

FREQUENCY AND OUTCOME OF NEW ONSET OF ATRIAL FIBRILLATION IN CRITICALLY ILL PATIENT WHO PRESENTED TO THE EMERGENCY DEPARTMENT AT TERTIARY CARE HOSPITAL

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DOI: <https://doi.org/10.5281/zenodo.17761515>

Keywords

Critical illness; Atrial fibrillation;
Mortality; Stroke; Arrhythmia;
Emergency Department.

Article History

Received: 10 July 2025

Accepted: 25 August 2025

Published: 02 September 2025

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Abstract

Background: New-onset atrial fibrillation (AF) often develops in critically ill patients, yet data from Emergency Department (ED) populations remain scarce. We aimed to measure the frequency of new-onset AF in critically ill ED patients and examine its association with short-term outcomes.

Methods: We carried out a cross-sectional study of 137 critically ill patients presenting to a tertiary care ED. For each patient, we recorded demographic details, AF status, need for hospital admission, stroke, and ED mortality. We compared outcomes between patients with and without AF using chi-square tests, with $p < 0.05$ indicating statistical significance.

Results: New-onset AF occurred in 26 patients (19%). Most AF cases were in patients aged 46–70 years (72.7%). AF showed no significant association with sex ($p = 0.31$) or stroke ($p = 0.84$). Patients with AF were more likely to be admitted than those without AF (57.7% vs. 43.2%, $p = 0.18$), though this was not significant. Mortality in the ED was markedly higher among AF patients (46.2%) compared with those without AF (12.6%, $p = 0.01$).

Conclusion: New-onset AF was frequent in critically ill ED patients and carried a substantially higher risk of early death. Stroke rates were similar between AF and non-AF groups. Clinicians should identify AF promptly and monitor these patients closely.

INTRODUCTION

Atrial Fibrillation (AF) is the most common arrhythmia of clinical significance worldwide, and is linked to substantial morbidity and mortality.¹ The US population with AF is expected to increase from the current estimate of 2.2 million individuals to 5.6 million by the year 2050. Apart from valvular heart disease, the ongoing increase in the prevalence of other AF risk factors such as hypertension, obesity, and advanced age, are expected to result in a growing

burden of AF.²⁻³ Indeed, a recent analysis of data from the Global Burden of Disease study found that the burden of AF was increasing more rapidly than any other cardiovascular disease.⁴

Atrial fibrillation (AF) can manifest in a broad range of acute medical and surgical conditions. Although previously postulated as transient and isolated events, accumulating evidence suggests that AF detected in the setting of acute care or acute illness is

associated with a high risk of long-term AF recurrence, warranting attention during acute hospitalization and long-term follow-up as well as the need for specific guidance.^{5,6}

The diagnosis of AF requires both access to electrocardiography (ECG) and expertise to interpret this diagnostic test which are not universally available.⁷ Moreover anti coagulation; the cornerstone of long-term AF management, requires therapies, laboratory monitoring, and routine outpatient follow-up that are not widely available in resource limited settings.⁸

Oyediran et al. conducted a study including 681 patients on frequency and outcome of new onset atrial fibrillation in critically patients presenting in emergency department and reported AF in 53 (7.8%) patients. On comparison of outcomes in AF and non-AF patients, the authors reported hospitalization in 92.5% AF patients, and in 69.1% non-AF patients, In-hospital mortality in 34.6% AF and 21.6% non-AF patients, while stroke occurred in 9.6% AF and 1.8% non-AF patients.⁹

The aim of proposed study is to determine the frequency and outcomes of new onset AF in critically ill patients presenting in emergency department. This study is important because little work is published regarding occurrence of AF and its associated outcomes in Pakistani population. The results of this study will help us to determine the burden of new onset AF in our emergency departments and its associated outcomes. On the basis of results we will be able to formulate management and prevention strategies of AF in our critically ill patients.

MATERIAL AND METHODS

This longitudinal study was conducted in the Department of Accident and Emergency at Jinnah Postgraduate Medical Center, Karachi, from 23 February 2025 to 28 June 2025 following the approval of the research synopsis. A total of 137 patients were included in the study. The sample size was determined using an anticipated frequency of new onset atrial fibrillation (AF) of 7.8%, with a 4.5% margin of error and a 95% confidence level, calculated using standard epidemiological methods. A non-probability consecutive sampling method was employed for patient recruitment.⁹

Eligible participants were critically ill patients presenting to the emergency department with symptoms such as chest pain, shortness of breath, or hypotensive shock (systolic blood pressure less than 90 mmHg), as defined in the study protocol. Inclusion criteria specified patients aged between 18 and 70 years of either gender. Patients were excluded if they had a prior documented history of atrial fibrillation, or if they had known valvular heart disease based on previous medical records or echocardiography reports. After obtaining ethical approval, data collection was initiated. Patients meeting the inclusion criteria were enrolled consecutively after informed consent was obtained from either the patient or their legal guardian. Demographic details, including age, gender, and the primary reason for emergency presentation, were recorded.

Upon arrival in the emergency department, each patient underwent a standard 12-lead electrocardiogram (ECG) to assess for the presence of new onset atrial fibrillation. Patients were then monitored throughout their stay in the emergency department, and if stabilization was not achieved, they were admitted for further management according to hospital protocols. Patients were followed until discharge from the emergency department or the hospital. If discharged before 30 days of enrollment, they were contacted in person to assess for 30-day outcomes, specifically mortality and stroke, according to the predefined criteria. All findings and outcomes were systematically recorded on a structured proforma.

Statistical analysis was performed using SPSS version 23. For continuous variables such as age, mean and standard deviation were computed for normally distributed data, while median and range were used for skewed data. Categorical variables, including gender, incidence of new onset AF, requirement of hospitalization, stroke occurrence, and in-ER mortality, were reported as frequencies and percentages. To assess associations and control for potential effect modifiers such as age, gender, and presenting symptoms, stratification was applied. Post-stratification, the Chi-square test or Fisher's exact test was used, as appropriate, and a p-value of ≤ 0.05 was considered statistically significant.

RESULTS

We enrolled 137 critically ill patients who presented to the Emergency Department during the study period. Most patients (67.9%) were between 46 and 70 years of age, while 32.1% were aged 18 to 45 years. The sex distribution was almost equal, with 51.1% men and 48.9% women. A large majority (81%) resided in rural areas. Whereas, 19% came from urban locations. Nearly half of the participants (46%) required hospital admission. Furthermore, 19% died in the ED. Stroke was diagnosed in 29.2% of patients during their ED stay.

When comparing patients by atrial fibrillation status, we found that AF occurred more often in the older age group. Among those with AF, 72.7% were aged 46–70 years compared with 84.9% in the non-AF group. Although, this difference did not reach statistical significance ($p = 0.08$). Women had a slightly higher proportion of AF than men (22.4% vs. 15.7%). However, this difference was not statistically significant ($p = 0.31$). Patients with AF required hospitalization more frequently than those without AF (23.8% vs. 14.9%), but the difference was not significant ($p = 0.18$).

Mortality in the ED was markedly higher among patients with AF. Almost half of those in the AF group (46.2%) died in the ED compared with only 12.6% of patients without AF. This difference was statistically significant ($p = 0.01$). The proportion of patients who experienced a stroke was similar between the two groups (20% in the AF group and 18.6% in the non-AF group, $p = 0.84$). Overall, patients with AF tended to be older. Furthermore, they were slightly more often female, and required hospitalization more frequently. However, the most striking finding was the substantially higher mortality rate in the ED among patients with AF, while stroke rates did not differ between groups.

DISCUSSION

We observed new-onset atrial fibrillation (AF) in nearly one-fifth of critically ill patients who presented to the Emergency Department (ED). The most striking finding was the high mortality among patients with AF (almost half died during their ED stay) compared with just over one in ten patients without AF. AF patients more often required hospital admission. However, the difference did not reach

statistical significance. Stroke rates were similar between the two groups.

Our prevalence estimate is consistent with earlier reports in critically ill populations. These range from around 10% to more than 20%, depending on patient mix, severity of illness, and monitoring approaches.¹⁰

¹² Gupta et al. reported comparable prevalence in the ICU and identified AF as a predictor of increased mortality.¹⁰ Wu et al.'s systematic review also confirmed that AF is both common and strongly linked to adverse outcomes in critically ill patients.¹¹ The strong association between AF and ED mortality in our study echoes previous work suggesting that AF often signals severe physiological stress and can worsen hemodynamic instability.¹³⁻¹⁴ In patients with sepsis or shock, systemic inflammation, catecholamine surges, and myocardial strain create a pro-arrhythmic environment. Once AF develops, it may further impair cardiac output and tissue perfusion. Duarte et al. found that older age, sepsis, vasopressor use, and mechanical ventilation increase the likelihood of new-onset AF.¹² These factors were common in our cohort.¹²

We did not find a statistically significant difference in stroke incidence between AF and non-AF groups. This may reflect the short observation period, as most thromboembolic events occur later in the disease course (2,5).^{11, 14} Deciding on anticoagulation in the ED for unstable patients remains challenging. Therefore, clinicians must weigh the risk of stroke against a substantial risk of bleeding.¹⁵

Our findings also fit within the broader picture of global variation in AF management among the critically ill. Johnston et al. described considerable heterogeneity in rate versus rhythm control strategies and anticoagulation practices, reflecting the lack of clear, evidence-based guidelines for this population.¹⁵ Moreover, recent work has suggested that acute illness can influence cardioversion success rates in ED patients with AF.¹⁶ Thus raising further questions about whether early rhythm control improves outcomes in critically ill settings.

LIMITATIONS

We conducted this study at a single centre, which limits how far the findings can be applied to other settings. The modest sample size reduced our ability to detect associations for less common outcomes. We

did not record illness severity scores or follow patients beyond their ED stay. Hence, so we could not adjust fully for confounding or capture later events.

CONCLUSION

We identified new-onset atrial fibrillation as a frequent finding among critically ill patients

Table 1: Distribution of baseline characteristics among the study participants.

Variables	n (%)
Age	
18 to 45 years	44 (32.1)
46 to 70 years	93 (67.9)
Gender	
Male	70 (51.1)
Female	67 (48.9)
Atrial fibrillation	
Urban	26 (19)
Rural	111 (81)
Need of hospitalization	
Yes	63 (46)
No	74 (54)
Mortality in ER	
Yes	26 (19)
No	111 (81)
Stroke	
Yes	40 (29.2)
No	97 (70.8)
Total	137 (100)

Table 2: Distribution of patient characteristics according to the Atrial fibrillation groups.

Variables	Atrial fibrillation Yes n (%)	Atrial fibrillation No n (%)	P value
Age			0.08
18 to 45 years	12 (27.3)	32 (72.7)	
46 to 70 years	14 (15.1)	79 (84.9)	
Gender			0.31
Male	11 (15.7)	59 (84.3)	
Female	15 (22.4)	52 (77.6)	
Need of hospitalization			0.18
Yes	15 (23.8)	48 (76.2)	
No	11 (14.9)	63 (85.1)	

Mortality in ER			0.01
Yes	12 (46.2)	14 (53.8)	
No	14 (12.6)	97 (87.4)	
Stroke			0.84
Yes	08 (20)	32 (80)	
No	18 (18.6)	79 (81.4)	

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