Frequency of atrial fibrillation in patients presenting with acute ST segment elevation myocardial infarction

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ABSTRACT

BACKGROUND: Atrial fibrillation often complicates acute myocardial infarction with an incidence of 6 to 21%. Rapid and irregular ventricular rates during the arrhythmia may cause further impairment of the coronary circulation and left ventricular function. Atrial fibrillation in patients hospitalized for acute myocardial infarction has serious adverse prognostic implications.

OBJECTIVE: To determine the frequency of atrial fibrillation in patients presenting with acute ST segment elevation myocardial infarction.

MATERIAL AND METHODS: This was a descriptive observational hospital based study, conducted in Coronary Care Unit, Saidu Teaching Hospital, Saidu Sharif Swat from May 2015 to April 2016. Patients admitted to CCU with acute ST segment elevation myocardial infarction were included in this study. These patients were closely monitored and any episode of Atrial fibrillation was recorded for maximum of 7 days during hospital stay.

RESULTS: A total of 536 patients with acute myocardial infarction were included in this study, 298 (55.59%) were male and 238 (44.40%) were female. The age of the study population ranged from 34 years to 94 years, while the mean age of the patients was 60.47±9.79 years. Atrial Fibrillation was found in 49 (9.1%) patients, 20 (40.81%) were male, and 29 (59.18%) were female. Mean hospital stay of the patients was 2 ± 1.8 days.

CONCLUSION: Atrial Fibrillation complicating acute myocardial infarction is common in our population. Such patients should be identified and closely monitored as they have got higher rate of complications and mortality during hospital course.

Key Words: Atrial Fibrillation, Acute Myocardial Infarction.

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INTRODUCTION

Atrial fibrillation (AF) is a supraventricular arrhythmia characterized electrocardiographically by low-amplitude baseline oscillations (fibrillatory or f waves) and an irregularly irregular ventricular rhythm, which may lead to pulmonary edema and serious hemodynamic disturbance. AF is associated with approximately five fold increase in the risk of stroke and a two fold increase in the risk of all-cause mortality[1,2].

Atrial Fibrillation (AF) is the most common cardiac arrhythmia with 1 to 2 % prevalence in general population[3]. We don't have a reliable data regarding the prevalence of AF in Pakistan, however one study shows that the prevalence of AF is 6.5% among acute medical admissions to hospitals in Pakistan[4].

One of the important causes for the development of AF is myocardial ischemia. AF often complicates acute myocardial infarction (AMI) with an incidence of 6 to 21%[5]. In this clinical setting, the occurrence of AF is of particular importance since rapid and irregular ventricular rates during the arrhythmia may cause further impairment of the coronary circulation and left ventricular function.

In patients with AMI, AF is associated with higher 7 days mortality (5.1%) than those without AF (1.6%)[6]. Any type of AF like new onset, or known persistent, or known paroxysmal AF associated with AMI almost doubles the mortality risk[7]. New onset AF in patients with AMI is associated with adverse in-hospital outcomes[8]. Patients who develop AF during the acute phase of Myocardial infarction (MI) have a more complicated hospital course, and higher in-hospital mortality (13.8%) compared to those who do not have AF (5.8%)[9]. Sustained ventricular tachycardia (VT) and ventricular fibrillation (VF) are also common in these patients[10]. Transient AF during the acute phase of MI is also associated with increased risk of stroke (9.2%) compared to those without AF (2.6%)[11].

The main purpose of this study was to determine the frequency of AF in patients with AMI in our population. The idea behind doing this study was that AF is generally not perceived by clinicians as a critical event during the acute phase of myocardial infarction (MI); however review of the available literature shows higher short term and long term complications associated with AF in patients with AMI. Moreover no local data is available on this issue. So the aim of this study is to provide the foundation and basic frame work for

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further research in this area.

MATERIAL AND METHODS

Informed signed consent was collected from all volunteers who participated in the study, after the purpose, nature and risks of the participation were fully explained to them verbally and in writing.

Atrial Fibrillation was defined as disturbance of heart rhythm seen on ECG as rapid, irregular fibrillatory waves associated with irregularly irregular ventricular response.

Acute Myocardial Infarction was diagnosed on the basis of all of the following

1. Characteristic chest pain.
2. ECG showing: ST segment elevation of > 1 mm in two or more than two leads.
3. Elevated serum troponin levels.

A total of 536 male and female patients of different age group (age ranged from 34 to 94 years) admitted with acute MI were monitored for AF during hospital stay.
Male and female patients above 18 years of age admitted to CCU with acute ST elevation MI.

Patients with serious co-morbid condition, like malignancies, renal failure, COPD, or decompensated liver cirrhosis, who were not treated with Streptokinase, or who had known history of Diabetes Mellites or Hypertension and patients who already had AF were excluded from the study.

This study was conducted in Coronary care unit (CCU), Saidu Group of Teaching Hospital from 01/05/ 2015 to 30/04/2016.

The sampling technique was non-probability consecutive sampling.

A total of 536 patients were included in this study, using 6%[5] proportion of AF among patients with acute MI, 95% confidence interval and 3% margin of error under WHO sample size calculations.

The study was conducted after approval from hospitals ethical and research committee. All patients meeting the inclusion criteria and diagnosed as having AMI were included in the study through OPD and ER department. The diagnosis of AMI was based upon criteria as mentioned in operational definitions. The purpose and benefits of the study was explained to all patients and written informed consents were obtained.

All patients were subjected to detailed history, followed by complete routine examination and baseline investigations including ECG (Cardiofax) and echocardiography (eSaote my lab), and Troponin I levels were checked.

ECG's of all these patients were analyzed by single consultant cardiologist for presence or absence of AF. During hospital stay patient's heart rhythm was monitored on cardiac monitor, and their ECG's were obtained daily and analyzed by same cardiologist and any episode of AF was documented.

All the information including demographic features and hospital admission number were recorded in a pre-designed proforma. Strictly exclusion criteria were followed to control confounders and bias in the study results.

RESULTS

Data was available on a total of 536 patients with acute myocardial infarction. There were 298 (55.59%) male and 238 (44.40%) female patients. The age of the study population ranged from 34 years to 94 years. The mean age of the patients was 60.47$\pm$9.79 years. . Mean hospital stay of the patients was 2 ± 1.8 days. Age distribution among patients, given in table 01. Atrial Fibrillation was found in 49 (9.1%) patients. Among these 49 patients 20 (40.81%) were male, and 29 (59.18%) were female.

Among 49 patients who developed AF no patient was 40 years or below, Table 02

Table 1. Age distribution of study population.

AGE IN YEARS	FREQUENCY	PERCENTAGE
40 years or below	20	3.73
41-50 Years	69	12.87
51-60 Years	199	37.12
61-70 Years	206	38.43
Above 70 years	42	7.83

Table 2. Age distribution of AF in patients with MI

Age group in years	No. of cases with AF	Percent (%)
40 or below	0	0
41-50	4	8.1
51-60	5	10.2
61-70	25	51
Above 70	15	30.6
Total	49	100

DISCUSSION

Atrial Fibrillation is the most common clinical arrhythmia, leading to serious hemodynamic consequences and long term complications. One of the important causes for the development of AF is myocardial ischemia. In this clinical setting, the occurrence of AF is of particular importance since rapid and irregular ventricular rates during the arrhythmia may cause further impairment of the coronary circulation and left ventricular function.

In our study the frequency of AF in patients with acute myocardial infarction was 9.1%, which is comparable with other studies done in different countries on the same problem, however we did not find similar studies in Pakistan. One study done in Karachi shows that among acute medical admissions to hospitals in Pakistan the frequency of AF is 6.5%, and 47% of these patients also have associated ischemic heart disease[4], which means that quite a high number of patients with ischemic heart disease have AF, however they have not specifically targeted patients with acute myocardial infarction.

A meta-analysis of 20 different studies J Schmit et al shows that 6 to 21% of patients developed AF during the acute phase of MI[5]. One study done by Lopes RD et al shows that AF was found in 7.5% patients with Acute MI[6] (both ST elevation and non ST elevation MI) , however the subgroup analysis of this study shows that the frequency of AF was 8% in patients with STEMI which is comparable with our results.

In our study the incidence of AF was high in above 60 years age group which is comparable with the results from GISSI III trial[24]. Similarly AF was more common in female patients which is also consistent with data from GISSI III trial and other small and large trials included by Patrica Jabre in his meta analysis[9].

Compared with severe complications, such as ventricular tachycardia or cardiac failure, AF is generally not perceived by clinicians as a critical event during the acute phase of MI; however, in the literature, the prognostic influence of the presence of AF in MI remains controversial. Some studies illustrated an independent adverse effect on mortality while others do not show this effect[9]. The study done by RD Lopes and his colleagues shows mortality of 5.1% in those who have AF compared to 1.6% for those who were in sinus rhythm during the acute phase of MI[6], on the other hand data from GUSTO I trial[10] shows mortality of 13.8% which is an earlier study done and streptokinase was used for thrombolysis. A study done by Aronson D and his colleagues[11] shows the incidence of stroke is 9.2% in those with AF compared to 2.6% in those who remain in sinus rhythm during the acute phase of MI. Data from GUSTO I trial[10] shows the incidence of VT in 14.8% and VF is 14.7% in patients with AF during acute phase of MI.

Data from earlier studies like GUSTO I and GISSI III when streptokinase was mostly used for opening the occluded arteries shows higher incidence of adverse clinical outcomes in patients who develop AF during acute of MI.

We still use streptokinase for opening the occluded coronary arteries, and probably the incidence of adverse clinical outcome is high in our patients as well but we studied only the frequency of AF in these patients and we did not follow the patients for clinical outcomes. So further studies will be needed to determine the true effect of AF in patients with MI and to determine its short term and long term consequences.

CONCLUSION

Atrial Fibrillation is a common clinical arrhythmia complicating acute Myocardial Infarction, mortality and morbidity is high in this group of patients. So these patient need to be identified and closely monitored. Special attention should be given to pharmacological rate control, antiarrhythmic drugs and prevention of thromboembolism in these patients.

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