

FREQUENCY OF ATRIAL FIBRILLATION AND ITS COMMON CLINICAL OUTCOMES AMONG PATIENTS PRESENTING WITH ACUTE MYOCARDIAL INFARCTION

Zahoor Ahmad Khan¹, Bilal Ahmad², Charagh Hussain³,
Mahmood UI Hassan⁴, Faisal Amin⁵, Asif Iqbal⁶

¹⁻⁵Department of Cardiology, Hayatabad Medical Complex, Peshawar, Pakistan

⁶ Department of Medicine, Ayub Teaching Hospital, Abbottabad, Pakistan

Address for Correspondence:

Dr. Zahoor Ahmad Khan,

Department of Cardiology, Hayatabad Medical Complex, Peshawar, Pakistan

E-mail: drzahoorcd_79@yahoo.com

Date Received: March 06, 2014

Date Revised: July 17, 2014

Date Accepted: July 26, 2014

Contribution

All the authors contributed significantly to the research that resulted in the submitted manuscript.

All authors declare no conflict of interest.

This article may be cited as: Khan ZA, Ahmad B, Hussain C, Hassan MU, Amin F, Iqbal A. Frequency of atrial fibrillation and its common clinical outcomes among patients presenting with acute myocardial infarction. Pak Heart J 2014; 47(3):123-6.

ABSTRACT

Objective: To determine frequency of atrial fibrillation and its common clinical outcomes among patients presenting with acute myocardial infarction.

Methodology: This descriptive cross-sectional study was conducted at Hayatabad Medical Complex, Peshawar from 1st May to 31st October 2013. Patients who were admitted with Acute Myocardial Infarction (STEMI and NSTEMI) were included. These patients were closely monitored and any episode of AF was recorded. Those patients who developed AF were closely monitored for common clinical outcomes in the form of stroke, VT, VF, and death for maximum of 7 days during hospital stay. The collected data was stored and analyzed in SPSS version 10.0 for windows. Mean \pm SD was calculated for numerical variables like age. Frequencies and percentages were calculated for categorical variables like gender, AF, VT, VF, stroke, type of MI, and death. AF and its common clinical outcomes were stratified among age, gender, and type of MI to see the effect modifications.

Results: Out of 241 patients with acute myocardial infarction, males were 137 (56%) while females were 104 (43.2%). The mean age of the patients was 60.47 ± 9.79 years. 174 (72.2%) patients had STEMI, while 67 (27.8%) patients had NSTEMI. Atrial fibrillation was found in 22 (9.1%) patients out of which, 22.7% had VF, followed by VT in 18.2% patients, while 18.2% patients died, and 13.6% patients sustained stroke.

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, Stroke

INTRODUCTION

Atrial fibrillation often complicates acute myocardial infarction (AMI) with an incidence of 6 to 21% and 40% increase in the risk of mortality compared with control patients in sinus rhythm.^{1,2} Atrial Fibrillation (AF) is the most common cardiac arrhythmia with 1 to 2% prevalence in general population.³ Prevalence of AF in the United States ranges from 2.7 to 6.1 million, and in England the prevalence of AF is 1.3%.^{4,5} The prevalence of AF is 6.5% among acute medical admissions to hospitals in Pakistan.⁶

In patients with AMI, AF is associated with higher 7 days mortality (5.1%) than those without AF (1.6%).⁷ Any type of AF like new onset, known persistent, or known paroxysmal AF associated with AMI almost doubles the mortality risk.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 (14.8% and 14.7% respectively) compared to those who remain in sinus rhythm during the acute phase of MI (5.2% and 5.8% respectively).⁹ 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%).¹⁰

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 this study will provide us with local statistics of this condition and its common clinical outcomes and once the results are obtained, it will be shared with other locally available cardiologists and future guidelines will then be formulated for the management of patients who develop AF during the acute phase of MI.

The aim of this study was to determine the frequency of AF and its common clinical outcomes in patients with AMI.

METHODOLOGY

This descriptive cross-sectional study was conducted at Coronary Care Unit (CCU), department of cardiology, Hayatabad Medical Complex, Peshawar from 1st May to 31st October 2013. This study was approved from Hospital ethical and research committee.

These patients after undergoing inclusion criteria and diagnosed as having AMI were included in the study through OPD and ER department and rest were excluded. The inclusion criteria was patients admitted to CCU with acute myocardial infarction (ST elevation MI and Non ST elevation

MI), both male and female patients above 18 years of age. While the exclusion criteria was patients with severe co morbid condition like malignancies, renal failure, COPD, or decompensated liver cirrhosis diagnosed on history and clinical record. Patients who already have ventricular dysfunction, AF, stroke diagnosed on history, and clinical record. About 241 patients were included, using 6.5% proportion of atrial fibrillation in patients with acute MI, 95% confidence level and 4% margin of error, under WHO software for sample size determination.

The purpose and benefits of the study was explained to all patients and written informed consents were obtained. All patients demographic features and hospital admission number were recorded in a pre-designed proforma. Detailed history, followed by complete routine examination and baseline investigations including ECG (Cardiofax) and echocardiography (Siemens' Acuson cv-70), and Troponin I levels were checked.

ECG's of all these patients were analyzed 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 and any episode of AF was documented.

Among patients in whom atrial fibrillation was detected were followed over 7 days to detect ventricular arrhythmias, stroke and death. CT brain of those patients performed who develop stroke, and was analyzed by senior radiologist of the hospital. Strict management protocols were followed for all included patients. All patients AF were reverted immediately by DC cardioversion and none of them had persistent AF.

The collected data was stored and analyzed in SPSS version 10.0 for windows. Mean \pm SD was calculated for numerical variables like age. Frequencies and percentages were calculated for categorical variables like gender, AF, VT, VF, stroke, type of MI, and death. AF and its common clinical outcomes were stratified among age, gender, and type of MI to see the effect modifications.

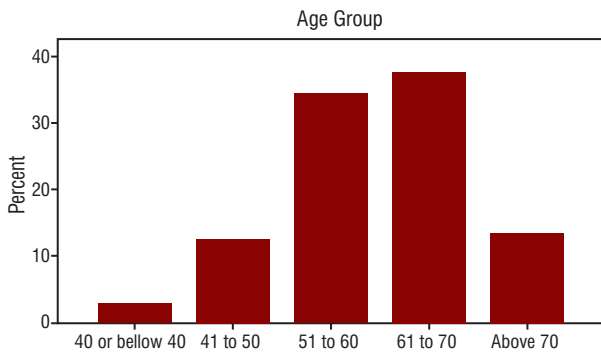
RESULTS

A total of 241 patients with acute myocardial infarction were enrolled in this study. There were 137 (56%) male and 104 (43.2%) female patients. Out of 241 patients, 174 (72.2%) were having STEMI, and 67 (27.8%) patients were admitted with NSTEMI.

Atrial Fibrillation was found in 22 (9.1%) patients. Among these 22 patients 7 (31.8%) were male, and 15 (68.2%) were female. The age of the study population ranged from 34 years to 94 years, with mean age of the patients was 60.47 ± 9.79 years (Figure 1).

The most common clinical outcome in patients with AF was Ventricular Fibrillation, followed by Ventricular Tachycardia

Figure 1: Age Distribution of Patients



(VT), patients death and stroke (Table 1). When these stroke patients were analysed, they were in age group above 70 years of age, 1 patient (33.3%) was male and 2 were female (66.7%), while all the 3 patients had STEMI.

Among 4 patients who died, 2 patients had VF and 1 patient had stroke, so clinical outcome occurred in 13 out of 22 patients.

Among 22 patients who developed AF, 16 patients had STEMI while 6 patients were admitted with NSTEMI.

Among 4 patients who died, 1 was in age group 61 to 70 (25%), and 3 were in age group above 70 (75%), 1 patient was male and 3 were female, 2 patients had STEMI while 2 had NSTEMI.

Ventricular Tachycardia was distributed in different age groups in such a way that among 4 patients who developed VT, 1 patient was in age group 51 to 60, 2 patients were in age group 61 to 70, while 1 patient was above 70 years. 2 patients were male and 2 were female, and all the 4 patients had STEMI.

Among 5 patients who developed Ventricular Fibrillation 2 were in age group 61 to 70 and 3 were in age group above 70, 1 patient was male and 4 were female, 2 of these 5 patients had STEMI, while 3 patients were admitted with NSTEMI (Table 2).

DISCUSSION

Atrial Fibrillation is the most common clinical arrhythmia, leading to serious hemodynamic consequences and long

Table 1: Common Clinical Outcomes in Patients with Atrial Fibrillation (n=22)

| Common Clinical Outcome | Frequency | Percentage |
|--------------------------|-----------|------------|
| Death | 4 | 18.2% |
| Ventricular Tachycardia | 4 | 18.2% |
| Ventricular Fibrillation | 5 | 22.7% |
| Stroke | 3 | 13.6% |

Table 2: Distribution of Clinical Outcomes in Different Types of MI in Patients with AF

| Common Clinical Outcome | STEMI | NSTEMI | Total |
|--------------------------|----------|----------|-------|
| Death | 2(0.82%) | 2(0.82%) | 4 |
| Ventricular Tachycardia | 4(1.65%) | - | 4 |
| Ventricular Fibrillation | 2(0.82%) | 3(1.24%) | 5 |
| Stroke | 3(1.24%) | - | 3 |

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, 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.⁶

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.¹ One study done by Lopes et al, showed that AF was found in 7.5 patients with Acute MI (both ST elevation and non ST elevation MI) which are comparable with our results, however the subgroup analysis of this study shows that the frequency of AF was 8% in patients with STEMI and 6.4% in patients with NSTEMI, while in our study both groups were having an incidence of around 9%, which shows that in our population the incidence of AF is high in patients with NSTEMI as well.⁷

In our study the incidence of AF was high in above 60 years age group (Figure 1) which is comparable with the results from GISSI III trial.¹¹ 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 Jabre et al, in his meta analysis.²

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.² In our study the mortality was 18.2% in those patients who developed AF, while the study

done by 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, on the other hand data from GUSTO I trial shows mortality of 13.8% which is an earlier study done and streptokinase was used for thrombolysis, and here we can see that the results are comparable to this study.^{7,9} Stroke was found in 13.6% patients with AF while study done by Aronson and his colleagues shows an incidence of 9.2% in those with AF compared to 2.6% in those who remain in sinus rhythm.¹⁰

In this study the incidence of VT was 18.2% while VF was found in 22.7% patients, while data from GUSTO I trial shows the incidence of VT in 14.8% and VF in 14.7% patients with AF, so we had more patients with ventricular dysrhythmias especially VF.⁹

So data from earlier studies like GUSTO I and GISSI III when streptokinase was mostly used for opening the occluded arteries shows results comparable to our study, while in more recent studies the incidence of adverse clinical outcome is lower than our study, but still when compared with sinus rhythm patients who develop AF during the acute phase of MI have significantly high mortality and morbidity.¹¹

We studied only short term clinical outcome and did not compare with patients in sinus rhythm, so further studies will be needed to determine the true effect of AF in patients with MI and to determine its long term consequences.

CONCLUSION

Atrial fibrillation is a common clinical arrhythmia complicating acute Myocardial Infarction, leading to adverse clinical outcomes like stroke, Ventricular Tachycardia, and Ventricular Fibrillation. Mortality rate is high in this group of patients. So these patients 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.

REFERENCES

- Schmitt J, Duray G, Gersh BJ, Hohnlosly SH. Atrial fibrillation in acute myocardial infarction: a systematic review of the incidence, clinical features and prognostic

implications. *Eur Heart J* 2009;30:1038-45.

- Jabre P, Roger VL, Murad MH, Chamberlain AM, Prokop L, Adent F, et al. Mortality associated with atrial fibrillation in patients with myocardial infarction. *Circulation* 2011;123:1587-93.
- Murady F, Zipes DP. Atrial fibrillation. In: Bonow RO, Mann DL, Zipes DP, Libby P, editors. *Braunwald's heart diseases: a textbook of cardiovascular medicine*. 9th ed. Philadelphia: Elsevier Saunders Publishing; 2012. P. 825-44.
- Lisabeth LD, Makuc DM, Marcus GM, Marelli A, Matchar DB, Howard VJ, et al. Heart disease and stroke statistics--2012 update: a report from the American Heart Association. *Circulation* 2012;125:2-220.
- Cottrell C. Atrial fibrillation part I: pathophysiology. *Pract Nurs* 2012;23:16-21.
- Haq U, Lip GYH. A prospective survey of acute hospital admissions with atrial fibrillation in Karachi, Pakistan. *J R Coll Physicians Edinb* 2009;39:200-3.
- Lopes RD, Pieper KS, Horton JR, Al-Khatib SM, Newby LK, Mehta RH. Short and long term outcomes following atrial fibrillation in patients with acute coronary syndrome with or without ST segment elevation. *Heart* 2008;94:867-73.
- Poci D, Hartford M, Karlsson T, Edvardsson N, Caidahl K. Effect of new versus known versus no atrial fibrillation on 30 days and 10 years mortality in patients with acute coronary syndrome. *Am J Cardiol* 2012;110:217-21.
- Crenshaw BS, Ward SR, Granger CB, Tebbins AL, Topol EJ, Califf RM. Atrial fibrillation in the setting of acute myocardial infarction: the GUSTO-I experience. *J Am Coll Cardiol* 1997;30:406-13.
- Aronson D, Hammerman H, Kapeliovich M, Dragu R, Bishara R. Frequency of stroke after transient AF in patients with acute coronary syndrome. *Eur Heart J* 2011;32:639-40.
- Pizzetti F, Turazza FM, Franzosi MG, Barlera S, Ledda A, Maggioni AP, et al. Incidence and prognostic significance of atrial fibrillation in acute myocardial infarction: the GISSI-3 data. *Heart* 2001;86:527-32.