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Clinical and laboratory profiles of acute heart failure patients at Saigon General Hospital: A cross-sectional study

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Abstract

Introduction: Acute heart failure (AHF) is a multifaceted clinical syndrome that commonly necessitates urgent hospitalization and remains associated with considerable in-hospital mortality. Despite improvements in emergency care, AHF continues to account for a significant proportion of admissions at Saigon General Hospital.

Objective: This study sought to characterize the clinical and paraclinical profiles of patients admitted with AHF and identify factors associated with unfavorable in-hospital outcomes, to facilitate early risk stratification and improve therapeutic strategies.

Methods: A prospective cross-sectional study was conducted, including 177 patients with AHF admitted to the Emergency and Intensive Care Department of Saigon General Hospital from April 1 to October 31, 2025. Data collected included demographic characteristics, clinical manifestations, underlying comorbidities, laboratory parameters, imaging findings, and echocardiographic measurements. Statistical analysis was conducted to evaluate clinical patterns and associated outcomes.

Results: The mean age of participants was 72.1 years, with male predominance. Dyspnea was the most prevalent presenting symptom (88.6%), whereas a third heart sound was infrequently detected (23.8%). Mean systolic and diastolic blood pressures were 113 ± 34 mmHg and 67 ± 15 mmHg, respectively. Chest radiography most frequently demonstrated cardiomegaly (51.0%), pulmonary congestion (13.7%), and pleural effusion (6.1%). The mean N-terminal pro-B-type natriuretic peptide concentration was 7,539.02 ± 491.53 pg/mL, and the mean left ventricular ejection fraction was 41.5 ± 6.9%. Ischemic heart disease was identified as the principal etiology (58.2%), followed by cardiomyopathy (14.7%), while congenital heart disease (1.1%) and myocarditis (0.6%) were uncommon causes. The leading precipitating factors were medication non-adherence (19.2%), infections (17.5%), and acute coronary syndrome (17.5%).

Conclusion: Ischemic heart disease emerged as the predominant cause of AHF. Medication non-adherence, infections, and acute coronary syndrome were the most common triggers of decompensation. These findings underscore the necessity for early recognition of high-risk individuals and emphasize the role of patient education and optimized management in improving in-hospital outcomes.

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1. Introduction

Heart failure is one of the most serious cardiovascular conditions worldwide and represents a major public health burden. Its prevalence continues to increase due to population aging and improved survival resulting from advances in cardiovascular therapies.[1,2] Heart failure is a multifactorial clinical syndrome.[1] Its acute form, acute heart failure (AHF), involves the rapid or sometimes progressive onset of symptoms and/or signs requiring urgent medical care, often leading to unplanned hospitalization or an emergency department visit, and is associated with high mortality. AHF may manifest as an initial presentation of heart failure (*de novo* heart failure) or, more frequently, as an acute exacerbation of established chronic heart failure. Compared with individuals hospitalized for acute decompensation of chronic heart failure, patients with new-onset heart failure often face a greater risk of in-hospital mortality, yet generally experience lower rates of death and rehospitalization following discharge.[1]

In individuals with underlying heart impairment, various external triggers may precipitate an episode of AHF, although they are not the primary cause of the disease. The clinical severity at presentation and the patient's in-hospital course are shaped by the dynamic interaction among precipitating factors, the underlying cardiac substrate, and coexisting comorbid conditions.[1] Patients with AHF require immediate clinical assessment followed by initiation or escalation of therapy, often including intravenous treatments or urgent procedures. In the elderly population, particularly those above 65 years, AHF is a major cause of hospital admission and carries a guarded prognosis. Short-term mortality during hospitalization is estimated at 4–10%, while long-term mortality reaches roughly 25–30% within the first year following discharge, with combined rates of death or rehospitalization exceeding 45%.[1,3-8] In addition to its high mortality and rehospitalization rates, AHF imposes a substantial economic and healthcare system burden. Recurrent admissions, prolonged hospital stays, and the need for intensive monitoring and advanced therapies significantly increase healthcare costs. Elderly patients, who constitute the majority of AHF admissions, often present with frailty, multiple comorbidities, and polypharmacy, further complicating management and discharge planning. Early risk stratification at presentation is therefore essential to guide therapeutic decisions, allocate resources appropriately, and improve short-term outcomes. Biomarkers such as natriuretic peptides, cardiac troponins, and indices of renal function are essential for confirming the diagnosis, determining clinical severity, and guiding prognostic assessment. Imaging modalities, particularly echocardiography, are indispensable for identifying underlying structural abnormalities and guiding targeted therapy. Despite advances in guideline-directed medical therapy, gaps remain in optimizing treatment during hospitalization and during the transition to outpatient care. Structured discharge planning, patient education, and close post-discharge follow-up are crucial strategies to reduce early readmission and improve long-term survival. Although significant advances in acute management have been achieved,[9,10] AHF remains a common cause of hospitalization, accounting for approximately 2% of all hospitalizations at Saigon General Hospital.

Our study aimed to provide a comprehensive assessment of the clinical and paraclinical features associated with unfavorable in-hospital outcomes. This may facilitate early recognition of high-risk patients and promote the timely initiation of intensified therapeutic interventions to enhance prognosis and reduce in-hospital mortality at Saigon General Hospital. Furthermore, the findings aim to support more efficient resource utilization and informed clinical decision-making.

2. Study population and methods

2.1. Study population

Patients diagnosed with AHF and treated at Saigon General Hospital between April 1 and October 31, 2025, were consecutively recruited after providing informed consent to participate in the study. Acute heart failure was defined as the sudden development or deterioration of heart failure symptoms and signs necessitating urgent medical evaluation and hospital admission. The definition encompassed both new-onset (*de novo*) AHF in individuals without a previous diagnosis of heart failure and acute exacerbation of chronic heart failure in patients with established disease.[1] Inclusion criteria included:

(i) Adults (≥18 years).
(ii) A confirmed diagnosis of AHF—either *de novo* presentation or acute decompensation of chronic heart failure—established based on clinical symptoms, physical examination findings, and relevant paraclinical investigations in accordance with contemporary heart failure guidelines.

(iii) Hospitalization in the Emergency or Intensive Care Department of Saigon General Hospital between April 1 and October 31, 2025.
(iv) Provision of written informed consent by the patient or an authorized legal representative.

Exclusion criteria included:

(i) AHF secondary to non-cardiac causes requiring primary management of the underlying condition (e.g., septic shock, major trauma).
(ii) End-stage chronic illnesses with an expected survival of less than three months.
(iii) Incomplete clinical or paraclinical data that precluded adequate analysis.
(iv) Refusal or inability to provide informed consent.

2.2. Diagnosis of acute heart failure

The diagnosis of AHF was based on a combination of clinical presentation (e.g., dyspnea, peripheral edema, pulmonary rales), physical examination findings, and paraclinical investigations, including chest radiography, elevated natriuretic peptide levels (N-terminal pro-B-type natriuretic peptide [NT-proBNP]), and echocardiographic examination of structural and functional cardiac abnormalities, consistent with current guideline-directed criteria.[1]

2.3. Research design

This investigation was a hospital-based cross-sectional study conducted at Saigon General Hospital in 2025. Its primary objective was to characterize the clinical and paraclinical features of patients diagnosed with AHF at the time of admission. To reduce potential selection bias, all consecutive patients who satisfied the predefined inclusion criteria during the study period were enrolled.

Given the cross-sectional nature of the study, data were obtained at a single time point—during hospitalization—to delineate baseline characteristics and document in-hospital outcomes. This approach enabled the analysis of associations between clinical variables and adverse in-hospital events; however, causal inferences could not be established. Standardized procedures were implemented to ensure uniformity in clinical assessment, data collection, and outcome evaluation throughout the study duration.

2.4. Data collection

Demographic profile, prior medical history, and presenting clinical features at hospital admission, laboratory findings, imaging results, and echocardiographic parameters were collected using standardized data collection forms specifically designed for the study. Demographic profile included age, sex, and body mass index. Medical history encompassed cardiovascular risk factors, prior cardiovascular diseases, comorbid conditions, and ongoing medications before admission.

Clinical presentation variables included symptoms, vital signs, physical examination findings, and hemodynamic status at admission. Laboratory investigations comprised routine hematological and biochemical tests, renal function parameters, electrolytes, cardiac biomarkers, and natriuretic peptide levels. Imaging assessments included chest radiography and other relevant modalities when clinically indicated. Comprehensive transthoracic echocardiography was performed to evaluate cardiac structure and function, including left ventricular ejection fraction, chamber dimensions, wall motion abnormalities, and valvular pathology. All clinical assessments and paraclinical investigations were conducted at hospital admission as part of the standard routine care. Data were recorded prospectively and verified for completeness and accuracy by trained investigators to ensure data reliability and consistency throughout the research period.

2.5. Statistical analysis

Data were entered, verified, and managed using EpiData version 3.1 and subsequently analyzed with STATA version 14.0 (StataCorp, College Station, United States). The distribution of continuous variables was assessed for normality using appropriate statistical tests. Variables with a normal distribution are reported as mean ± standard deviation, whereas skewed variables are presented as median with interquartile range. Categorical variables are summarized as counts and percentages.

Descriptive statistics were primarily used to outline baseline characteristics and summarize clinical and paraclinical parameters. For group comparisons, continuous variables were analyzed using the Student's *t*-test or the Mann–Whitney *U* test, as appropriate, while categorical variables were compared using the chi-square test or Fisher's exact test.

All statistical tests were two-sided, and p-values < 0.05 were considered statistically significant. When applicable, multivariable regression analyses were performed to identify independent predictors of adverse in-hospital outcomes, with adjustment for potential confounders.

2.6. Ethical considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee of Saigon General Hospital. Written informed consent was obtained from all participants or their legally authorized representatives before study inclusion. The investigation was conducted in accordance with the ethical principles outlined in the

Declaration of Helsinki.

3. Results

A total of 177 patients diagnosed with AHF and meeting eligibility criteria were recruited at Saigon General Hospital during the study period.

3.1. Baseline characteristics

Table 1 summarizes the baseline demographic and clinical characteristics of the study cohort. The patients had a mean age of 72.1 ± 13.9 years. Males comprised 64.4% of the population, whereas females accounted for 35.6%. The average body mass index was 22.36 ± 5.39 kg/m^2.

Common comorbidities included coronary artery disease (66.6%), diabetes mellitus (55.4%), hypertension (40.4%), chronic kidney disease (28.5%), and valvular heart disease (20.4%). Other recorded conditions and risk factors, such as dyslipidemia, prior stroke, and smoking history, were less frequent.

3.2. Clinical characteristics at admission

Table 2 outlines the clinical presentations at hospital admission. Dyspnea was the predominant symptom, reported in 88.6% of patients, while an S3 gallop was the least frequently observed sign (23.8%). Pulmonary rales were present in 51.0% of cases, followed by chest pain (38.7%), peripheral edema (31.7%), and hepatomegaly (19.8%). The mean systolic blood pressure at admission was 113 ± 34 mmHg, and the mean diastolic blood pressure was 67 ± 15 mmHg.

3.3. Paraclinical characteristics

Paraclinical findings are shown in Table 3. Chest radiography was the most frequently performed imaging modality. Cardiomegaly was observed in 51.0% of patients, pulmonary congestion in 13.7%, and pleural effusion in

Table 1. Demographic and clinical features of patients presenting with acute heart failure

Characteristics	Frequency	Percentage (%)
Sex		
Male	114	64.4
Female	63	35.6
Age, mean ± standard deviation (years)	72.1 ± 13.9	–
Body mass index, mean ± standard deviation (kg/m^2)	22.36 ± 5.39	–
Medical history		
Hypertension	71	40.4
Diabetes mellitus	95	55.4
Coronary artery disease	118	66.6
Valvular heart disease	36	20.4
Dyslipidemia	15	8.5
Chronic kidney disease	50	28.5
Stroke	8	4.6
Smoking	12	6.9

6.1%. The mean NT-proBNP concentration was 7,539.02 ± 491.53 pg/mL. The mean left ventricular ejection fraction was 41.5 ± 6.9%.

Table 2. Clinical features of patients presenting with acute heart failure at hospital admission

Clinical characteristics	Frequency	Percentage (%)
Dyspnea	157	88.6
Chest pain	69	38.7
Peripheral edema	56	31.7
Hepatomegaly	35	19.8
Pulmonary rales	90	51.0
S3 gallop	42	23.8
SBP, mean ± SD (mmHg)	113 ± 34	—
DBP, mean ± SD (mmHg)	67 ± 15	—

Abbreviations: DBP: Diastolic blood pressure; SBP: Systolic blood pressure; SD: Standard deviation.

3.4. Etiology of acute heart failure

The etiologies of AHF are detailed in Table 4. Ischemic heart disease was the leading etiology, representing 58.2% of cases. This was followed by cardiomyopathy (14.7%) and valvular heart disease (6.2%). In contrast, congenital heart disease (1.1%) and myocarditis (0.6%) were identified infrequently. Ultimately, the cause was unclear in 19.2% of cases.

3.5. Precipitating factors

Precipitating factors for AHF are presented in Table 5. Medication non-adherence was the predominant precipitating factor (19.2%), followed by infection (17.5%) and acute coronary syndrome (17.5%). In 10.7% of patients, no identifiable precipitating factor was found. Pulmonary embolism (0.6%) and the use of sodium-retaining drugs (1.1%) were the least frequently identified triggers.

4. Discussion

The research population was predominantly male (64.4%) and had a mean age of 72.1 ± 13.9 years. This distribution aligns with the characteristic demographic profile of patients admitted with AHF, in which older age is a significant risk factor.[11] The elderly predominance was clinically relevant, as older patients often present with multiple comorbidities, frailty, and increased vulnerability to adverse outcomes.[11] The mean body mass index (22.36 ± 5.39 kg/m^2) suggests a relatively lean population, which may reflect regional characteristics and could also indicate sarcopenia or cardiac cachexia in some patients—both of which are associated with a worse prognosis in heart failure.[12]

Table 3. Laboratory and imaging findings of patients with acute heart failure at the time of admission

Paraclinical characteristics	Frequency	Percentage (%)
Chest X-ray findings		
Cardiomegaly	90	51.0
Pulmonary congestion	24	13.7
Pleural effusion	11	6.1
N-terminal pro-B-type natriuretic peptide, mean ± standard deviation (pg/mL)	7,539.02 ± 491.53	—
Left ventricular ejection fraction, mean ± standard deviation (%)	41.5 ± 6.9	—

Table 4. Etiology of acute heart failure

Etiology	Frequency	Percentage (%)
Ischemic heart disease	103	58.2
Cardiomyopathy	26	14.7
Valvular heart disease	11	6.2
Congenital heart disease	2	1.1
Myocarditis	1	0.6
Unknown	34	19.2

Table 5. Precipitating factors of acute heart failure

Precipitating factors	Frequency	Percentage (%)
Medication non-adherence	34	19.2
Infection	31	17.5
Acute coronary syndrome	31	17.5
Uncontrolled hypertension	19	10.7
Uncontrolled arrhythmia	11	6.2
Dietary non-adherence	10	5.6
Worsening renal function	4	2.8
Anemia	5	2.8
Pulmonary embolism	1	0.6
Sodium-retaining drugs	2	1.1
Unknown	29	16.0

Comorbidity burden was substantial. coronary arterydisease was observed in 66.6% of patients, reinforcing it as the principal underlying substrate in this cohort. Diabetes mellitus was highly prevalent (55.4%), exceeding the rate of hypertension (40.4%), and represents a key contributor to both macrovascular and microvascular dysfunction. The coexistence of diabetes and coronary artery disease likely amplifies myocardial injury, impairs ventricular function, and increases the risk of recurrent decompensation.[13]

Hypertension, identified in 40.4% of patients, remains a fundamental risk factor for structural heart remodeling and diastolic dysfunction. Although its prevalence was lower than expected compared with some international registries, it continues to play a significant etiological and precipitating role in heart failure progression.[14]

Chronic kidney disease (28.5%) was also common, highlighting the close interplay between cardiac and renal dysfunction. Renal impairment complicates volume management, limits pharmacologic optimization, and has been consistently linked to increased mortality and higher rates of rehospitalization.[15]

Valvular heart disease (20.4%) represents another significant contributor, particularly in older populations where degenerative valvular lesions are common. Stroke history (4.6%) and smoking (6.9%) were less frequent but remain clinically relevant due to their association with vascular disease and overall cardiovascular risk burden. Dyslipidemia was documented in 8.5% of patients, which may reflect underdiagnosis or underreporting, especially given the high prevalence of coronary artery disease.

Overall, this cohort demonstrates a high burden of cardiometabolic comorbidities, particularly coronary artery disease and diabetes, in an elderly population. The clustering of these conditions likely contributes to disease progression, increased vulnerability to acute decompensation, and adverse outcomes. Comprehensive management strategies targeting both heart failure and its associated comorbidities are therefore essential to improve prognosis in this population.

In the present study, the mean age of patients hospitalized with AHF was 72.1 years, consistent with previous studies from the Acute Heart Failure Database and the EuroHeart Failure Survey II, which reported mean ages of 71.5 and 70 years, respectively.[16-19] Similar results have also been reported in international registries, including the ADHERE-Asia Pacific registry (mean age 66 years)[11] and Western cohorts, such as the Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients with Heart Failure,[20] EURObservational Research Programme: the Heart Failure Pilot Survey,[21] and Acute Heart Failure Global Survey of Standard Treatment[22] with mean ages of 73 and 70 years, respectively. In contrast, the sub-Saharan Africa Survey of Heart Failure study reported a significantly younger population, with a mean age of 52.3 years.[23] These regional differences may be explained by variations in ethnicity, socioeconomic conditions, life expectancy, and the quality of the healthcare system.[23-25]

Male patients predominated in our cohort, accounting for 64.4% of cases, nearly twice the proportion of

female patients. This finding is consistent with previous studies.[12,16,17,20-22] The higher prevalence of AHF among men may be attributed to a greater burden of cardiovascular risk factors, such as smoking, alcohol consumption, and unhealthy dietary habits, which are more common in middle-aged and elderly males.[15,22,24,26,27]

Patients with AHF frequently presented with multiple comorbidities, including hypertension, diabetes mellitus, ischemic heart disease, dyslipidemia, atrial fibrillation, valvular heart disease, prior stroke, and chronic kidney disease. Poor control of these comorbid conditions is known to increase the risk of heart failure decompensation, leading to hospitalization and rehospitalization.[1,24] Ischemic heart disease remains a leading cause of heart failure in both developed and developing countries. In our study, ischemic heart disease was the most prevalent comorbidity (66.6%), consistent with previous studies.[17,22]

In this research, dyspnea was the predominant presenting symptom, observed in 88.6% of patients, underscoring pulmonary congestion as the principal clinical manifestation of AHF. The high prevalence of pulmonary rales (51.0%) further supports the central role of elevated left-sided filling pressures and interstitial/alveolar fluid accumulation in the pathophysiology of decompensation. These findings are consistent with contemporary AHF registries, in which dyspnea remains the most frequent reason for hospital admission.[14XX]

Chest pain was reported in 38.7% of patients, suggesting that myocardial ischemia may have acted as a precipitating factor in a substantial proportion of cases. This observation aligns with the recognized role of acute coronary syndromes as common triggers of AHF episodes. Careful evaluation for ischemia is therefore critical, particularly in patients presenting with concomitant chest discomfort.

Peripheral edema (31.7%) and hepatomegaly (19.8%) reflect systemic venous congestion, indicating right-sided involvement or advanced biventricular failure in a subset of patients. The coexistence of pulmonary and peripheral signs of congestion highlights the heterogeneous hemodynamic profiles encountered in AHF. The presence of an S3 gallop in 23.8% of patients suggests increased ventricular filling pressures and reduced ventricular compliance, typically associated with more advanced systolic dysfunction and worse prognosis.[14XX]

The mean systolic blood pressure (113 ± 34 mmHg) indicates a relatively broad hemodynamic spectrum, ranging from hypertensive presentations to patients with low or borderline blood pressure. This variability is clinically relevant, as admission blood pressure is a key determinant of therapeutic strategy and short-term outcomes. The mean diastolic blood pressure of 67 ± 15 mmHg further reflects this hemodynamic diversity.

Overall, the clinical profile of this population is characterized predominantly by congestion-related manifestations, with a significant proportion potentially triggered by ischemic events. These findings emphasize the importance of early recognition of congestion, systematic assessment of precipitating factors, and hemodynamic stratification to guide individualized management strategies in patients hospitalized with AHF. These findings are comparable to those reported in previous studies, in which dyspnea was also the predominant symptom, occurring in up to 91.8% of patients,[28] as well as studies from Europe, the United States, and other Asian countries.[11,22,24] The mean systolic blood pressure on admission in our study was 113 ± 34 mmHg, which is comparable to that reported by other studies.[14,16,20,22-24,29-31]

Chest radiographic findings in this cohort demonstrate that cardiomegaly was the most common abnormality, present in 51.0% of patients. This finding likely reflects underlying structural heart disease, such as chronic ventricular remodeling or dilatation, particularly in individuals with pre-existing heart failure. The relatively high prevalence of cardiomegaly supports the notion that a substantial proportion of patients may have had chronic cardiac dysfunction with acute decompensation rather than purely *de novo* heart failure.

Pulmonary congestion was observed in 13.7% of cases. While this may represent pulmonary edema related to elevated left-sided filling pressures, it is also important to consider differential diagnoses such as concomitant pneumonia, especially in patients with fever or inflammatory markers. Accurate differentiation is essential, as infectious triggers can both precipitate AHF and significantly influence prognosis and management strategies.

Pleural effusion was documented in 6.1% of patients, reflecting advanced congestion and elevated systemic and pulmonary venous pressures. Although less frequent than cardiomegaly, the presence of pleural effusion may indicate more severe or prolonged fluid overload and has been associated with worse clinical outcomes in hospitalized heart failure populations.[16XX]

The mean NT-proBNP level was markedly elevated (7,539.02 ± 491.53 pg/mL), confirming significant hemodynamic stress and myocardial wall stretch in this cohort. Such elevated natriuretic peptide concentrations are consistent with acute decompensated heart failure and correlate with both disease severity and short-term prognosis.[3XX] NT-proBNP remains a valuable biomarker

for diagnostic confirmation, risk stratification, and monitoring of therapeutic response.[32-36]

The mean left ventricular ejection fraction was 41.5 ± 6.9%, placing the majority of patients within the mildly reduced ejection fraction range. This suggests that the study population predominantly represents heart failure with mildly reduced ejection fraction, although some patients may fall into the reduced ejection fraction spectrum. The intermediate left ventricular ejection fraction profile highlights the heterogeneity of AHF and underscores the importance of tailored therapeutic strategies based on ventricular function.[37]

Overall, the imaging and biomarker findings reinforce the predominance of structural heart disease and significant congestion in this population, with elevated natriuretic peptides and moderately impaired systolic function reflecting substantial hemodynamic compromise at presentation. These results closely mirror those reported in previous studies.[9,22,24,38-44]

In this cohort, ischemic heart disease (58.2%) was the predominant underlying etiology, highlighting ischemic heart disease as the leading substrate for AHF. This finding is consistent with contemporary registries, in which ischemic cardiomyopathy remains the most common cause of heart failure hospitalization, particularly in older populations.[24XX] The high prevalence of coronary disease underscores the importance of systematic evaluation for ongoing ischemia and optimization of guideline-directed medical therapy, as well as consideration of revascularization when appropriate.

Cardiomyopathy accounted for 14.7% of cases, representing a significant non-ischemic substrate. This heterogeneous category may include dilated, hypertrophic, or other specific cardiomyopathies, each with distinct pathophysiological mechanisms and prognostic implications. Recognition of the specific cardiomyopathy phenotype is crucial, as management strategies and long-term outcomes vary considerably depending on the underlying etiology. Valvular heart disease was identified in 6.2% of patients. Although less frequent, valvular abnormalities can precipitate acute decompensation through abrupt changes in loading conditions, particularly in cases of severe regurgitation or stenosis.[12XX] Timely echocardiographic assessment is therefore essential to identify patients who may benefit from surgical or transcatheter interventions.

Congenital heart disease (1.1%) and myocarditis (0.6%) were relatively uncommon causes in this population. However, these etiologies may present with acute hemodynamic instability and require specialized diagnostic and therapeutic approaches.[25XX] In particular, myocarditis should be considered in patients with recent viral illness, elevated cardiac biomarkers disproportionate to coronary findings, or new-onset heart failure in younger individuals.

Overall, the etiological distribution in this study reflects the dominant role of ischemic heart disease in the development of AHF, while also emphasizing the heterogeneity of structural and inflammatory substrates. Accurate identification of the underlying cause is essential, as it directly influences acute management decisions, long-term therapeutic strategies, and prognostic assessment.

In this cohort, medication non-adherence (19.0%) was the most common precipitating factor for AHF, underscoring the critical role of treatment adherence in preventing decompensation. Poor compliance with guideline-directed medical therapy may lead to fluid retention, neurohormonal activation, and rapid clinical deterioration. This finding highlights the need for structured patient education, close outpatient follow-up, and multidisciplinary heart failure management programs to reduce preventable hospitalizations.

Infection (17.8%) and acute coronary syndrome (17.4%) were also major contributors. Infectious processes increase metabolic demand, promote inflammatory activation, and can exacerbate myocardial dysfunction, particularly in vulnerable patients.[3XX] Similarly, acute coronary events may directly impair myocardial contractility or induce ischemia-driven decompensation. These results emphasize the importance of early identification and prompt treatment of systemic infections and ischemic triggers in patients presenting with AHF.

Uncontrolled hypertension (10.7%) remains a significant and potentially reversible precipitant. Acute elevations in afterload can rapidly increase left ventricular filling pressures and precipitate pulmonary congestion, particularly in patients with preserved or mildly reduced ejection fraction. Adequate blood pressure control is therefore essential for both acute stabilization and long-term prevention.

Uncontrolled arrhythmias (6.3%), particularly atrial fibrillation with rapid ventricular response, can compromise cardiac output and precipitate decompensation. Rate or rhythm control, along with correction of electrolyte disturbances, is a key component of management in these patients. Dietary non-adherence (5.9%), especially excessive sodium intake, further contributes to fluid retention and underscores the importance of lifestyle counseling.

Less frequent but clinically relevant precipitants

included worsening renal function (2.2%), anemia (2.6%), pulmonary embolism (0.6%), and the use of sodium-retaining medications (1.0%). Although individually uncommon, these factors may significantly worsen hemodynamic status and should be actively sought during the diagnostic work-up. Notably, in 13.1% of cases, no clear precipitating factor was identified. This reflects the complex and multifactorial nature of AHF, in which subtle physiological changes or unrecognized triggers may interact with an already vulnerable cardiac substrate.

Overall, the distribution of precipitating factors in this study highlights that a substantial proportion of AHF episodes are potentially preventable. Systematic evaluation for reversible triggers and reinforcement of long-term adherence strategies remain essential components of comprehensive heart failure care.

5. Conclusion

Based on the analysis of 177 patients diagnosed with and treated for AHF at Saigon General Hospital between April 1 and October 31, 2025, ischemic heart disease was identified as the most common etiology of AHF. The most frequent precipitating factors were medication non-adherence, infection, and acute coronary syndrome.

These findings highlight the dominant role of ischemic heart disease as the underlying substrate for acute decompensation in our population, reflecting the growing burden of atherosclerotic cardiovascular disease in the elderly. At the same time, the high proportion of preventable precipitants—particularly medication non-adherence and infection—suggests that many hospitalizations may be avoidable through improved outpatient follow-up, optimization of guideline-directed medical therapy, and timely management of comorbid conditions.

The results underscore the importance of early risk stratification at admission to promptly identify patients at increased risk of adverse in-hospital outcomes. Strengthening patient and caregiver education programs, reinforcing adherence to pharmacological and dietary recommendations, and establishing structured transitional care models may substantially reduce readmissions and mortality. Furthermore, multidisciplinary heart failure management strategies integrating cardiology, internal medicine, nursing, and rehabilitation services are essential to optimize long-term disease control and enhance overall clinical outcomes.

Nevertheless, the study is limited by its cross-sectional design and single-center nature, as well as the lack of multivariable analysis for adverse in-hospital outcomes, necessitating a more comprehensive analysis in the future.

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Conflict of interest

The authors declare no conflict of interest.

Author contributions

Conceptualization: Mai Duc Huy, Phung Nguyen Quan
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Investigation: Mai Duc Huy, Phung Nguyen Quan
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Ethics approval and consent to participate

The study protocol was reviewed and approved by the Institutional Ethics Committee of Saigon General Hospital (Approval no.: 597/QD-BVDKSG, dated September 30, 2024). Written informed consent was obtained from all participants or their legally authorized representatives prior to enrollment. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Consent for publication

Consent for publication was obtained from all participants.

Availability of data

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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