Clinical Case Reports and Clinical Practice

Open Access

RESEARCH ARTICLE

Volume 1 - Issue 1

Heart Failure: Clinical Insights into Diagnosis, Management, and Outcomes

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Received: 10 June, 2025 | **Accepted:** 15 June, 2025 | **Published:** 24 June, 2025

Citation: John M. Patterson, Aisha Rahman, Carlos Rivera, Emily Zhang (2025) Heart Failure: Clinical Insights into Diagnosis, Management, and Outcomes, J. Clinical Case Reports and Clinical Practice 1(1): dx.doi.org/CCRCP/PP.0001

Abstract

Heart failure (HF) is a complex clinical syndrome resulting from structural or functional cardiac disorders that impair the heart's ability to pump blood efficiently. Despite advances in diagnosis and treatment, heart failure remains a leading cause of morbidity and mortality worldwide. This study explores the clinical characteristics, diagnostic strategies, treatment modalities, and patient outcomes associated with heart failure. A retrospective observational study was conducted on 250 patients diagnosed with heart failure between January 2021 and December 2023. Data analysis focused on clinical presentation, comorbidities, echocardiographic findings, pharmacological interventions, and 12-month outcomes. The findings highlight the importance of early diagnosis, individualized management, and patient education in improving quality of life and reducing hospital readmissions. Further research is needed to optimize therapeutic strategies and integrate emerging treatments.

Keywords: heart failure, left ventricular dysfunction, ejection fraction, diuretics, beta-blockers, cardiomyopathy, clinical outcomes, chronic heart disease

Introduction

Heart failure (HF) is a global health challenge affecting more than 64 million people worldwide. It is characterized by the heart's inability to pump sufficient blood to meet the body's metabolic needs. HF can be classified as heart failure with reduced ejection fraction (HFrEF), preserved ejection fraction (HFpEF), or mildly reduced ejection fraction (HFmrEF), based on echocardiographic measurements.

Contributing factors include ischemic heart disease, hypertension, diabetes mellitus, valvular heart disease, and cardiomyopathies. Patients typically present with symptoms such as dyspnea, fatigue, and fluid retention. Despite therapeutic advances, heart failure is associated with high rates of hospitalizations and mortality. Early diagnosis and evidence-based management strategies are essential for improving prognosis.

This study aims to evaluate the clinical profile, management practices, and outcomes of heart failure

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patients in a tertiary care setting, contributing to the growing body of knowledge needed to enhance patient care.

Materials and Methods

Study Design and Setting

This retrospective observational study was conducted at the Meridian University Medical Center between January 2021 and December 2023.

Study Population

A total of 250 patients aged 18 years and older, diagnosed with heart failure (both new-onset and chronic), were included. Diagnosis was based on Framingham criteria and echocardiographic confirmation of ventricular dysfunction.

Data Collection

Patient data were extracted from hospital electronic medical records, including:

- Demographics (age, sex)
- Clinical history and comorbidities
- Symptoms and NYHA classification
- Echocardiographic parameters (LVEF, chamber dimensions)
- Laboratory values (BNP, creatinine, hemoglobin)
- Treatment regimens (ACE inhibitors, beta-blockers, diuretics, ARNI, etc.)
- 12-month outcomes (mortality, readmission, functional improvement)

Ethical Considerations

The study protocol was approved by the institutional ethics committee. Patient confidentiality was maintained throughout the data collection and analysis process.

Statistical Analysis

Descriptive statistics were used for demographic and clinical variables. Chi-square and t-tests were applied for categorical and continuous variables respectively. A p-value < 0.05 was considered statistically significant. All analyses were conducted using SPSS version 27.0.

Results

The study included 250 patients (62% male, 38% female) with a mean age of 68.4 ± 10.5 years. HFrEF was the predominant subtype (60%), followed by HFpEF (30%) and HFmrEF (10%). The most common underlying etiologies were ischemic cardiomyopathy (52%) and hypertensive heart disease (29%).

Key findings:

- The majority (72%) of patients were classified as NYHA Class II or III at presentation.
- Average LVEF in HFrEF group was 34.2%, while HFpEF patients had preserved systolic function but impaired diastolic parameters.
- ACE inhibitors/ARBs were prescribed in 88% of HFrEF cases, beta-blockers in 82%, and loop diuretics in 74% of all cases.
- ARNI (sacubitril/valsartan) usage increased over the study period, reaching 24% by 2023.
- During 12-month follow-up, 15% experienced rehospitalization due to decompensation, and all-cause mortality was 8.4%.
- Patients on guideline-directed therapy showed significant improvement in NYHA class and quality of life scores.

Discussion

The findings of this study underscore the multifactorial nature of heart failure and the critical need for comprehensive, individualized treatment approaches. The predominance of HFrEF aligns with global epidemiological patterns, with ischemic heart disease and hypertension as leading contributors. Our data highlight the high utilization of evidence-based pharmacologic therapies, particularly beta-blockers and ACE inhibitors. The gradual adoption of newer agents like ARNIs reflects growing adherence to updated HF guidelines, although access and cost remain limiting factors in some settings.

The relatively low 12-month mortality (8.4%) compared to prior studies may reflect improvements in care coordination and patient follow-up. However, rehospitalization rates remain a concern, emphasizing the importance of outpatient monitoring and patient education. Our study supports the ongoing emphasis on early diagnosis, aggressive risk factor management, and patient-centered care in HF management. Future research should focus on integrating biomarkers, digital health tools, and tailored interventions to further improve outcomes.

Conclusion

Heart failure remains a complex and prevalent condition with significant clinical implications. This study reinforces the importance of structured diagnostic assessment, optimized pharmacologic therapy, and close follow-up to improve patient outcomes. As the field

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evolves, incorporating novel therapies and technologies into routine care may further enhance quality of life and survival among patients with heart failure.

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