Heart failure: understanding the condition and navigating its management

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Abstract

Heart failure (HF) is a progressive clinical syndrome that affects millions of people worldwide and significantly contributes to morbidity and mortality. The condition presents as inadequate blood supply to comply with the body's oxygen requirements because of inefficient heart function. Underlying comorbidities such as hypertension, diabetes, and structural heart disease can cause progressive heart failure.

HF can be divided into three primary categories: heart failure with reduced ejection fraction (HFrEF), heart failure with mid-range ejection fraction (HFmrEF), and heart failure with preserved ejection fraction (HFpEF). Each type presents unique challenges regarding diagnosis and treatment, necessitating tailored clinical strategies. Pharmacological therapies such as ACE-inhibitors, beta-blockers, mineralocorticoid receptor antagonists (MRAs), angiotensin receptor-neprilysin inhibitors (ARNIs), and sodium-glucose cotransporter-2 (SGLT2) inhibitors are essential in the management of heart failure. Non-pharmacological interventions like lifestyle modifications, smoking cessation and dietary management are important. The significance of a multidisciplinary approach, particularly in enhancing long-term outcomes and quality of life in the management of HF are important.

Effective management of heart fHF requires a balance between adherence to clinical guidelines and the provision of individualised care. By integrating evidence-based medicine with comprehensive patient support, healthcare providers can more effectively address the complexities of HF, enabling patients to manage their condition with increased confidence and dignity.

This article examines the fundamental aspects of HF, including its pathophysiology, classification, and symptoms, while underscoring the critical need for early diagnosis and patient-centred care, through a multidisciplinary approach.

Keywords: heart failure, angiotensin-converting enzyme inhibitor, multidisciplinary management

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Introduction

Heart failure (HF) significantly contributes to global morbidity and mortality, with an estimated 64.3 million individuals globally impacted.[1,2] Due to its high prevalence and unfavourable clinical outcomes, HF is linked to recurrent hospitalisations and significant healthcare costs.[3,4] Figure 1 depicts the global incidence of heart failure, including the mortality rate. When the syndrome is left untreated or not well managed, the disease is fatal. The rising prevalence of HF in low- and middle-income countries can be attributed to an epidemiological transition alongside a notable increase in the prevalence of contributing factors, including hypertension, diabetes mellitus, dyslipidaemia, and obesity. Additionally, lifestyle changes, characterised by reduced physical activity, heightened alcohol consumption and smoking further exacerbate this issue.[4,5] Currently, there is minimal data regarding the prevalence of HF in Africa due to a lack of sufficient population studies. However, findings from the Heart of Soweto Study cohort (2006),[6] South Africa, revealed that among 1 960 patients diagnosed with HF, 43% experienced incident, or new onset HF, and 23% of these individuals exhibited HF with preserved ejection fraction (HFpEF).[6] In sub-Saharan Africa, hospital-based studies report prevalence rates for HF ranging from 12–33% of adult populations.[6] The overall prevalence of HF in the adult population of developed countries ranges from 1–3%, exhibiting an exponential increase in incidence with advancing age. It affects between 6–10% of individuals aged 65 years and older.[7]

HF is a clinical condition marked by anatomical and functional abnormalities in the myocardium that restrict ventricular filling or ejection of blood. The result of HF is a complex syndrome including fluid build-up and reduced blood flow leading to oxygen deprivation, reduced waste excretion and hypoxaemia in other organs.[1,8]

The objectives of the clinical approach to HF are: (i) accurate diagnosis of the clinical syndrome; (ii) identification and management of the underlying cause; and (iii) implementation of an effective management strategy for symptom control, prolonging survival, and reversing factors that contribute to HF exacerbations.[3,4]

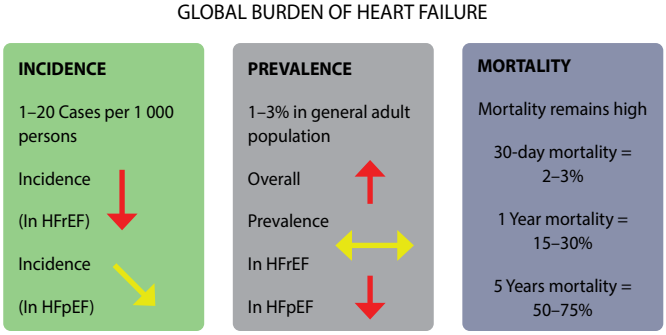

Figure 1: Global burden of heart failure[6]

Pathophysiology and symptoms

HF is a clinical syndrome resulting from structural or functional cardiac abnormalities that impair ventricular filling or ejection, leading to reduced cardiac output and elevated intracardiac pressures. A key component of HF progression is activation of the renin-angiotensin-aldosterone system (RAAS), which promotes vasoconstriction and fluid retention through aldosterone-mediated sodium reabsorption. Concurrent stimulation of the sympathetic nervous system (SNS) increases heart rate and contractility, but chronic activation contributes to myocardial injury, arrhythmogenesis, and adverse remodelling.[9]

Clinically, HF presents with dyspnoea, orthopnoea, peripheral oedema, fatigue, and pulmonary crackles, reflecting elevated filling pressures and inadequate tissue perfusion.[10] Prompt recognition and understanding of these mechanisms is essential for appropriate diagnosis and management.

Classification of heart failure

HF is mainly classified into three different categories, namely heart failure with reduced ejection fraction (HFrEF), heart failure with mid-range ejection fraction (HFmrEF) and heart failure with preserved ejection fraction (HFpEF).[7] Systolic heart failure, alternatively referred to as HFrEF, is characterised by a left ventricular ejection fraction (LVEF) of less than 40% and systolic dysfunction.[3] Diastolic heart failure, also known as HFpEF, is characterised by impaired left ventricular relaxation, which leads to restricted filling of the left ventricle, while maintaining a LVEF of 50% or greater.[3] HF with preserved ejection fraction is typically a diagnosis of exclusion, often seen in elderly, female, obese patients with a history of hypertension and atrial fibrillation.[2,9,11] HF with mid-range ejection fraction denotes a "grey area," characterised by a mid-range LVEF of 40–49%, possibly indicating the early recovery phase of HfrEF.[2]

Management of heart failure

HF presents a significant global health challenge that necessitates a multidisciplinary approach. Despite recent advancements in pharmacological and interventional therapies, morbidity and mortality rates among these patients continue to be elevated.[12] The major goals of treatment for patients with heart failure according to Inamdar (2016)[8] are to improve the prognosis and reduce mortality, to alleviate symptoms and reduce morbidity by reversing or slowing down the cardiac and peripheral dysfunction. For admitted patients, the goal is to reduce the length of hospital stay and subsequent re-admissions, to prevent organ system damage and lastly to appropriately manage the comorbidities that may contribute to poor prognosis.[8]

Effective management of HF poses a significant challenge for cardiologists.[13] The complexity of this condition, combined with the growing number of available pharmacological treatments, necessitates standardised approaches to enhance the effectiveness of HF therapy in reducing mortality and re-hospitalisation rates.[13] It necessitates a comprehensive approach that includes pharmacological treatments, lifestyle changes, device interventions and collaborative multidisciplinary care.[1,14,15] The European Society of Cardiology (ESC) has developed guidelines by evaluating the evidence level and the strength of recommendations for specific management options and categorised them based on established criteria as outlined in Table I.[15]

Table I: Classes of recommendations, adopted from ESC[15]

Class	Definition	Wording to use
1	Evidence and/or general agreement that a given treatment option is beneficial, useful and effective.	Recommended/ Indicated
2	There is conflicting evidence about the efficacy of the treatment or procedure.	
2a	The weight of the evidence is in favour of usefulness or efficacy	Should be considered
2b	There is less evidence to support the efficacy of the treatment.	May be considered
3	The evidence or general agreement that the given treatment or procedure is not useful or effective and in some cases may be harmful.	Not Recommended

Treatment with angiotensin-converting enzyme inhibitors (ACE-Is) and angiotensin receptor blockers (ARBs) has led to a significant improvement in the prognosis of heart failure patients.[16] The current guidelines from the European Society of Cardiology (ESC) and the American College of Cardiology/American Heart Association (ACC/AHA) recommend initiating treatment with

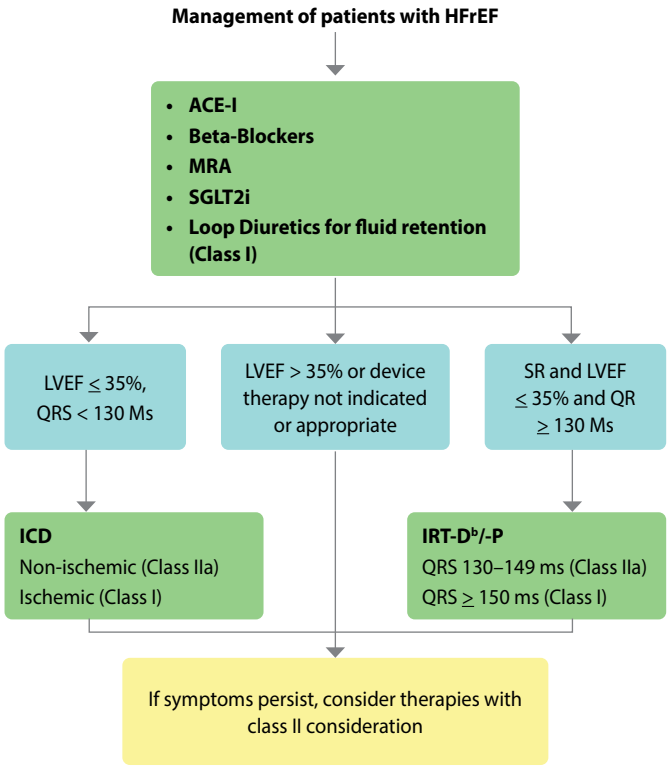

Figure 2: ESC 2021 therapeutic algorithm of Class I Therapy Indications for a patient with heart failure with a reduced ejection fraction[15]

angiotensin-converting enzyme inhibitors/angiotensin receptor blockers ± neprilysin inhibitors (ACE-I/ARNI), a combination of angiotensin receptor blocker and neprilysin inhibitor to treat specifically HFrEF. βeta-blockers (BB), mineralocorticoid receptor antagonists (MRAs), and sodium glucose cotransporter-2-inhibitors (SGLT2i) additionally lower the risk of mortality and hospitalisation in patients with heart failure with reduced ejection fraction.[13]

The main goal of these medications is to alleviate symptoms, reduce fluid retention, and improve heart function.[17] Patients with HFrEF should participate in a disease management programme, managed by a multidisciplinary team. A variety of treatment options are available, and patients should be regularly assessed for their eligibility for each treatment modality, as shown in Figure 1.[18]

The goals of therapeutic therapies for heart failure with preserved ejection fraction (HFpEF) are to manage comorbidities, avoid disease progression, enhance quality of life, and reduce symptoms. The mainstays of treatment include dietary changes, exercise, weight loss, and reduced sodium intake (table salt). A blood pressure target of less than 130/80 mm Hg is advised for antihypertensive treatments, such as diuretics, ARNIs, ARBs, and MRAs. It has been demonstrated that beta-blockers, sacubitril-valsartan, and sodium-glucose cotransporter-2 inhibitors (SGLT2i) are advantageous.[19] The treatment of heart failure I patients with preserved ejection fraction heart failure is summarised in Figure 3.[20] (Refer to Table I for explanation of the strength of recommendations)

The role of the pharmacist in management of heart failure

Pharmacists play an important role in the multidisciplinary management of heart failure by optimising medication therapy, enhancing adherence, and reducing hospital readmissions. Their involvement in medication reconciliation, especially during transitions of care, helps prevent errors and ensures continuity of treatment. Pharmacists, being the custodians of medication, often have information on latest guidelines and new treatment modalities and should provide that information to other members of the multidisciplinary team. They provide patient education on proper medication use and lifestyle changes, empowering patients to manage their condition more effectively. Pharmacists can monitor patient adherence and stress the importance of adherence of their treatment regimens. Through collaborative care, pharmacists contribute to improved therapeutic outcomes, greater patient satisfaction, and increased self-care ability. As treatments for heart failure evolve, the role of pharmacists continues to expand, reinforcing their value in chronic disease management.[21,22]

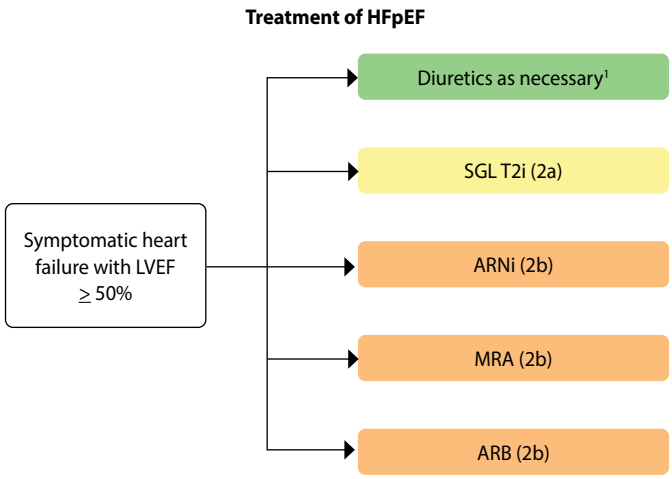

Figure 3: Recommendations for patients with LVEF (≥ 50%)

Schumacher et al. (2021)[23] found through the results of their systemic review that pharmacist care in a clinic setting can improve patient knowledge on their condition, medication adherence, and optimise symptom control. When the complexity of guideline-directed management of conditions like HF is considered, the pharmacist is in a unique position to focus on medication management and patient education, which is a necessary part of the management strategy for these vulnerable patients.[23]

Conclusion

HF, a clinical syndrome with underlying comorbidities like hypertension, diabetes and structural heart disease, globally still contributes significantly to morbidity and mortality. The management of HF treated with angiotensin-converting enzyme inhibitors and angiotensin receptor blockers has led to a significant improvement in the prognosis of HF patients. Pharmacists, as part of the multidisciplinary team, can make a positive impact on the management of HF patients. Pharmacists contribute by doing medication reconciliation and stressing the importance of adherence. Pharmacists may further monitor symptom control and provide education to patients. Pharmacists continue expanding their roles to meet the demands, reduce medication-related costs, and improve quality of care for cardiac patients in an ever-changing healthcare system.

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