Original Article

Atrial Fibrillation

Frequency of Atrial Fibrillation and its Common Clinical Outcomes among Patients Presenting with Acute Myocardial Infarction

Muhammad Inam Qureshi[1], Afzal Qasim[2], Nadeemuddin[3] and Muhammad Umar Khan[4]

ABSTRACT

Objective: To determine the outcome of acute myocardial infarction associated with a trial fibrillation.
Study Design: Observational study.
Place and Duration of Study: This study was conducted at the Karachi Institute of Heart Diseases and Dow University Hospital OJHA Campus Karachi, from July 2017 to December 2017.
Materials and Methods: 311 patients aged >30 years, both gender presented with acute myocardial infarction were included in the study through Outpatient department or Emergency Room. Hospital admitted patients to CCU due to acute myocardial infarction (ST elevation MI and Non ST elevation MI) were also included. Patients with severe comorbid conditions like malignancies, renal failure, COPD, or decompensated liver cirrhosis, patients already on treatment on ventricular dysfunction, AF, stroke were excluded from this study.
Results: Out of 311 patients, 203(65.27%) were having STEMI, and 108(34.72%) patients were admitted with NSTEMI. Atrial Fibrillation was found in 38 (12.21%) patients. The most common clinical outcome in patients with AF was Ventricular Fibrillation, followed by Ventricular Tachycardia (VT), patients death and stroke. Among 3 patients who died, 6(15.78%) patients had VF and 4(10.52%) patient had stroke, so clinical outcome occurred in 19 out of 38 patients who developed AF.
Conclusion: Rate control therapy and oral anti coagulants should be offered to patients at risk for development of atrial fibrillation, This can result in significant reduction of mortality.
Key Words: Atrial fibrillation, Acute Myocardial Infarction, STEMI, NSTEMI

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INTRODUCTION

Atrial fibrillation is the most common arrhythmia found in patients with acute myocardial infarction. The predominant cause for development of atrial fibrillation includes myocardial ischemia. Some other causes can include hemodynamic disturbances, pericarditis, left ventricular dysfunction and catecholamine surge[1]. A population-based study showed that Atrial fibrillation status in acute myocardial ischemia usually increases by 13.3% over the last ten years. Atrial fibrillation between acute myocardial ischemia has a serious impact on the clinic and disease prediction[2].

[1.] Department of Cardiology, Karachi Institute of Heart Diseases. Karachi.
[2.] Department of Cardiology / Nursing[3], Dow University Hospital OJHA Campus Karachi,
[3.] Department of Medicine, National Institute of Diabetes and Endocrinology, Dow University Hospital OJHA Campus Karachi.

Correspondence: Dr. Muhammad Inam Qureshi, Assistant Professor, Department of Cardiology, Karachi Institute of Heart Diseases. Karachi.
Contact No: 03002675634
Email: danishin1@hotmail.com

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Atrial fibrillation was found at 10.4-12% of cases with acute myocardial ischemia treated with thrombolytics or primary percutaneous interventions, with higher levels of risk of LV dysfunction [3].

It has been estimated that atrial fibrillation complicates around 6-21% of acute myocardial infarction. It is associated with higher in hospital mortality (13.8 vs 5.8%). The development of ventricular fibrillation and ventricular tachycardia are also more evident among patients who experienced atrial fibrillation compared to those with sinus rhythm (14.7%,14.8% vs 5.8%, 5.2%). There is an increased risk of subsequent stroke among these patients (9.2% vs 2.6%) [4].

The cause for development of atrial fibrillation is ischemia however during the arrhythmia the blood supply to the myocardium is further compromised leading to devastating outcomes . The associated loss of atrial contraction leads to reduced stroke volume and subsequent elevation of filling pressures with atrial dilation[5]. Atrial fibrillation alone is an independent risk factor for adverse clinical outcomes among patients with myocardial infarction. It can further precipitate tachyarrhythmias due to further loss of blood supply, varying R-R intervals. Atrial fibrillation can also be associated with activation of sympathetic nervous system[6,7].

Some other predictors for development of atrial fibrillation after myocardial infarction include advanced heart failure (as demonstrated by Killip Class), advanced age (>65), elevated heart rate at presentation, no history for use of beta blockers or thrombolytic therapy in the past [8].

MATERIALS AND METHODS

This study was carried out at Karachi Institute of Heart Diseases and Dow University Hospital OJHA Campus Karachi, from July 2017 to December 2017. Patients aged >30 years, both gender present with acute myocardial infarction were included in the study through Outpatient department or Emergency Room. Hospital admitted patients to CCU due to acute myocardial infarction (ST elevation MI and Non ST elevation MI) were also included. Patients with severe comorbid conditions like malignancies, renal failure, COPD, or decompensated liver cirrhosis, patients already on treatment on ventricular dysfunction, AF, stroke were excluded from this study.

RESULTS

A total of 311 patients with acute myocardial infarction were enrolled in this study. There were 188(60.45%) male and 123(39.54%) female patients. Out of 311 patients, 203(65.27%) were having STEMI, and 108(34.72%) patients were admitted with NSTEMI (Table No.1).

Atrial Fibrillation was found in 38 (12.21%) patients. Among these 38 patients12 were male, and 26 were female. The age of the study population ranged from 30 years to 71 years, with mean age of the patients was 51.12±6.21 years. The most common clinical outcome in patients with AF was Ventricular Fibrillation, followed by Ventricular Tachycardia (VT), patients death and stroke. Among 3 patients who died, 6(15.78%) patients had VF and 4(10.52%) patient had stroke, so clinical outcome occurred in 19 out of 38 patients who developed AF (Chart No.1).

Table No.1: Clinical outcome of patients

Variable	Patients	Percentage
Age groups (n=311)		
31 – 40 years	65	20.90%
41 – 50 years	88	28.29%
51 – 60 years	109	35.04%
> 60 years	49	15.72%
Gender (n=311)		
Male	188	60.45%
Female	123	39.54%
STEMI and NSTEMI		
STEMI	203	65.27%
NSTEMI	108	34.72%

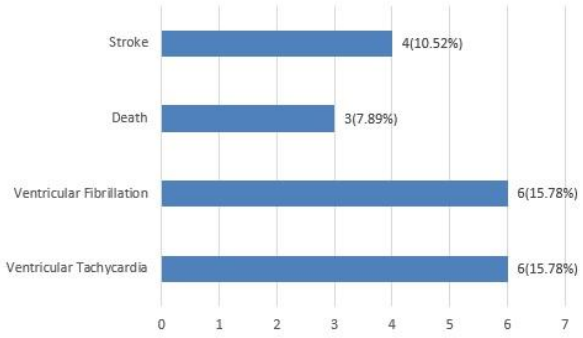

Chart No.1: Clinical outcome of acute myocardial infarction with Atrial Fibrillation (n=38)

DISCUSSION

There are various predictors of atrial fibrillation in patients with acute myocardial infarction. Some of them include advanced age, presence of heart failure and inadequate left ventricular function[4]. Studies predicting in-hospital mortality have suggested that development of atrial fibrillation among patients with acute myocardial infarction is an independent predictor of mortality. This can be explained as atrial fibrillation can be described as a demonstrator of heart failure. Atrial fibrillation can also represent elevated filling pressures or volume overload. Similarly lone AF is not associated with mortality and morbidity due to the absence of these markers[9].

Atrial fibrillation can also trigger other ventricular tachyarrythmias. This can be due to variable R-R intervals, widespread sympathetic activation or ischemia[8]. In our study, 12.2% patients developed atrial fibrillation after acute MI. Crenshaw et al's study shows 10.4% patients with atrial fibrillation after acute myocardial infarction. Crenshaw et al's study has demonstrated that age is an independent predictor for development of atrial fibrillation after acute myocardial infarction[10]. Zahoor et al's study shows 9.1% patients with atrila fibrillation after acute myocardial infarction[4]. 7.5% patients developed atrial fibrillation after myocardial infarction in Lopes et's study. Lopes et al catergorized his study participants into two categories. Those with STEMI whereas those with NSTEMI. Atrial fibrillation was more prevalent among patients with STEMI than NSTEMI (8% vs 6.4%)[11]. A meta-analysis was conducted which included 20 different studies. The results report that upto 6-21% patients with acute myocardial infarction develop atrial fibrillation during the acute phase[12,13].

In our study death occurred in 7.89% patients whereas Zahoor et al's study showed a mortality rate of 18.2% patients[4]. Lopes et al and his collegues demonstrated a mortality rate of 5.1% among myocardial infarction patients who developed atrial fibrillation compared to

1.6% among those who were in sinus rhythm. In our study ventricular fibrillation developed in 15.78% patients whereas ventricular tachycardia also in 15.78% patients. Stroke developed in 10.52% patients. These results are similar to that seen in GUSTO I trial[10,11].

It has been seen that with the development of thrombolytic therapies, the rate of atrial fibrillation has significantly declined. A study has reported that oral anti-coagulants particularly warfarin has resulted in significant reduction in mortality. Around 29% decrease in relative mortality risk whereas 7% reduction in absolute mortality risk at 1 year interval [14]. Patients at risk of atrial fibrillation are usually offered beta blockers for rate control however use of beta blockers or calcium channel blockers in ischemic myocardium can further compromise cardiac function. In this case digitalis can be offered. Amiodarone can also be added to the regime[15,16].

CONCLUSION

Patients at risk for development of atrial fibrillation should be offered rate control pharmacologic therapy to prevent devastating outcomes. Other options include anti-arrthymic agents and prophylaxis for thromboembolism. Patients with older age, advanced heart failure, elevated heart rate and not using rate control therapy should be given attention as they are more prone to developing atrial fibrillation which can precipitate further devastating clinical outcomes.

Author's Contribution:

Concept & Design of Study:	Muhammad Inam Qureshi
Drafting:	Afzal Qasim
Data Analysis:	Nadeemuddin, Muhammad Umar Khan
Revisiting Critically:	Muhammad Inam Qureshi, Afzal Qasim
Final Approval of version:	Muhammad Inam Qureshi

Conflict of Interest: The study has no conflict of interest to declare by any author.

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