



CLINICAL PROFILE AND PREDICTORS OF ATRIAL FIBRILLATION IN ACUTE MYOCARDIAL INFARCTION: AN OBSERVATIONAL STUDY IN A TERTIARY CARE HOSPITAL

Cardiology

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ABSTRACT

Background and aims: Acute myocardial infarction (AMI) frequently results in atrial fibrillation, which has a documented incidence ranging from 2.3 to 21%. This paper aims to evaluate the incidence of atrial fibrillation in a setting of myocardial infarction and the effect of this arrhythmia on the outcome. **Materials and methods:** This institution - based observational study was conducted on 110 patients attending the different units of Medicine Department and Cardiology Department of Gauhati Medical College and Hospital during the period from 1st July 2021 to 30th June 2022. All patients had undergone Routine blood investigations, 12 – lead ECG, 2D ECHO, Serum Electrolytes, Cardiac Markers. **Results:** the study showed that 9 patients out of 110 had new onset atrial fibrillation in the hospital course i.e. in this study overall incidence of AF in AMI is 8.18% of which, 44.4% succumbed to death. Incidence of AF in AMI in patients with age ≥ 60 years is 13.33%. **Conclusion:** The occurrence of AF in a setting of AMI is worth studying as there are numerous challenges in the management and follow up of these groups of patients. Elderly individuals, patients with tachycardia (HR >100 /min), hypotension (SBP <100 mm of Hg) and heart failure with Killip class ≥ 3 are more prone to develop AF after AMI.

KEYWORDS

Acute Myocardial Infarction, Atrial Fibrillation, AMI.

INTRODUCTION

AF is one of the most prevalent supraventricular arrhythmias in the presence of acute myocardial infarction which affects 5–18% of all patients⁽¹⁾.

The arrhythmia may appear for a variety of reasons, such as left ventricular dysfunction with hemodynamic impairment, atrial ischaemia or infarction (especially in patients with early onset atrial fibrillation during acute myocardial infarction), right ventricular infarction, pericarditis, excessive catecholamine release, chronic lung disease, acute hypoxia, medications (such as the use of sympatho mimetic agents), and hypokalemia⁽¹⁾.

Atrial fibrillation has been linked in numerous studies to advanced age, congestive heart failure, poor left ventricular function⁽²⁾, and widespread myocardial infarction⁽³⁾, among other conditions. Mitral insufficiency⁽⁴⁾, a higher prevalence of ventricular arrhythmias, right bundle branch block⁽⁵⁾, and left bundle branch block are additional disorders that are related. The location of the myocardial infarct has no bearing on whether atrial fibrillation develops^(4,6).

Compared to those with no AF and past AF, those with newly diagnosed AF in AMI had greater odds of mortality, heart failure, hospitalisation and significant haemorrhage. Newly diagnosed AF may carry a higher risk of stroke than prior AF⁽⁷⁾.

Atrial fibrillation in the presence of an acute myocardial infarction treated with thrombolysis independently predicted stroke and 30-day mortality, according to data from the large GUSTO-I study (global utilisation of streptokinase and tissue plasminogen activator for occluded coronary arteries), which was just published.

By raising the demand for oxygen, high ventricular rates related to AF may worsen the hemodynamics in individuals with AMI.

MATERIALS AND METHODS

This study was conducted in different units of Medicine Department and Cardiology Department of Gauhati Medical College and Hospital during the period from 1st July 2021 to 30th June 2022.

Inclusion Criteria

1. All patients with Acute Myocardial Infarction (both STEMI AND NSTEMI) presenting within 12 hrs of onset of symptoms.
2. Age 40 – 70 years.

Exclusion Criteria

1. Age < 40 and > 70 years
2. Patients with Chronic Atrial Fibrillation
3. Patients with unknown and undefined arrhythmias of known pre-morbid condition.
4. Thyrotoxicosis

All patients who fulfilled the inclusion criteria of the study underwent a thorough clinical examination and tests like routine blood investigations, 12 – lead ECG, 2D ECHO, Serum Electrolytes and Cardiac Markers were done.

RESULTS AND OBSERVATION

The present study was carried out at Gauhati Medical College and Hospital, Guwahati. A total 110 patients of Acute Myocardial Infarction were included in the study. Detailed history was taken and clinical examination was done as per proforma. In the present study, there were 78 males and 32 females. M: F ratio being 9.75:4.

Association Of Age And Af After Ami:

In the present study, out of 110 patients, 60 patients were ≥ 60 years (51.49%) and 49 patient < 60 years. 88.88% of patients who developed AF after AMI ≥ 60 years of age.

Table 1: Association Of Age And Af After Ami

AGE GROUP	AF	No AF	TOTAL	FISHER'S EXACT TEST
< 60 years	1(11.12%)	49(48.51%)	50	0.0382
≥ 60 years	8(88.88%)	52(51.49%)	60	

Association Of Heart Rate And Af After Ami:

Higher heart rate (≥ 100 /min) was found in 66.7% of the patient who developed AF after AMI whereas among patients who did not develop AF only 3.96% had heart rate 100 or above.

Table 2: Association Of Heart Rate And Af After Ami

HEART RATE	AF	No AF	TOTAL	FISHER'S EXACT TEST
< 100 /min	3(33.3%)	97(96.04%)	100	< 0.001
≥ 100 /min	6(66.7%)	4(3.96%)	10	

Association Of Systolic Bp And Af After Ami:

6 out of 9 patients (66.7%) who had AF after AMI had systolic BP < 100 mm of Hg whereas only 13 patients (12.9%) without AF had systolic BP < 100 mm of Hg.

Table 3: Association Of Systolic Bp And Af After Ami

SBP	AF	No AF	TOTAL	FISHER'S EXACT TEST
<100 mm of Hg	6(66.7%)	13(12.9%)	19	0.001
≥100 mm of Hg	3(33.3%)	88(87.1%)	91	

Association Of Killips Class And Af After Ami:

Out of 9 patients who had AF, 5 patients (55.6%) were in Killip Class 3 or higher. On the other hand only 17 patients (16.8%) who didn't have AF were in Killip Class 3 or higher.

Table 4: Association Of Killips Class And Af After Ami

KILLIP CLASS	AF	No AF	TOTAL	FISHER'S EXACT TEST
≥3	5(55.6%)	17(16.8%)	22	0.015
<3	4(44.4%)	84(83.2%)	88	

DISCUSSION

110 patients of AMI were included in the study of which 9 patients had new onset AF in the hospital course i.e. in this study overall incidence of AF in AMI is 8.18%. 51.49% patients were aged 60 years or more. Incidence of AF in AMI in patients ≥60 years is 13.33%.

Siu et al showed an incidence of 13.7% for AF after AMI⁽⁹⁾. Kober et al in VALIANT study showed an incidence of 7.6% for AF after AMI⁽⁹⁾.

Predictors Of Af After AMI

Association Of Age In Af With Acute MI:

This study clearly links age to the occurrence of atrial fibrillation in patients with AMI. It was observed that Patients ≥60 years were more likely to develop AF following AMI when compared to the younger age group (p=0.0382).

Siu et al. found a similar link and demonstrated that older age is a predictor of AF in AMI⁽⁹⁾.

In the VALIANT research, Kober et al. demonstrated that patients with older ages are more prone to develop AF in AMI⁽⁹⁾.

Similar conclusions were supported by Laurent et al⁽¹⁰⁾ in the RICO study, Lehto et al.⁽¹¹⁾ in the OPTIMAAL trial, Wong et al.⁽¹²⁾ in the GUSTO III study, Crenshaw et al.⁽¹³⁾ in the GUSTO I study, and Goldberg et al.⁽¹⁴⁾.

Association of Higher Killip Class and AF after AMI:

This study demonstrates a strong correlation between higher Killip class, specifically 3 and above, and AF in AMI (p=0.015).

Similar conclusions, that Killip class >2 is a predictor of AF following AMI, were made by Laurent et al in the RICO study⁽¹⁰⁾.

In an OACIS investigation, Kinjo et al. discovered that Killip class 4 is a predictor of AF following AMI⁽¹⁵⁾.

Higher Killip class is a predictor of AF after AMI has also been supported by research from Wong et al.⁽¹²⁾ in GUSTO III and Rathore et al.⁽¹⁶⁾

Association of Heart Rate and AF after AMI:

In this study it was observed that higher heart rate i.e. ≥100/min is a significant risk factor for new onset AF after AMI (p=<0.001).

Similar association was also proposed by Laurent et al in RICO study⁽¹⁰⁾, Wong et al⁽¹²⁾ in GUSTO III study, Crenshaw et al in GUSTO I study⁽¹³⁾.

Association of Lower Systolic BP and AF after AMI:

In this study it was observed that lower systolic BP (SBP<100 mm of Hg) at time of admission is definite risk factor for AF after AMI (p=0.001).

Similar results were also observed by Crenshaw et al in GUSTO I study⁽¹³⁾.

CONCLUSION

The occurrence of AF in a setting of AMI is worth studying as there are numerous challenges in the management and follow up of these groups

of patients. 8.19% patients in our study developed new onset AF within a setting of AMI, of which, 44.4% succumbed to death.

Our study shows that elderly individuals aged 60 years and above are at more risk of developing AF after AMI. Patients with tachycardia (HR>100/min), hypotension (SBP<100 mm of Hg) and heart failure with Killip class ≥3 at time of hospitalization are more prone to develop AF after AMI.

Patients with tachycardia, hypotension, HF and those in geriatric age group need a close watch and monitoring. These set of people are more vulnerable for probable worsening of condition and risk of developing fatal arrhythmia.

Conflicts of Interest: None declared.

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