

Frequency of New Onset Atrial Fibrillation In Patients Presenting With Acute Coronary Syndrome

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Abstract

Background: Atrial fibrillation (AF) is a frequent complication of acute coronary syndromes (ACS) and is associated with an increased risk of in-hospital and long-term mortality. New onset atrial fibrillation (AF) in conditions of the acute coronary syndrome (ACS). Despite advances in the diagnosis and management of acute coronary syndrome (ACS), atrial fibrillation (AF) remains a commonly encountered complication leading to adverse short- and long-term outcomes across the whole spectrum of ACS.

Objective: To assess the frequency of new-onset atrial fibrillation in patients presenting with the acute coronary syndrome in our population.

Study Design: Cross-sectional study

Study Setting: Department of Cardiology, Jinnah Hospital, Lahore.

Duration of Study: March 2019 - August 2019.

Subjects and Methods: 150 patients fulfilling the selection criteria will be included in the study from OPD of the Department of Cardiology, Jinnah Hospital, Lahore. Informed consent and demographic and clinical information (name, age, gender, BMI, history of diabetes) were recorded. ECG was done by a senior cardiologist with the presence of an abnormal heartbeat and ECG changes, then new-onset AF was labeled as per operational definition. Data were analyzed in SPSS Ver: 20.0 and presented as frequency and percentages.

Results: Current study showed that out of 150 patients 71(47.3 %) were males and 79(52.7 %) were females. The mean age of patients was calculated as 55.15±9.63 years and the Mean duration of ACS was 42.33±37.23 years. The frequency of new-onset atrial fibrillation was 13.3 % and diabetes mellitus was 38 % in patients with the acute coronary syndrome.

Conclusion: We concluded that new-onset atrial fibrillation was a common complication of acute coronary syndrome. We found that diabetes mellitus and old age were associated with new-onset atrial fibrillation.

Keywords: Arrhythmia, Atrial Fibrillation, Acute coronary syndrome, new onset fibrillation.

Introduction

Acute coronary syndrome (ACS) refers to a spectrum of clinical presentations ranging from those for ST-segment elevation myocardial infarction (STEMI) to presentations found in non-ST-segment elevation myocardial infarction (NSTEMI) or in unstable angina. It is almost always associated with rupture of an atherosclerotic plaque and partial or complete thrombosis of the infarct-related artery.[1] Atrial fibrillation (AF) confers a substantial risk of mortality and morbidity from stroke and thromboembolism, and this common cardiac arrhythmia represents a major healthcare burden. [2] Despite advances in the diagnosis and management of ACS, AF remains a commonly encountered complication leading to adverse short- and long-term

outcomes across the whole spectrum of ACS. [3] Initiation of AF are typically due to focal automaticity within the pulmonary vein musculature. Triggers include ganglionic plexi that reside near the antral portion of the pulmonary vein-left atrial junction. [4] The incidence of new-onset AF is 10.7 %, and it is an important predictor of a patient's mortality.5 One study showed that the frequency of new-onset AF was 2.3-23 % in patients presenting with ACS. [6] Another study reported the frequency of new-onset AF was 11.94 % in patients presenting with ACS. [7] While one study reported the frequency of AF was 13.8 % in patients presenting with ACS, out of which 73.3 % had new-onset AF while 26.8 % had previous AF. [8] A recent study

by Santos H found new-onset AF incidence in ACS around 4.1 %. [9] The rationale of this study is to assess the frequency of new-onset AF in patients presenting with ACS in our population. Literature has shown that new-onset AF is a common complication of ACS. Controversial data have been retrieved through literature. Moreover, there is no local evidence available which shows that to what extent, the new onset of AF occurs after ACS. So, there is a need to perform a study on the local population to confirm the evidence. This study will help us to get local evidence and in the future, we can plan better preventive and management protocols to reduce complications of ACS and new-onset AF and achieve a better prognosis for the patient.

Objective: To assess the frequency of new-onset atrial fibrillation in patients presenting with the acute coronary syndrome in our population.

Subjects and Method: A Cross-sectional study was conducted at the Department of Cardiology, Jinnah Hospital, Lahore from April 2018 – March 2019. A sample size of 150 patients is calculated with a 95% confidence level, 5% margin of error, and taking an expected percentage of new-onset AF i.e. 11.94% in patients with ACS through a non-probability, consecutive sampling. ACS was defined chest pain,

with ST-elevation on ECG and troponins > 0.01 ng/ ml in STEMI, without ST-elevation and troponins > 0.01 ng/ml in NSTEMI, and without ST elevation and troponins < 0.01 ng/ml in Unstable Angina. New onset atrial fibrillation was labeled if there will be an abnormal heartbeat and ECG changes with the absence of P waves and irregular R-R. Patients with a non-previous history of AF will be labeled as new-onset AF. Patients aged 35-70years, of either gender, presenting with ACS were included and Patients with prior AF or taking medicine for AF undergoing CABG with valvular or congenital heart surgery and with thyroid disease were excluded from the study. Then patients underwent ECG by a senior cardiologist and if there was an abnormal heartbeat and ECG changes, then new-onset AF was labeled. Data was entered and analyzed through IBM SPSS21. Mean and SD was calculated for quantitative variables like age, BMI, and duration of ACS. Frequency and percentage will be done for categorical variables like gender, history of diabetes, and new onset AF. Data will be stratified for age, gender, BMI, duration of ACS, and history of diabetes (BCR > 200mg/ dl). Post-stratification, the chi-square test will be applied with $P \leq 0.05$ taken as significant.

Results

The mean age was 55.15 ± 9.63 years with 71(47.3 %) males and 79(52.7 %) females. BMI means 25.58 ± 4.99 kg/m². The mean duration of ACS was 42.33 ± 37.23 years. Diabetes mellitus was present in 57(38 %) of subjects and new-onset atrial fibrillation was present in 20(13.3 %) subjects. Stratification was with age, gender, BMI, DM, and duration of ACS. 10 (18.2 %) of subjects with 35-50

years and 10 (10.5 %) with age 51 – 70 years have AF. ($p=0.184$). 11 (14.0 %) of females had AF as compared to 9 (12.7 %) of males. ($p=.822$). 6 (7.3 %) of subjects with normal BMI has AF as compared to 4 (20.6%) of the obese patient. ($p=.822$). Among subjects who had diabetes mellitus, 9 (15.8 %) had AF, and those who have 1 -72 months of duration of ACS were 18 (15.5 %). ($p=.146$) (Table no:2)

Table no 1: Demographic and Clinical Profile of subjects:

Variables n= 150	Frequency	Percent
Age Mean \pm SD = 55.15\pm9.63		
35-50 years	55	36.7
51-70 years	95	63.3
Gender		
Female	79	52.7
Male	71	47.3
BMI Mean \pm SD = 25.58\pm4.99		
≤ 25 kg/m ²	82	54.7
≥ 26 kg/m ²	68	45.3
Duration of ACSN Mean \pm SD = 42.33\pm37.23		
1-72 months	116	77.3
≥ 73 months	34	22.7
Diabetes Mellitus		
No	93	62.0
Yes	57	38.0
New onset AF		
No	130	86.7
Yes	20	13.3

Table no 2: stratification of atrial fibrillation with age, gender, BMI and Diabetes Mellitus and duration of ACS

Variables N=150		Atrial Fibrillation		Total	p-value
		No	Yes		
Age	35-50 years	45 (81.8 %)	10 (18.2 %)	55 (100.0 %)	0.184
	51-70 years	85 (89.5 %)	10 (10.5 %)	95 (100.0 %)	
Gender	Female	68 (86.0 %)	11 (14.0 %)	79 (100.0 %)	0.822
	Male	62 (87.3 %)	9 (12.7 %)	71 (100.0 %)	
BMI	15-25 kg/m ²	76 (92.7 %)	6 (7.3 %)	82 (100.0 %)	0.822
	26-40 kg/m ²	54 (79.4 %)	14 (20.6 %)	68 (100.0 %)	
DM	No	82 (88.1 %)	11 (11.9 %)	93 (100.0 %)	0.488
	Yes	48 (84.2 %)	9 (15.8 %)	57 (100.0 %)	
Duration of ACS	1-72 months	98 (84.5 %)	18 (15.5 %)	116 (100.0 %)	0.146
	>=73 months	32 (94.1 %)	2 (5.9 %)	34 (100.0 %)	

Discussion

Atrial fibrillation (AF) is one of the most common arrhythmia complications of the acute coronary syndrome (ACS).[10]The incidence of new-onset AF is 2.3–37 %, and it is an important predictor of a patient’s morbidity, mortality, and prolonged hospitalization. [11] Various risk factors for the development of new-onset AF after ACS have been identified, including old age, female gender, hypertension, diabetes mellitus, chronic kidney disease, and peripheral arterial disease. [12]

In the current study mean age, BMI, and duration of the acute coronary syndrome was 55.15 ±9.63 years, 25.58±4.99 kg/m², and 42.33 ±37.23. Out of 150 patients, 55(36.7 %) patients were in the age group of 35-50 years and 95(63.3 %) patients were in the age group of 51-70 years. In this study incidence of new-onset, atrial fibrillation was 20 (13.3 %) of the total patients presenting with the acute coronary syndrome. We found that out of 150 patients, 20(13.3 %) had new-onset AF and 130(86.7 %) had no new-onset AF.

The current estimated global prevalence of AF is 2-4 % among the general population. [13] Atrial fibrillation (AF) is a common cardiac arrhythmia occurring in an estimated 2.7 to 6.1 million people in the United States (US) and it would be expected to rise to 12.1 million in 2030 AF prevalence increases with age affecting 6 % of the US population ≥ age 65. [14]

According to European Union statistics in 2010, adults of age ≥ 55 years had an estimated AF of 1.8 % of the total population and this is expected to rise by 2060 to 3.5 %. AF prevalence could increase in adults of age ≥ 75 years from 5.6 up to 13.8 million by 2060. [15] Given the high burden of the arrhythmia, AF accounts for many annual hospitalizations. The rates of AF admissions increased 34 % from 1996 to 2010 in the US. [16] More recently, a study that reviewed all hospital admissions in Australia found that there was a greater than 295 % increase in hospitalizations due to AF between 1993 and 2013. [17] In this study incidence of new-onset atrial fibrillation was in 20(13.3 %) of the total patients presenting with the acute coronary syndrome. In this study, we found that diabetes mellitus is one of the risk factors for atrial fibrillation. Out of 150 patients, 57(38 %) had DM. which

showed that there is an association between diabetes mellitus and atrial fibrillation.

One study found that the Risk factors for atrial fibrillation include obesity, hypertension, diabetes mellitus, alcohol, and obstructive sleep apnea.[18] Some but not all studies have reported that diabetes mellitus (DM) is an independent risk factor for AF. A potential association between DM and the incidence of AF has long been postulated based on epidemiologic studies. [19,20] The original Framingham Heart Study consisted of 5,209 patients (2,336 men, 2,873 women), aged 30–62 years of age. This study initiated in 1948 represented a random sample of two-thirds of the population of Framingham, Massachusetts, and has conducted pivotal research defining cardiovascular risk factors. This study reported that hypertension, diabetes mellitus, congestive heart failure, and valvular heart disease were independent risk factors for AF in both men and women. [21] In a recent editorial by Zhao J et al, the worldwide epidemic of AF increasing due to the increasing age of the population, and the incidence of heart failure, hypertension, and diabetes mellitus. [22]

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia with an incidence markedly increasing with advanced age. The prevalence of AF is 2.3 % in people older than 40 years and 5.9 % in those older than 65 years. 10 % of people over 80 years suffer from AF. [23] Epidemiological studies such as Framingham emphasized the strong and consistent association between the incidence of AF and age. [24] According to the current study, Out of 150 patients, 55(36.7 %) patients were in the age group of 35-50 years and 95(63.3 %) patients were in the age group of 51-70 years. So, age is also associated with atrial fibrillation in patients with the acute coronary syndrome.

One study showed that the frequency of new-onset AF was 5.3 % in patients presenting with ACS. [25] Another study reported the frequency of new-onset AF was 12.5 % in patients presenting with acute myocardial infarction (AMI), [26] while one study reported the frequency of new-onset AF was 14.2 % in patients presenting with AMI. [27]

The present study has several important contributions to clinical practice and the treatment of patients with ACS with the foremost

being that the clinical significance of transient AF episodes in ACS should not be neglected.

Conclusion

The conclusion of the study frequency of development of new-onset AF was very low in our study population. Age, gender, Diabetes mellitus, BMI, and duration of ACS were not significantly associated with new-onset atrial fibrillation in patients with the acute coronary

syndrome. Further experimental and clinical studies are needed to improve the current understanding and management of new-onset AF in ACS patients.

Contributions

UMB conceived the idea, designed the study and analyzed the data. JZ and UM did data collection. MKI and FMZ did the manuscript writing. MAQ did review and final approval of manuscript. All the authors

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

Conflict of Interest: All authors declare no conflict of interest

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