart disease
- Prolonged arrhythmia
- Metabolic disorders (e.g., hypothyroidism)

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hypertension, infiltrative disease (e.g., amyloidosis), which cause restrictive cardiomyopathy. Table 2 lists the different presentations of left- vs. right-sided HF.

Diagnosis

The first step in assessing HF is a good history and physical examination, then the initiation of the appropriate diagnostic tests.

The initial work-up should include:

- ECG,
- chest x-ray,
- complete blood work,
- B-type natriuretic peptide (BNP) and
- ECHO.

Further investigations will depend on the results of the above work-up. This may include:

- radionuclide imaging,
- cardiopulmonary exercise testing and
- cardiac catheterization.

How does the BNP level help to diagnose HF?

BNP has a high negative predictive value for diagnosing HF. It is useful when clinical uncertainty, regarding the etiology of shortness of breath, is present. A normal level can exclude HF.

Management

Although HF is a serious condition that progressively gets worse over time, certain cases can be reversed with treatment. The goals of therapy are to:

- Relieve symptoms and improve quality of life

Table 2

Left-sided HF vs. right-sided HF

Left-sided HF	Right-sided HF
<ul style="list-style-type: none"> • Shortness of breath, either at rest or with exertion • Orthopnea • Paroxysmal nocturnal dyspnea • Dry cough • Fatigue and low exercise tolerance • Tachycardia, basilar rales, S3 gallop and pleural effusion 	<ul style="list-style-type: none"> • Swelling in the legs (e.g., edema) • Dry skin and leg ulcers • Hepatomegaly • Elevated jugular venous pressure • Nausea due to accumulation of fluid in the abdominal cavity and organs

- Slow disease progression
- Reduce the need for hospitalization
- Increase survival

For new onset HF, try to determine the type of cardiac dysfunction (systolic vs. diastolic) and the etiology then define prognosis and start therapy. Treatment options should be individualized based on etiology, clinical presentation and the severity of the HF. These options include treating the underlying causes and risk factors aggressively. Treatment may range from medications, to revascularization, including the possibility of an implantable cardioverter defibrillator (ICD) or cardiac resynchronization therapy.

Lifestyle changes

Lifestyle changes to consider in the treatment process include:

- Modify daily activities
- Low sodium and fat diet
- Smoking cessation
- Avoid alcohol or limit intake
- Weight reduction
- Regular exercise
- Physical rehabilitation program
- Daily weight monitoring
- Close outpatient monitoring

Medications

A number of medications are prescribed for HF. All patients with a LVEF < 40% should be treated with an ACE inhibitor and β -blocker, unless specific contraindications exist. The maximum tolerated doses should be used. A simplified algorithm for HF management is shown in Figure 1.

In Canada, the incidence of hospitalization due to HF is estimated to increase three-fold over the next 30 years.

Types of medication

Ace inhibitor

An ACE inhibitor is a vasodilator that counteracts the action of angiotensin II, which is formed by the body to regulate HF (but can also contribute to disease progression). An ACE inhibitor improves survival while reducing mortality and hospitalization.^{3,4}

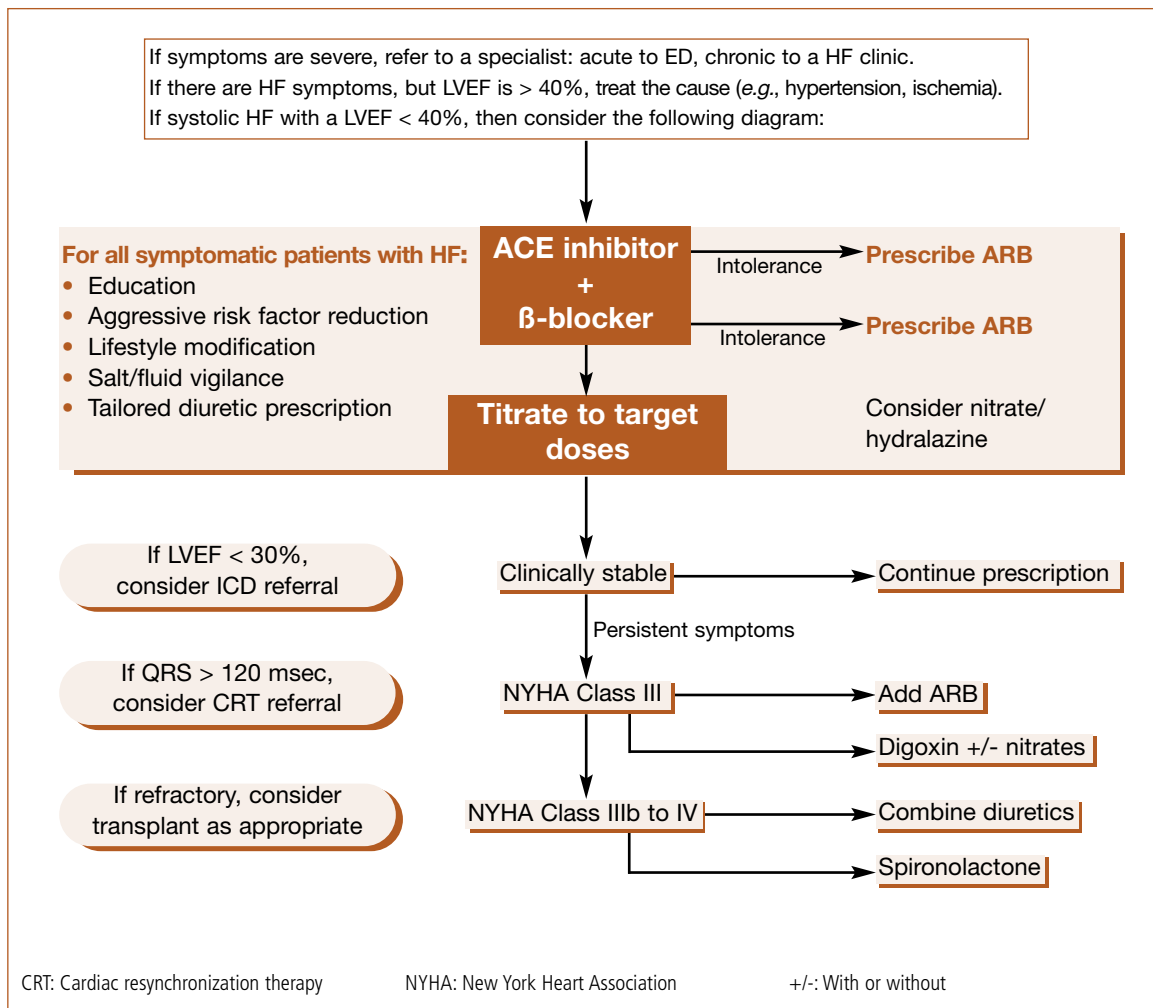


Figure 1. Simplified treatment algorithm for HF management, including drug and service therapy. Taken from Arnold JM, Howlett JG, Dorian P, et al: Canadian Cardiovascular Society Consensus Conference Recommendations on Heart Failure Update 2007: Prevention, Management During Intercurrent Illness or Acute Decompensation, and Use of Biomarkers. Can J Cardiol 2007; 23(1):21-45.

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An increase in creatinine of up to 30% is not unexpected after introducing an ACE inhibitor. The discontinuation of the drug is not recommended unless creatinine or potassium levels are progressively increasing, or an intolerable cough develops.

If a patient cannot tolerate an ACE inhibitor, then valsartan or candasartan are possible alternatives.^{7,8}

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β-blockers

β-blockers have been shown to improve survival, reduce mortality and hospitalization.^{5,6}

The doses should be doubled every two to four weeks if BP and heart rate are stable. Objective improvements in LV function may not be apparent for six to 12 months or longer. A major reduction of the dose or an abrupt withdrawal should be avoided. In acute decompensated HF, β-blocker dose down-titration may be required, but not necessarily discontinued, unless the patient is in cardiogenic shock.

Loop diuretics

Loop diuretics, such as furosemide, are recommended for patients with congestive symptoms. Once acute congestion is cleared, the lowest dose should be used that is compatible with stable signs and symptoms.

In patients with persistent volume overload, the cautious addition of a second diuretic (e.g., metolazone) may be considered with close monitoring of daily weight, creatinine and potassium levels.

Spirolactone

Spirolactone is a potassium-sparing diuretic which has been shown to reduce hospitalization

and prolong life when used to treat advanced HF (LVEF < 30% and severe symptoms).⁹

Supplements

Potassium and magnesium supplements are often prescribed with diuretics to replace the urine loss of these minerals.

Digoxin

Digoxin helps to relieve symptoms and to reduce hospitalization in patients with sinus rhythm who have persistent moderate-to-severe symptoms, despite optimized HF medical therapy.

Combinations

A combination of nitrates and hydralazine can be used as an alternative therapy for patients who are unable to tolerate ACE inhibitors and ARBs.

Anticoagulation therapy

Anticoagulation therapy should be given to all patients with HF and associated atrial fibrillation, or intracardiac thrombus and should be considered for patients with a severe reduction in EF.

Remember...

Calcium channel blockers, thiazolidinediones, anti-arrhythmics, NSAIDs and chemotherapeutic agents should all be used cautiously.



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Take-home message

- HF is a common disease that reduces quality of life, exercise tolerance and survival
- New treatments have greatly improved prognosis and many patients can now hope for long periods of stable, improved symptoms and heart function

An ACE inhibitor improves survival while reducing mortality and hospitalization.


ICD therapy

ICD therapy should be considered in those patients who have ischemic heart disease with or without mild-to-moderate HF symptoms and a LVEF < 30%, measured one month post-MI or three months post-coronary revascularization, or in those with non-ischemic cardiomyopathy present for at least nine months, New York Heart Association functional class II to III HF and a LVEF < 30%.¹⁰

Patients with symptomatic HF, despite optimal medical therapy and who are in normal sinus rhythm with a QRS duration \geq 120 msec and a LVEF < 35 %, should be considered for cardiac resynchronization therapy.

Surgical treatments

Surgical treatment for HF include:

- Revascularization/mitral valve repair or replacement
- Surgical ventricular reconstruction
- LV/right ventricular assist device
- Heart transplantation 

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