

FREQUENCY OF NEW ONSET ATRIAL FIBRILLATION IN ACUTE ST ELEVATION MYOCARDIAL INFARCTION

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ABSTRACT

Background: Atrial fibrillation is a common arrhythmia in the setting of acute ST-elevation myocardial infarction. **Objective:** To determine the frequency of new onset of atrial fibrillation in acute ST elevation myocardial infarction. **Methodology:** This cross-sectional study was conducted in Cardiology Department of Sheikh Zayed Medical College/Hospital, Rahim Yar Khan, from 8th April to 8th October 2016. Sample was taken by non-probability consecutive sampling. Two hundred forty one patients fulfilling inclusion criteria were registered through Emergency Department. Informed consent was taken from patients. ECG was performed and was assessed for the presence of STEMI before inclusion in the study. These patients were then attached with ECG monitors for 24 hours in department of cardiology and observed for AF and ECG was recorded during arrhythmia for documentation. Echocardiography was done of every patient to rule out VHD. Trop-T was performed for confirmation of acute STEMI. The data was entered into SPSS version 10 and analyzed. Chi-square test was applied to see the effect of effect modifiers on outcome (atrial fibrillation), taking P-value < 0.05 as significant. **Result:** Among the total study subjects (n=241), 144 (60%) were male. The mean age of the study subjects was 58.15±8.61 years, mean height of the patients was 1.65±0.09 meter and mean weight of the patients was 82±13.9 kg respectively. Out of 241, 22 (9%) have atrial fibrillation and 13 (59%) were males whereas 9 (41%) were female. Out of 241 patients, diabetics were 101 (41.9%), 92 (38.2%) were hypertensive, 116 (48.1%) were smokers, 119 (49.37%) were dyslipidemia and 34 (14.1%) of anterior wall MI, 102 (42.4%) of inferior wall MI, 54 (22.4%) of posterior wall MI and 51 (21.1%) were high lateral wall MI. **Conclusion:** This study showed that atrial fibrillation was common complication of acute ST elevation MI. It also indicated a high prevalence of AF in females, hypertensive, inferior wall MI and young patients.

Keywords: Atrial fibrillation, acute ST-elevation myocardial infarction, Inhospital, Complication.

INTRODUCTION

ST-segment elevation myocardial infarction (STEMI) is part of acute coronary syndrome (ACS)¹ and includes unstable angina (UA), non-ST-segment elevation myocardial infarction (NSTEMI), and STEMI.² In United States about 0.5 million suffer from STEMI yearly.³ Many of these patients die from sudden cardiac death prior to arriving at the hospital. CHD death rates are falling slowly in younger age one than older patients.^{4,5}

High-risk patients with STEMI early cardiac catheterization and thus revascularization of viable myocardium.⁴ This can lead to better outcome due to revascularization coupled with aggressive medical therapy.⁵ ST elevation denotes an acute coronary occlusion and thus warrants immediate reperfusion therapy. Time to reperfusion measured by door to balloon or door to needle time is an important determinant of outcome of these therapies.⁵ Atrial fibrillation (AF) is common arrhythmia after myocardial infarction. Post myocardial infarction prognosis is worse when complicated with atrial fibrillation regarding heart failure, stroke and thromboembolism,⁶ however, the mechanism

underlying AF is complex.⁷ This study was conducted to determine the frequency of new onset of atrial fibrillation in acute ST elevation myocardial infarction.

METHODOLOGY

This cross-sectional study was conducted in Cardiology Department of Sheikh Zayed Medical College/Hospital Rahim Yar Khan, from 8th April 2016 to at 8th October 2016. Sample was taken by non-probability consecutive sampling. Two hundred forty one patients fulfilling inclusion criteria were registered through Emergency Department Cardiology, Sheikh Zayed Hospital, Rahim Yar Khan. Informed consent was taken from patients and ethical approval was sought from Institutional Review Board. Demographic history including age (in years), sex (male or female) were taken. ECG was performed and was assessed for the presence of STEMI before inclusion in the study. These patients were then attached with ECG monitors for 24 hours in department of cardiology and observed for AF and ECG was recorded during arrhythmia for documentation. ECG for atrial fibrillation was assessed and confirmed by two consultant cardiologists. Echocardiography was done of every

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Received: 07-08-2018

Accepted: 25-08-2018

patient to rule out VHD. Trop-T was performed for confirmation of acute STEMI.

Inclusion criteria: All the patients admitted in CCU with ST elevation myocardial infarction, both gender and age ranges from 30 to 70 years

Exclusion criteria: Patients with NSTEMI, prior atrial fibrillation (with previous ECG findings), previous history ischemic heart disease, COPD (with history and pulmonary function tests), sepsis (with raised total leukocyte count), previous history valvular heart disease, and thyrotoxicosis.

All the collected data was entered into SPSS version 10 and analyzed. The qualitative data like demographics (sex; male or female), DM, hypertension, dyslipidemia, smoking, presence of atrial fibrillation was presented as frequency and percentages. Quantitative data like age (in years), height, weight, BMI was presented as mean and standard deviations. Effect modifiers like age, diabetes mellitus (DM), hypertension (HTN), dyslipidemia, smoking and sex was being controlled by stratification of data and other effect modifiers controlled by inclusion and exclusion criteria. Chi-square test was applied to see the effect of these on outcome (i.e. atrial fibrillation), taking P-value < 0.05 as significant.

RESULTS

Among the total study subjects (n=241), 144 (60%) were male and 97 (40%) were female. The minimum age was 30 years and maximum 70 years with mean age of the study subjects was 58.15±8.61 years. Out of 241, 22 (9%) were developed atrial fibrillation and among these 22 patients 13 (59%) were males and 9 (41%) were females (P value=0.94). Out of 241 patients 101 (41.9%) were diabetic, 92 (38.2%) were hypertensive, 114 (47%) were smokers, 119 (49.37%) were having dyslipidemia, 34 (14.1%) of anterior wall MI, 102 (42.4%) of inferior wall MI, 54 (22.4%) of posterior wall MI and 51 (21.1%) were of high lateral wall MI.

There were 8 (7.92%) out of 101 of DM who developed AF. (p=0.580). AF was seen in 12 (13.04%) out of 92 hypertension cases (p=0.097). There were 8 (7.01%) cases of AF, out of 114 smokers (p=0.281). (Table I). AF were seen in 14 (11.76%) out of 119 cases of dyslipidemia with p value =0.161 AF was observed in 3 (8.8%) in 34 cases of anterior wall MI, 11 (10.7%) out of 102 inferior wall MI, 4 (7.4%) in 54 cases of posterior

wall MI and 4 (7.8%) out of 51 cases of high lateral wall MI with p value =0.888 as shown in Table II.

Table I: Comparison of variables with and without atrial Fibrillation in patients with STEMI (n=241)

Study Variables	STEMI with atrial fibrillation	STEMI without atrial fibrillation	P-value
Age Groups in years			
30-50	8 (14.54%)	7 (85.45%)	0.034
50-70	14 (7.52%)	172 (92.47%)	
Gender			
Male	13 (8.9%)	131 (91.03%)	0.94
Female	9 (9.27%)	88 (90.27%)	
Diabetes Mellitus			
Yes	8 (7.92%)	93 (92.07%)	0.58
No	14 (10%)	126 (90%)	
Hypertension			
Yes	12 (13.04%)	80 (86.95%)	0.097
No	10 (6.7%)	139 (93.28%)	
Smoking			
Yes	8 (7.01%)	106 (92.98%)	0.281
No	14 (11.02%)	113 (88.97%)	
Dyslipidemia			
Yes	14 (11.76%)	105 (88.23%)	0.161
No	8 (6.55%)	114 (93.44%)	
BMI groups			
22 -30	7 (7%)	93 (93%)	0.334
30-44	15 (10.63%)	126 (89.36%)	

Table II: Frequency of atrial fibrillation in different types of STEMI

Type of Myocardial Infarction	Atrial Fibrillation	
	Yes	No
Anterior wall MI	3 (8.82%)	31 (91.17%)
Inferior wall MI	11 (10.78%)	91 (89.21%)
Posterior wall MI	4 (7.40%)	50 (92.59%)
High lateral wall MI	4 (7.84%)	47 (92.15%)

DISCUSSION

Analysis of the clinical features of patients of STEMI shows that age, hemodynamic compromise, severity of coronary artery disease and poor perfusion after thrombolysis or primary PCI mainly effects patients outcome.^{7,8,9}

In this study, atrial fibrillation was seen in 22 (9%) cases out of 241 cases of ST-segment elevation myocardial infarction, while new onset AF developed during the in-hospital stay in 7.9% of patients in a previous study.⁸ This lower finding may

be due to early intervention and revascularization specially primary PCI. This was in contrast to a study conducted by a previous study who found higher level 13.8%.¹⁰ Similarly higher results were seen in another study showing frequency of 16%. This finding may be result of relax inclusion criteria including higher age limit and valvular heart disease.⁹

Similarly high prevalence was seen in old age and hypertensive patients with p value (<0.034) & ($=0.097$) respectively. This finding may be because in old age patients there is abnormal electrical generation and pathway because of extensive myocardial damage. This finding was also consistent with a study which found higher prevalence of new-onset AF in older ($p=0.001$) and hypertensive patients p value (<0.001).¹⁰ In this study frequency was little higher in males than females (59.06 vs 40.9%) with an insignificant ($p=0.94$) which is consistent to OPTIMAAL study, showing AF development was common in male patients elevated HR and diastolic BP and a higher Killip class.¹⁰ In current study, this finding may be due to more cases of males in comparison of female cases (59.0 vs 40.7%) respectively. While a previous study showed more frequently women were involved (43% vs 30%, $p=0.006$).¹¹

That study showed new onset AF less in smoker than non-smokers (7% vs 11%) with a non-significant (p value = 0.281). This finding in non-smokers may be due to older age and type of infarction. Similar results were seen in a previous study which showed more frequency in non-smokers with ($p<0.013$). This finding was also consistent with a study, which shows more commonly in non-smokers, this finding may be due to other older age.⁹ Smokers were almost 10 years younger than non-smokers. In this study AF was more common in cases with dyslipidemia with an insignificant p value <0.161 . Similar results were also seen in other studies as well.^{12,13}

In this study, AF was more common in higher BMI group (30 to 44) with an insignificant p value = 0.334. In this study, AF was more frequent with inferior wall (50%) with an insignificant p value = 0.888. Similar results were found in a study showing 57% with inferior wall and in other study patients undergoing PCI, CAD was more frequently detected in the RCA.¹³ Although in some of previous studies these were not predictors

of AF patients.

There were few limitations of the study that it was conducted to see only the cases of ST-segment elevation myocardial infarction, not compared with NSTEMI, old ischemic heart disease with new onset of AF or valvular heart disease. New onset is assessed rather than incidence, which could be a good finding. Moreover, it was a small study and it also did not check for other confounding risk factors. Further studies can be planned to stratify the other co risk factors and a wider range

CONCLUSION

This study showed that atrial fibrillation was common complication of ST elevation myocardial infarction. It also indicated a high frequency of atrial fibrillation in females, inferior wall MI, hypertension and young patients.

REFERENCES

1. Helmers C, Lundman T, Mogenson I, Oriiiiis E, Sjogren A, Wester PO. Atrial fibrillation in acute myocardial infarction. *Acfc Med. Wid* 1973;193:39-44
2. Behar S, Zahavi Z, Goldbourt U, Reicher-Reiss H, for the SPRINT Study Group. Long-term prognosis of patients with paroxysmal atrial fibrillation complicating acute myocardial infarction. *Eur Heart J.* 1992;13:45-50.
3. Schmitt J1, Duray G, Gersh BJ, Hohnloser SH. Atrial fibrillation in acute myocardial infarction: a systematic review of the incidence, clinical features and prognostic implications. *Eur Heart J.* 2009 May;30(9):1038-45.
4. Sugiura T, Iwasaka T, Ogawa A, Shiroyama Y, Tsuji H, Onoyama H et al. Atrial fibrillation in acute myocardial infarction. *Am J Cardiol.* 1985;56:27-29.
5. Zahir S, Lheureux P. Management of new-onset atrial fibrillation in the emergency department. *Eur J Emerg Med.* 2005;12(2):52-6.
6. Bhatia GS, Lip GY. Atrial fibrillation post myocardial infarction: frequency, consequence and management. *Curr Heart Fail Rep* 2004 Dec;1(4):149-55.
7. Vias Markides, Richard J Schilling. Atrial fibrillation: Classification, pathophysiology, mechanism and Drug treatment. *Heart* 2003; 89 (8):939-943
8. Van de Werf F, Bax J, Betriu A, al. Management of acute myocardial infarction in patients presenting with persistent ST-segment elevation. The Task Force on the management of ST-segment elevation acute myocardial infarction of the European Society of Cardiology. *Eur Heart J* 2008; 29: 2909-45.
9. Nielsen JC, Kristensen L, Andersen HR, Mortensen PT, Pedersen OL, Pedersen AK. A randomized comparison of atrial and dual-chamber pacing in 177 consecutive patients with sick sinus syndrome: Echocardiographic and clinical outcome. *Journal of the American College*

- of Cardiology; 2003;42(4):614-23.
10. Gordon P. Review: Congenital heart block: clinical features and therapeutic approaches. *Lupus*. 2007;16(8):642-6.
 11. Samartín RC, de Carranza MJS-T, Mateas FR, del Ojo González JL, Andrésa MLF. Spanish Pacemaker Registry. Seventh Official Report of the Spanish Society of Cardiology Working Group on Cardiac Pacing. *Revista Española de Cardiología (English Edition)*. 2010;63(12):1452-67.
 12. Coma SR, Sancho-Tello dCM, Ruiz MF, Leal DOGJ, Fidalgo AM. Spanish pacemaker registry. Seventh official report of the spanish society of cardiology working group on cardiac pacing . *Revista Espanola de Cardiologia*. 2010;63(12):1452-67.
 13. Expert Panel on Detection E. Executive summary of the Third Report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (Adult Treatment Panel III). *JAMA* 2001;285(19):2486-90.

Article Citation: Majid A, Babar MZM, Hussain A. Frequency of new onset atrial fibrillation in acute ST elevation myocardial infarction. *JSZMC* 2018;9(3): 1491-1494.