Original Research Article

Study of incidence and clinical profile of cardiac arrhythmias in patients presenting with acute STEMI

Haresh Panchal[1], Urvesh Mistry[2*]

[1]Assistant Professor, Department of Medicine, BJ Medical College, Ahmedabad, INDIA.
[2]Assistant Professor, Department of Medicine, GCS Medical College, Ahmedabad, INDIA.
Email: hareshpnchl@gmail.com dr_urvesh@yahoo.com

Abstract

Aim and Objective: To study incidence and clinical profile of cardiac arrhythmia in acute STEMI. **Methods:** Total 100 patients admitted with acute MI were studied. Diagnosis of MI was Based on detection of a rise and/or fall of cTn values with Symptoms of acute myocardial ischaemia; New ischaemic ECG changes; Development of pathological Q waves; Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality in a pattern consistent with an ischaemic aetiology. Holter Monotoring and Multipara Monitor used to record arrhythmia in all patients for first 48 hr. **Result:** 86 patients out of 100 had any form of Arrhythmia. Out of 70 males, 59(84.2%) and out of 30 female, 27(90%) had arrhythmia. **Conclusion:** Among all arrhythmias, VPC had the highest occurrence (80.23%) followed by AIVR and CHB (11.63% each) and VT (9.30%). Majority of Patients with Anterior, Inferior and Infero-posterior wall STEMI develops arrhythmia (>85%) as compared to Antero-lateral and Infero-lateral STEMI (<75%).

Key Word: Arrhythmia, Myocardial Infarction, Thrombolysis, VPCs

***Address for Correspondence:**
Dr. Urvesh Mistry, Assistant Professor, Department of Medicine, GCS Medical College, Ahmedabad, INDIA.
Email: hareshpnchl@gmail.com

Received Date: 12/02/2019 Revised Date: 24/03/2019 Accepted Date: 19/04/2019
DOI: https://doi.org/10.26611/10211013

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 22 April 2019

INTRODUCTION

Acute Coronary Syndrome (ACS) represents a Global epidemic, and is intimidating large as the new epidemic affecting population worldwide, especially in the sub-continent. By 2020 it is estimated that ACS will become a major cause of death in all the regions of the world. Many of these deaths are attributed to the development of arrhythmias during periods of myocardial infarction. The search for new tools for prediction, the refinement of the existing tools, and the initiation of well-designed intervention trials are the steps that must be taken towards the more efficient prevention of premature deaths from arrhythmias. CVDs are the number 1 cause of death globally: more people die annually from CVDs than from any other cause. An estimated 17.9 million people died from CVDs in 2016, representing 31% of all global deaths. Of these deaths, 85% are due to heart attack and stroke. Over three quarters of CVD deaths take place in low- and middle-income countries. Out of the 17 million premature deaths (under the age of 70) due to noncommunicable diseases in 2015, 82% are in low- and middle-income countries, and 37% are caused by CVDs. Most cardiovascular diseases can be prevented by addressing behavioural risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity and harmful use of alcohol using population-wide strategies. People with cardiovascular disease or who are at high cardiovascular risk (due to the presence of one or more risk factors such as hypertension, diabetes, hyperlipidemia or already established disease) need early detection and management using counselling and medicines, as appropriate. Cardiac rhythm disturbances occur in most of the patients during acute myocardial infarction, and approximately twenty-five percent have cardiac conduction disturbance within 24 hours following infarct onset. Almost any rhythm disturbance can be associated with acute myocardial infarction, including bradyarrhythmias, supraventricular tachyarrhythmias, ventricular arrhythmias, and atrio ventricular block. With

How to cite this article: Haresh Panchal, Urvesh Mistry. Study of incidence and clinical profile of cardiac arrhythmias in patients presenting with acute STEMI. *MedPulse International Journal of Medicine.* April 2019; 10(1): 48-51. https://www.medpulse.in/Medicine/

the advent of thrombolytic therapy, coronary reperfusion also produce some rhythm disturbances in patients with acute myocardial infarction.

AIMS AND OBJECTIVE

- To study the incidence and clinical profile of arrhythmias in Patients of acute STEMI
- To study different variables affecting STEMI patients
- To study effect of revascularization and their outcome on arrhythmias
- To study different types of arrhythmias and associated factors

MATERIAL AND METHODOLOGY

The present study was conducted in General Tertiary Care Hospital. A total of 100 patients are recruited on admission to the intensive coronary care unit Between January 2018 to December 2018. Patients with confirmed diagnosis of acute myocardial infarction and satisfying the inclusion and exclusion criteria are included in the study group. The diagnosis of acute myocardial infarction is based on the fourth universal Definition of Myocardial Infarction.

Criteria for MI: Detection of a rise and/or fall of Cardiac Troponin values with at least one value above the 99th percentile URL and with at least one of the following:

- Symptoms of acute myocardial ischemia.
- New ischemic ECG changes.
- Development of pathological Q waves.
- Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality in a pattern consistent with an ischemic etiology.

Inclusion Criteria:

1. Patient in hyper-acute to acute phase of myocardial infarction within 48 Hours of STEMI.
2. Age above 18 years.

Exclusion Criteria:

1. The patients admitted with previous history of myocardial infarction
2. A known case of valvular heart diseases
3. A known case of thyroid disorders.
4. Patients with unknown and undefined arrhythmias of known pre morbid condition.

Clinical Data: A detailed history with special reference to the cardiovascular system is taken. A thorough physical examination is done with emphasis on the cardiovascular system.

Investigations: 12-lead ECG was taken at admission and 24 hour Holter monitoring done in all patients. Multi parameter monitor was used to monitor the patients for 48 hours and the pattern of arrhythmias, if any, was noted. 2-D echo-cardiographic analysis was done in all patients, during the first 48 hours of hospitalization.

Statistical Analysis: The current study is hospital – based descriptive study. The test of significance used between the associations of different characteristics was the Chi square test. For statistical significance, the p value was calculated and a value less than 0.05 was considered significant. SPSS11.5 was used to analyse the data. + Suggestive significance (P value: $0.05<P<0.10$) * Moderately significant (P value:$0.01<P \leq 0.05$) ** Strongly significant (P value: $P\leq0.01$)

RESULT

Out of 100 Patients, Majority of patients were above 50 years of age (74%). Out of 100 Patients, 70 were male and 30 were female. More than half patients (62%) were not having history of Hypertension. Almost One third (32%) of the patients had history of Diabetes. Out of total 100 study population, Very Few (8%) had Obesity. Approximately, 37% patients were Smokers and 21% patients were having history of chewing tobacco. 86 patients out of 100 had any form of Arrhythmia. Out of 70 males, 59(84.2%) and out of 30 female, 27(90%) had arrhythmia.

Table 1: Distribution of Patients as per Type of Arrhythmias (N=100).

Type of Arrhythmia	Frequency*	Percentage
VPC	69	80.23%
AIVR	10	11.63%
CHB	10	11.63%
VT	9	9.30%
AF	3	3.49%
1st Degree AV Block	2	2.33%
2nd Degree AV Block	2	2.33%
APC	2	2.33%
LBBB	2	2.33%
RBBB	2	2.33%

Among all arrhythmias, VPC had the highest occurrence (80%). Out of 10 patients having CHB, 80% had inferior wall infarction that is statistically significant. (p=0.073). Whereas in patients with VT, majority had Anterior wall infarct (p=0.024).

Table 2: Arrhythmia vs serum Electrolytes.

Biochemistry	Arrhythmia Present	Total	Percentage
Low Potassium(<3.50 meq/l)	11	12	91.7%
Low Sodium(<130 meq/l)	47	57	82.5%
Low Magnesium(<1.8 meq/l)	22	24	91.7%

Among patients with Low Serum markers, more than majority had arrhythmia.

Table 3: Site of Infarction and its occurrence. **(N=100)**

Site of Infraction	Percentage
Anterior wall	52%
Inferior wall	26%
Infero Posterior and RV wall	10%
Antero lateral wall	8%
Infero lateral wall	4%
Total	100%

Maximum occurrence of Infarction was found to be on Anterior wall. Majority of Patients with Anterior, Inferior and Infero-posterior wall STEMI develops arrhythmia (>85%) as compared to Antero-lateral and Infero-lateral STEMI (<75%). Out of 100 patients, 38 did not underwent any revascularization procedure.

Table 4: Status of Revascularization and Occurrence Arrhythmia

Status of Intervention	Arrhythmia	No Arrhythmia	Total
No Revascularization	32(84%)	6(16%)	38(100%)
Revascularization	54(87%)	8(13%)	66(100%)

On comparing status of revascularization with presence of Arrhythmia there is no statistical difference (p=0.68)

Table 5: Killip class and presence of Arrhythmia (N=100).

Killip Class	Arrhythmia	No arrhythmia	Total
I, II	70(83.33%)	14(16.67%)	84
III, IV	16(100%)	0 (0.00%)	16

All the Patients with Killip Class III and IV had Arrhythmia (100%) whereas and 70 out of 84 belonging to Killip Class I and II had Arrhythmia (83.33%). This is not statistically significant (p>0.05)

DISCUSSION

In the present study arrhythmia was detected in 86% of the patients. In a study by Aufderheide TP, 90% of patients with acute myocardial infarction have some cardiac rhythm abnormality during the first 24 hours following infarct onset. Our study showed VPCs in 80% of patients with acute MI. This result is similar to study by Campbell RW *et al* and Bigger JT *et al*, which showed VPCs of various frequencies were observed in up to 90% of patients with MI. Maximum occurrence of Myocardial infarction was found in anterior wall (50%) followed by inferior wall (34%) in the study done by Puneet P *et al*. In our study, 52% of patients had Anterior wall involved followed by Inferior wall (26%). In the present study, there is no difference in occurrence of arrhythmia whether patients are revascularized or not. This can be due to reperfusion which may precipitate arrhythmia initially mainly AIVR which was seen in 11.63% of patients. In the study done by DeGeare VS *et al*, patients with Killip class III and IV showed higher mortality due to associated major arrhythmias. Our study showed Killip Class III and IV had 100% chance of developing arrhythmias. In the present study, VT occurred in 9.3% of the patients. In a study by Newby KH *et al*, sustained VT and VF occur in up to 6% of patients with AMI and have been associated with poor prognosis. In a study by Tofler GH *et al*, sustained VT occurring within 48 hours of MI seen in 2% of patients is often transient and is not associated with long –term risk of sudden cardiac death. In the present study, first and second degree heart block was seen in 2.33% of the patients each, complete heart block was seen in 11.63% of the patients. Archbold RA *et al* observed complete heart block in 5.3% of MI patients. A study by Goldberg RJ *et al*, showed that in hospital mortality significantly higher with anterior wall infarction with complete heart block than with inferior wall myocardial infarction. complete heart block is twice as common with inferior or posterior wall infarction as

compared with anterior wall involvement. In the current study, atrial fibrillation occurred in 3.49% of the patients.. In a study by Jewitt DE, *et al*, atrial fibrillation occur in up to 5% within 24 hours of infarction. The SPRINT Study Group, observed that atrial fibrillation is seen in up to 15% of patients with myocardial Infarction, most commonly in those who have significant left ventricular dysfunction. Our study has some limitations. Firstly, patients of STEMI were not evaluated beyond 48 hours of initial presentation for Arrhythmias. Secondly, there can be multiple etiologies for genesis of arrhythmias like dyselectrolytemia, which can modify the incidence and profile of arrhythmias in STEMI. Lastly, clinical outcomes of the patients with arrhythmias in STEMI were not studied.

SUMMARY

- In our study, 100 Patients of Acute STEMI were included.Majority of patients were above 50 years of age (74%).70% were male and 30% were female.
- 86 patients out of 100 had any form of Arrhythmia.
- Among all arrhythmias, VPC had the highest occurrence (80.23%) followed by AIVR and CHB (11.63% each) and VT (9.30%).
- Majority of Patients with Anterior, Inferior and Infero-posterior wall STEMI develops arrhythmia (>85%) as compared to Antero-lateral and Infero-lateral STEMI (<75%).
- All the Patients with Killip Class III and IV had Arrhythmia (100%) whereas 70 out of 84 belonging to Killip Class I and II had Arrhythmia(83.33%). This is not statistically significant (p>0.05).

REFERENCES

1. Rissam HS, Kishore S, Trehan N. Coronary artery disease in young Indians– The missing link. Journal, Indian academy of clinical medicine. 2001; 2(3):128-32.
2. "The Top 10 Causes of Death." WHO. N.p., 2013. Web. 25 Sept. 2013.
3. Fabijanic D, Culic V, Bozic I, *et al*. Gender differences in in-hospital mortality and mechanisms of death after the first acute myocardial infarction. Ann Saudi Med. 2006; 6: 455–60
4. Armstrong, William F, and Paul L Mchenry. Ambulatory electrocardiographic monitoring: can we predict sudden death? Journal of the American College of Cardiology. 5.6 (1985): 13B-6B.
5. Shah MJ, Bhatt NR, Dabhi A, Thorat PB, Chudasama K, Patel J. A study of 100 cases of arrhythmias in first week of acute myocardial infarction (AMI) in Gujarat: a high risk and previously undocumented population. Journal of Clinical and Diagnostic Research: JCDR. 2014 Jan; 8(1):58.
6. Cardiovascular disease (CVD) : WHO; available at :https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)
7. Muthuraju N, Chandrashekhar HM. The pattern of arrhythmias during first 48 hours of acute myocardial infarction.
8. Volpi A, Cavalli A, Santoro L, Negri E, GISSI-2 Investigators. Incidence and prognosis of early primary ventricular fibrillation in acute myocardial infarction—results of the Gruppo Italiano per lo Studio della Sopravvivenza nell'Infarto Miocardico (GISSI-2) database. The American journal of cardiology. 1998 Aug 1; 82(3):265-71.
9. A clinical study of arrythmias during the first 48 hours of acute myocardial infarction. Available at: http://www.rguhs.ac.in/cdc/onlinecdc/uploads/01_M009_44604.doc
10. Pathology and politics--Ludwig Aschoff (1866-1942) and the German way in the Third Reich.
11. Bashshur R, Shannon GW. History of telemedicine: evolution, context, and transformation. New Rochelle, NY: Mary Ann Liebert; 2009 Oct.
12. Braunwald E. Introduction with comments on the hemodynamic significance of atrial systole. The American journal of medicine. 1964 Nov 1; 37(5):665-9.
13. Triedman JK. Arrhythmias in adults with congenital heart disease. Heart. 2002 Apr 1; 87(4):383-9.
14. Madigan NP, Rutherford BD, Frye RL. The clinical course, early prognosis and coronary anatomy of subendocardial infarction. The American journal of medicine. 1976 May 10; 60(5):634-41.

Source of Support: None Declared
Conflict of Interest: None Declared