

## Original article

### Study of Arrhythmias in Myocardial Infarction patients in urban population in India

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#### Abstract:

**Introduction :** Despite impressive advances in diagnosis and management over the last four decades ST segment elevation myocardial infarction (STEMI) continues to be a major health problem in the developing countries also. The present study attempts to know facts about arrhythmias in Myocardial Infarction patients in urban population in India.

**Material and methods:** Clinical profile of patients with respect to age, sex, signs and symptoms of ischaemic heart disease, contributing past and family history, risk factors for ischaemic heart disease; general and systemic examination findings were recorded as per the proforma.

**Results :** Ventricular premature complexes (44.74%) were most commonly observed arrhythmias in the first 24 hours of STEMI, three (7.89%) patients amongst these also had sinus tachycardia and one (2.63%) of them had 1st degree AV block. Ventricular tachycardia was seen in five (13.16%) patients and two (5.26%) of them had prior sinus tachycardia.

**Conclusion:** It is imperative to ensure that all patients with MI are optimally treated for on going ischaemia to prevent life threatening complications like arrhythmias.

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#### Introduction

Despite impressive advances in diagnosis and management over the last four decades ST segment elevation myocardial infarction (STEMI) continues to be a major health problem in the developing countries also. As STEMI can strike an individual during the most productive years it can have profound and deleterious psychosocial and economic ramifications. Given the wide disparity of available resources to treat STEMI in developing countries, major effects are needed to strengthen primary prevention programs at the community level.<sup>1,2</sup> The incidence of arrhythmias after STEMI is higher in patients the earlier they are seen after the onset of symptoms. Arrhythmias are most likely to be seen during the peri-infarction period (arbitrarily accepted as within 48 hours of the index myocardial infarction) and are considered to be non-indicative of long-term prognosis.<sup>3</sup> Since most deaths from arrhythmia occur during the first few hours after infarction, the effectiveness of treatment relates directly to the speed with which patients come under medical observation.<sup>3</sup> The present study attempts to know facts about arrhythmias in Myocardial Infarction patients in urban population in India.

#### Material and methods:

Study Design: A cross-sectional study.

Sample size: 38 patients meeting inclusion criteria were enrolled in the study. IEC approval was obtained. The sample size was approved by expert from statistician.

Clinical profile of patients with respect to age, sex, signs and symptoms of ischaemic heart disease, contributing past and family history, risk factors for ischaemic heart disease; general and systemic examination findings were recorded as per the proforma.

Reports of cardiac biomarkers, routine blood investigations, blood sugar, lipid profile and serum electrolytes were recorded.

**Results:**

Table 1: Types of arrhythmias.

Type of arrhythmia	No. of cases	Percentage (n=38)
VPCs	17	44.74
ST	9	23.68
1st AVB	6	15.79
VT	5	13.16
SB	4	10.53
CHB	3	7.89
AF	2	5.26
RBBB	2	5.26
SVT	2	5.26
AIVR	1	2.63
VF	1	2.63
2nd AVB Mobitz II	1	2.63

Ventricular premature complexes (44.74%) were most commonly observed arrhythmias in the first 24 hours of STEMI, three (7.89%) patients amongst these also had sinus tachycardia and one (2.63%) of them had 1st degree AV block. Ventricular tachycardia was seen in five (13.16%) patients and two (5.26%) of them had prior sinus tachycardia. In two (5.26%) patients sinus tachycardia progressed to supraventricular tachycardia and in one (2.63%) patient, it progressed to ventricular fibrillation. Atrial fibrillation was seen in two (2.63%) patients. Sinus bradycardia progressed to 1st degree AV block in three (7.89%) out of the six (15.79%) patients and also in the one (2.63%) with 2nd degree AV block, Mobitz type II. There were three (7.89%) patients with complete heart block and one of them had an associated atrial fibrillation. Right bundle branch block was seen in two (5.63%) patients and accelerated idioventricular rhythm in one (2.63%) patient.

Table 2: Correlation of various arrhythmias with site of MI.

Type of arrhythmia	Site of MI					
	IWMI	AWMI	ASMI	ALMI	IWMI+ RVI	IWMI+ PWMI
	n=13	n=10	n=10	n=5	n=2	n=1
VPC n=17	4	5	7	1	0	0
ST n=9	1	3	4	1	0	0
1st AVB n=6	2	1	1	0	2	0
VT n=5	0	1	1	3	0	0
SB n=4	4	0	0	0	2	0
CHB n=1	3	0	0	0	0	0
RBBB n=2	0	2	0	0	0	0
SVT n=2	0	0	2	0	0	0
AF n=2	1	1	0	0	0	0
2ndAVB,MII n=1	1	0	0	0	0	0
VF n=1	0	0	0	1	0	0
AIVR n=1	1	0	0	0	0	1

Sinus tachycardia was most common in ALMI. In three cases of ASMI, it progressed to supraventricular tachycardia and ventricular tachycardia. In one case of AWMI, sinus tachycardia developed into ventricular tachycardia. One patient of ALMI progressed to ventricular fibrillation from sinus tachycardia. One patient of AWMI had sinus tachycardia with right bundle branch block. Sinus bradycardia was mostly seen in IWMI and it progressed to I<sup>o</sup> degree AV block in three patients, out of whom two had RVI. One patient of IWMI presented with atrial fibrillation and complete heart block. One patient with VPCs progressed to 1<sup>st</sup> degree AV block in a case of ASMI. One patient of IWMI had 2<sup>nd</sup> degree AV block, Mobitz type .

There was no significant relationship between any of the arrhythmias with left ventricular ejection fraction. 2-D echocardiography was not done in five patients due to early death following hospitalisation.

Table 3: Correlation of type of arrhythmia with mortality in the study group

Type of arrhythmia	Mortality		
	Yes (n=6)	No (n=32)	P Value
1st AVB	0	6	<0.05
AF	1	1	>0.05
CHB	2	1	>0.05
AIVR	0	1	>0.05
RBBB	0	2	>0.05
SB	0	4	<0.05
ST	3	6	>0.05
SVT	0	2	>0.05
VF	1	0	>0.05
VPC	0	17	<0.05
VT	3	2	<0.05
2nd AVB Mobitz II	0	1	>0.05

Six patients succumbed to STEMI within the first 48 hours. Amongst these patients, two patients had sinus tachycardia with ventricular tachycardia (AWMI, ASMI), rest of the four patients had ventricular tachycardia (ALMI), complete heart block (IWMI), sinus tachycardia with ventricular fibrillation (ALMI) and atrial fibrillation with complete heart block (IWMI).

The presence of ventricular tachycardia in three patients who died, was found to be statistically significant.

### **Discussion:**

Correlation of type of arrhythmia with mortality in the study group: Six (16%) patients succumbed to STEMI within the first 48 hours. The presence of ventricular tachycardia in three (7.89%) of the patients, was found to be statistically significant ( $P < 0.05$ ). Two patients had sustained VT (33%), which is comparable to the reported in-hospital mortality rate by GUSTO-I (34.5%), but slightly less than that by Mont (43%).<sup>4,7,53</sup> One of them had NSVT (17%), which is comparable to that reported by Cheema et. al (10%).<sup>4</sup>

Two patients had complete heart block, one of whom had associated atrial fibrillation.

One patient had ventricular fibrillation. These findings were statistically insignificant.

Goldberg et. al concluded that the incidence of AF after AMI was 13.7% and 5-23% respectively.<sup>71,110</sup> Atrial fibrillation was seen in inferior and anterior wall MI in the present study while Ghuran reported its incidence to be high in inferior wall MI if present within 24 hours and common in anterior infarction when appeared after 24 hours.<sup>5</sup>

- Right bundle branch block was seen in 5.56% patients which is more than Archbold et al' reported incidence of 3.6%<sup>88</sup> and much less than that reported by Hindman et. al and Melgarejo-Moreno et. al (15-55%)<sup>111,112</sup> Right bundle branch block was associated with anterior MI in the present study. This is comparable to the findings of HERO-II trial.<sup>96</sup>
- Supraventricular tachycardia was in 5.26% of the patients which is comparable to the reported incidences by Marchlinski (<10%), Julian (4%) and Rajagopalan (6%).<sup>33,98,99</sup> It was seen in antero septal MI in the current study.
- Accelerated idioventricular rhythm was present in 2.63% of the patients whereas according to Libby and Wagner, it is seen in upto 20% of the patients.<sup>6,2</sup> It was seen in inferior wall MI in the present study while Libby reported it to be common in anterior and inferior wall MI.<sup>2</sup>
- Ventricular fibrillation in the present study was seen in 2.63% patients which is similar to other studies as shown in the table 25. It was seen in antero lateral wall MI.<sup>7,8,9</sup>

### **Conclusion**

It is imperative to ensure that all patients with MI are optimally treated for ongoing ischaemia to prevent life threatening complications like arrhythmias. As coronary artery disease continues to be prevalent in today's society, it is inevitable that cardiologists and physicians will continue to be challenged with the arrhythmias generated from cardiac ischaemia

**References:**

1. Marshall T: Evaluating national guidelines for prevention of Cardiovascular disease and Primary care, *J. Eval. Clin. Pract.* 2005; 11 :452.
2. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F et al: Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): Case-control study. *Lancet* 2004; 364:937.
3. Fauci AS, Braunwald E, Kasper DL, Hauser SL, Longo DL, Jameson JL, Loscalzo J. *Harrison's Principles of Internal Medicine.* 17 ed. New York. Mc Graw Hill; 2008; 2.
4. Cheema AN, Sheu K, Parker M, Kadish AH, Goldberger JJ. Non-sustained ventricular tachycardia in the setting of acute myocardial infarction: tachycardia characteristics and their prognostic implications. *Circulation* 1998; 98: 2030-6.
5. Ghuran AV, Camm AJ. Ischaemic heart disease presenting as arrhythmias. *British medical bulletin.* 2001; 59: 193-210.
6. Libby P, Bonow RO, Mann DL, Zipes DP. *Braunwald's Heart Disease.* 8th ed. Philadelphia. Saunders Elsevier: 2007.
7. Pedersen OD, Bagger H, Kober L, et al. The occurrence and prognostic significance of Atrial Fibrillation/ Flutter following Acute Myocardial Infarction. TRACE study group TRAndolapril Cardiac Evaluation. *Eur Heart J* 1999; 20:
8. Ronner E, van Kesteren HA, Zijnen P, Altmann E, Molhoek PG, van der Wieken LR, Cuffie-Jackson CA, Neuhaus KL, Simoons ML: Safety and efficacy of eptifibatid vs placebo in patients receiving thrombolytic therapy with streptokinase for acute myocardial infarction; a phase II dose escalation, randomized, double-blind study. *Eur Heart J* 2000; 21: 1530-1536.
9. The PARADIGM Investigators : Combining thrombolysis with the platelet glycoprotein IIb/IIIa inhibitor lamifiban: results of the Platelet Aggregation Receptor Antagonist Dose Investigation and Reperfusion Gain in Myocardial Infarction (PARADIGM) trial. *J Am Coll Cardiol* 1998; 32:2003-2010.