ORIGINAL ARTICLE

Frequency of Atrial Fibrillation within 48 Hours of Acute Myocardial Infarction among Patients presenting to a Tertiary Care Hospital

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ABSTRACT

Background: Myocardial infraction (MI) is a result of decreased or totally ceased flow of blood to a portion of myocardium. It is also known as heart attack. MI may also remain silent resulting into sudden death. Majority of MI has an underlying coronary artery disease. Due to occlusion of coronary artery, supply of oxygen to the myocardium is hampered. Most common cardiac rhythm disorder is called atrial fibrillation (AF).
Aim: To determine the frequency of atrial fibrillation within 48 hours of acute myocardial infarction among patients presenting to a tertiary care hospital.
Design: It was a cross sectional study.
Study settings: The study was conducted at the Department of Cardiology, Lady Reading Hospital, Peshawar from 17/12/2018 to 16/6/2019.
Methods: A total of 205 patients were observed. Data regarding name, age, gender and duration of symptoms of MI was collected from all included patients. All patients were underwent history taking regarding symptoms and duration of symptoms, followed by physical examination including pulse, BP and cardiac auscultation, blood tests including complete blood count, cardiac enzymes and serum electrolytes, 12 lead ECG with cardio fax machine and echocardiography with Toshiba CD70 machine to full fill inclusion and exclusion criteria. The cohort was followed up till 48th hour with serial ECGs and pulse recordings for development of new onset atrial fibrillation. Frequency of new onset AF was noted.
Results: In this study mean age of the patients was 53 years with SD ±11.23. From total 68% patients were male while 32% patients were female. More over 7% patients had atrial fibrillation while 93% patients did not had atrial fibrillation.
Conclusion: Our study concluded that the frequency of atrial fibrillation within 48 hours was 7% among patients presenting with acute myocardial infarction.
Keywords: Acute myocardial infarction, Atrial fibrillation (AF).

INTRODUCTION

Worldwide a leading cause of death is cardiovascular disease (CVD).[1] Global burden of this disease was reported about 30% of all deaths in the world in 2013.[2] In UK CVD proved highly common cause of death in women in 2012 with 28% of overall deaths. Through UK frequency of mortality from CVD varies and highest age related CVD was found in north England and Scotland where prevalence of CVD was 4.3% and 4.5% respectively. The number of men suffering from myocardia infraction was three times as compared to women.[3,4]

Prolonged lack of oxygen supply result into death of heart muscles which is called myocardial infraction and it is irreversible.[5] Its common symptoms include discomfort and chest pain travelling into shoulder arm back neck and/or jaw. Other symptoms may include feeling faint, tiredness, cold sweat, nausea and shortening of breaths. Usually typically symptoms occur in 30% patients.[6-8] Atypical symptoms are usually noticed in women.[9] An St elevation MI (STEMI) is confirmed by ECG. In case of NSTEMI patients, presence of elevated cardiac enzymes like Trop T and Trop I levels are diagnostic with negative ECG changes.[10]

Acute myocardial infraction may result into cardiac arrest, heart failure, arrhythmia and cardiogenic shock. After MI, most common arrhythmia is atrial fibrillation (AF).[11] Higher risk baseline clinical profile is correlated with more complications. In comparison with patients without AF, AF patients have less likelihood of receiving perfusion / revascularization. In patients with atrial fibrillation, hospital mortality was significantly high that include death and withdrawal of treatment.[12] Post MI survival is reduced by AF due to accelerated development of heart failure and left ventricular dysfunction via reduced atrial transport and inducement of cardiomyopathy associated with chronically rapid ventricular rate.[13] For stroke, atrial fibrillation is recognized as a factor of risk long ago and is related with a pro-thrombotic tendency that can possibly increase risk of further coronary occlusion.[14]

In a study it was noted that AF was 10.4% in cases with myocardial infarction.[15] In a Japanese study, AF was found in 12% of post MI cases.[13] In another study, acute myocardial infraction suffering 600 patients were included and followed-up 84 months and AF developed during in hospital period was recorded in 48 patients (8%).[19] A study conducted at National Institute of cardiovascular disease exhibited 6.5% occurrence of new onset AF in first 48 hours of MI.[20]

The rationale of this study was to generate upgraded form of local data for the prevalence of AF, which is a strong contributor of mortality after acute MI, as locally published data was scarce and conflicting. Availability of local data would help in identification of high risk patients will be identified, early and performance of appropriate interventional therapy.

PATIENTS AND METHODS

This cross sectional study was conducted at the Department of Cardiology, Lady Reading Hospital, Peshawar for a period of 6 months w.e.f 17/12/2018 to 16/6/2019. Sample size of 205 was calculated at 5% level of significance and 3.5% margin of error and taking an expected percentage of atrial fibrillation as 6.5% in case of myocardial infarction under WHO sampling calculator.[20] Patient with age range of 18-60 years from both the genders presenting to LRH Emergency unit with acute myocardial infarction including both STEMI and NSTEMI within 12 hours of symptom onset after stabilization in CCU were included in the study. However, patients with chronic AF on clinical examination, history of CAD and any cardiac procedures like PCI, CABG, patients with valvular heart disease, with cardiomyopathy and cardiogenic shock were excluded from the study.

After stabilization of patients in CCU, informed consent was taken from the patients before enrolling them in data collection procedure. Data regarding name, age, gender and duration of symptoms of MI was collected from all included patients. All patients were underwent history taking regarding symptoms and duration of symptoms, followed by physical examination including pulse, BP and cardiac auscultation, blood tests including complete blood count, cardiac enzymes and serum electrolytes, 12 lead ECG with cardio fax machine and echocardiography with Toshiba CD70 machine to full fill inclusion and exclusion criteria. All the above mentioned data was recorded in a predesigned proforma. The cohort was followed up till 48th hour with serial ECGs and pulse recordings for development of new onset atrial fibrillation. Frequency of new onset AF was noted.

SPSS version 22 was used for data analysis. Quantitative data like age and duration of symptoms of MI was presented by mean and standard deviation. Qualitative variables like gender, type of MI, diabetes, hypertension, smoking and atrial fibrillation during 48 hours of hospital admission was presented by frequency and percentage. Data was stratified for age, gender, type of MI, diabetes, hypertension and smoking. Post stratification chi square test was applied with p≤0.05 as significant.

RESULTS

Total 205 patients participated in the study out of which 51(25%) patients were in age group of 18-40 years, 62(30%) patients were in age group of 41-50 years and 92(45%) patients were in age range of 51-60 years. Total 139(68%) patients were male while 66(32%) were females. Mean age of the patients was 53±11.23 years. Mean duration of symptoms of MI was 48 hours with SD ±2.75 as shown in Table 1. Frequency of patients with regard to

different variables like hypertension, diabetes, duration of MI symptoms, smoking, type of MI and atrial filtration has been shown in Table 2. Stratification of atrial fibrillation with regard to age, gender, hypertension, diabetes, previous history of CAD, smoking, type of MI is given in Table 3 which is statistically non-significant across all sub groups.

Table 1: Baseline Characteristics of the Subjects

Characteristics	Participants (n=205)
Age (Years)	53.0 ±11.23
• 18-40	51 (25.0%)
• 41-50	62 (30.0%)
• 51-60	92 (45.0%)
Gender	
• Male	139 (68.0%)
• Female	66 (32.0%

Table 2: Frequency of Patients on Different Variables

Characteristics	Participants (n=205)
Hypertensive Distribution	
• Yes	180 (88.0%)
• No	25 (12.0%)
Diabetic Distribution	
• Yes	148 (72.0%)
• No	57 (28.0%)
Duration of MI Symptoms	
• ≤ 6 hours	135 (66.0%)
• > 6 hours	70 (34.0%)
Smoking	
• Yes	133 (65.0%)
• No	72 (35.0%)
Type of MI	
• STEMI	139 (68.0%)
• NSTEMI	66 (32.0%)
Atrial Fibrillation	
• Yes	14 (7.0%)
• No	191 (93.0)

Table 3: Stratification of Arial Fibrillation with Respect to Different Variables

Atrial Fibrillation	Yes	No	p-value
Age	(n=205)		0.917
• 18-40	3	48	
• 41-50	4	58	
• 51-60	7	85	
Gender			
• Male	9	130	0.770
• Female	5	61	
Hypertension			
• Yes	12	2	0.804
• No	168	23	
Diabetes			
• Yes	10	4	0.947
• No	138	53	
Duration of Symptoms of MI			
• ≤ 6 hours	9	126	0.898
• > 6 hours	5	65	
Smoking			
• Yes	9	5	0.962
• No	124	67	
Type of MI			
• STEMI	10	129	0.764
• NSTEMI	4	62	

DISCUSSION

The ratio of adults suffering from underlying coronary artery disease (CAD) has been estimated to be 20%.[3] Moreover, risk for further cardiovascular complications substantially increase for those who survive acute myocardial infraction. These complications include sudden cardiac death, stroke and angina pectoris, recurrent MI and heart failure.[4] In clinical practice, most commonly observed arrhythmia is atrial fibrillation. Within atria of heart, abnormal electrical activity causes it to fibrillate resulting into non-proper functioning of upper chamber of the heart. So, static blood in the atria may cause blood clotting thereby increasing the risk of stroke. AF reduced quality of life that is why its comprehensive assessment and monument is needed.[5] As AF is not ruled out by electrocardiographic find signs, therefore the suspected patient should be kept under observation. Male gender, advanced age and European ancestry have been established as main risk factors of AF. Other modifiable risks include obesity, elevated blood pressure, diabetes mellitus, sedentary lifestyle, obstructive sleep apnea and smoking.[5,6]

Mean age of the patients was found 53±11.23 years during this study and out of which 68% patients were male with 2.11:1 ratio between male and female. Moreover, AF was found in 7% patients only. Similar observations were reported by Crenshaw et al.[17] They also reported significantly increased rate of in hospital stroke in atrial fibrillation patients (2.9% vs. 1.4%, p = 0.0002), mainly ischaemic stroke (1.7% vs. 0.4%, p = 0.0002). In patents with AF significantly higher mortality rate was exhibited at 30 days (14.3% vs. 6.2%, p = 0.0001) and at 1 year (21.5% vs. 8.6%, p < 0.0001).

Similarly, Kinjo et al.[18] reported 12% incidence of arterial filtration which matches to findings of our study. In comparison with patients without atrial fibrillation, patients suffering from AF were old in age, had previously higher rate of MI, were in high Killip classes, having cerebrovascular diseases previously, heart rates of > or =100 beats/min, systolic blood pressure of <100 mm Hg and highly poor reperfusion of infract-related artery. In hospital mortality was higher in AF patients (16.0% vs 6.7%, p <0.001) and 1-year (18.9% vs 7.9%, p <0.001) in comparison with non AF patients. It was exhibited though Multivariate Cox regression analysis that despite of the fact AF cannot be a predictor of in-hospital mortality but it is a independent predictor of 1-year mortality (hazard ratio 1.59, 95% confidence interval 1.04 to 2.49). In AMI patients treated with PCI, a common complication is AF but it influences 1-yeard mortality independently.

Findings reported by of Vukmirović et al.[19] also support observations of our study as they found development of atrial filtration in 8% patients during hospital stay. Older age was held a strongest predictor of AF developed during hospital stay especially in patients with age above 70 years (odds ratio 2.36, CI 1.22-4.61, p=0.010). Second predictor of AF was BMI (odds ratio 1.21, CI 1.03-1.29, p=0.011) and next were B-type natriuretic peptide (odds ratio 2.11, CI 1.23-3.33, p=0.047) and presentation of mitral regurgitation (odds ratio 3.61, CI 1.26-10.32, p=0.020). In patients who developed AF during hospital stay mortality rate was significantly high (10.4% vs. 5.6%, p-value=0.179).

Haq et al.[20] also had same observations who found more commonly related medical conditions as ischemic heart disease (47%), valvular heart disease (54%) and hypertension (54%). Common symptoms of males were anxiety (27%), chest pain (35%) and palpitations (46%) while common symptoms in females were anxiety (35%) and palpitations (51%).

A limited to current study was non-inclusion of chronic AF on clinical examination, history of CAD and any cardiac procedures like PCI, CABG, patients with valvular heart disease, with cardiomyopathy and cardiogenic shock. A study covering these variable is highly recommended in future.

CONCLUSION

Our study concluded that the frequency of atrial fibrillation within 48 hours was 7% among patients presenting with acute myocardial infarction.

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