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The pattern of arrhythmias during first 48 hours of acute myocardial infarction

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Abstract
There is a view that the cascade leading to sudden death from arrhythmias can be predicted by certain interactions among structural and functional abnormalities. 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. The data was obtained from total of 100 patients admitted to the ICCU, Hospital and Research Centre. Anterior wall infarctions (66%) were more common than inferior wall infarction (30%).There were 11 cases of right ventricular infarction – 10 were associated with inferior wall MI and 1 case occurred in anterior wall MI. There were 5 cases of posterior wall MI.

Keywords: arrhythmias, myocardial infarction, acute coronary syndrome

Introduction
Acute Coronary Syndrome (ACS) represents a Global epidemic. According to the National Commission on Macro-economics and Health, there would be around 62 million patients with Coronary Artery Disease (CAD) by 2015 in India, and of these, 23 million would be younger than 40 years of age [1]. Many of these deaths are attributed to the development of arrhythmias during periods of myocardial infarction. There is a view that the cascade leading to sudden death from arrhythmias can be predicted by certain interactions among structural and functional abnormalities [2]. 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.

Deaths most commonly occur within one hour of acute myocardial infarctions. Early deaths are not related to the severity of infarct but observations from monitoring units suggest that the mechanism in most of the cases is arrhythmias and cardiac asystole.

A substantial number of patients with acute myocardial infarction have some cardiac rhythm abnormality, and approximately twenty-five percent have cardiac conduction disturbance within 48 hours following infarct onset. Almost any rhythm disturbance can be associated with acute myocardial infarction, including bradyarrhythmias, supraventricular tachyarrhythmias, ventricular arrhythmias, and atrioventricular block. With the advent of thrombolytic therapy, it was found that some rhythm disturbances in patients with acute myocardial infarction may be related to coronary artery reperfusion (reperfusion arrhythmias).

Other findings that augur poorly are repetitive ventricular ectopic activity, persistent horizontal or downsloping ST segment depression, Q waves in multiple leads, atrial fibrillation, and voltage criteria for left ventricular hypertrophy, left ventricular dysfunction [3, 4].

This study is undertaken to study the profile of arrhythmias in acute myocardial infarction during the first 48 hours of hospitalization in our hospital.

The purpose of this study is to evaluate the incidence and profile of cardiac arrhythmias in acute myocardial infarction in the first 48 hours of hospitalization. Attention is given to the peri-infarction period (arbitrarily accepted as within 48 hours of myocardial infarction), as arrhythmias are most likely to be seen around this time [5].

Methodology
The data was obtained from total of 100 patients admitted to the ICCU, Hospital and Research Centre.

Inclusion Criteria
1. Patients 18 years of age or above admitted in the ICCU with acute myocardial Infarction.
2. ST segment elevation Myocardial infarction
3. Myocardial infarction less than 48 hours old.

Exclusion Criteria
1. Patients less than 18 years of age.
2. Myocardial infarction 48 hours old or more.
3. Non ST segment elevation myocardial infarction.

Statistical Methods
The data obtained was analyzed by descriptive statistics by means of percentage, proportions and depicted via bar charts, pie charts.

Investigations
- Blood routine
- Random blood sugar
- ECG
- CPK MB
- TROPONIN I
- Blood urea, serum creatinine
- Serum electrolytes
- 2-D Echocardiography.

Results

Table 1: Showing the age distribution

Age group(in years)		Percentage
20- 30	5	5
31-40	16	16
41-50	26	26
51-60	31	31
61-70	12	12
71-80	7	7
More than 81	3	3
Total	100	100

The age of patient in this study ranged from 24 years to 85 years. Mean age was 52.9 (± 13.35) years.

Table 2: Showing site of infarction

Site of Infarction	No of cases	Percentage
Anterior wall MI	66	66
Anteroseptal MI	32	32
Anterolateral MI	1	1
Anterior wall MI	16	16
Extensive anterior wall MI	17	17
Inferior wall MI	30	30
Inferior wall MI	8	8
Inferio lateral MI	12	12
Inferior wall + RV infarction	10	10
Combined (Anterior And Inferior) MI	4	4

Anterior wall infarctions (66%) were more common than inferior wall infarction (30%).

There were 11 cases of right ventricular infarction – 10 were associated with inferior wall MI and 1 case occurred in anterior wall MI.

There were 5 cases of posterior wall MI (associated with inferior wall MI).

Table 3: Showing Incidence Arrhythmias

Arrhythmias	No of cases	Percentage
Present	81	81
Absent	19	19

81 Patients (81%) developed arrhythmias in one form or other.

Table 4: showing different types of arrhythmias documented in present study

Types of arryhthmia	No of case	Percentage
Sinus tachycardia	30	30
Sinus bradycardia	15	15
Premature atrial beats	8	8
Premature ventricular beats	20	20
Atrial fibrillation	2	2
Supraventricular	4	4
tachycardia		
Ventricular tachycardia	5	5
Ventricular fibrillation	3	3
Atrioventricular blocks	7	7
Bundle branch blocks	8	8

Sinus tachycardia was the commonest arrhythmia (30%) followed by premature ventricular beats (20%).

Table 5: Showing types of av block

Types of AV block	No. of cases	Percentage
First degree AV block	1	1
Second degree AV block	3	3
- Mobitz type I	1	1
- Mobitz type II	2	2
Complete AV block	3	3
Total	7	7

Totally 7 AV block cases were demonstrated. 1% of the patients had first degree AV block, 3% of patients presented with second degree heart block (Mobitz type I- 1 patient, Mobitz type II- 2 patients) and 3 patient presented with complete heart block All the AV Block cases were seen with inferior wall MI.

Table 6: Time of appearance of individual arrhythmias

Types of arrhythmias	≤ 12 hours	12-24 hours	24-48 hours	Total
Sinus tachycardia	8	16	6	30
Sinus bradycardia	13	-	2	15
Premature atrial beats	3	2	3	8
Premature ventricular beats	13	4	3	20
AF	-	-	2	2
SVT	2	1	1	4
VT	4	-	1	5
VF	1	1	1	3
AVB	2	5	-	7
Bundle branch blocks		7	1	8

Sinus bradycardia (13%) and premature ventricular beats (13%) were documented within 12 hours.

Discussion

The age distribution in this present study ranged from 24 years to 85 years with maximum number of patients in the age group 51 to 6o years. There were 31% of patients in this age group. This is comparable with findings of other authors who have quoted a similar incidence in this age group [6, 7, 8].

21% of the patients were aged 40 years or below. This is comparable with study of Siwach *et al.* [9] who have quoted an incidence of 19.2%.

In the present study 81 of patients (81%) had arrhythmia in one or the other form, which is comparable to Jacob *et al.* [8] reported an incidence of 84%, R.S.N. Murthy *et al.* 101 and Afzal *et al.* [10] reported an incidence of 80% and 81% respectively.

In the present study 64% of patients developed arrhythmias in one or the other form within 24 hours of admission, while 17% developed arrhythmia after 24 hours of admission. Totally 81% patients manifested with arrhythmia within 48 hours of admission, which is comparable to S. Afzal *et al.* [10] reported an incidence of 81% of arrhythmia occurring within 24 hours of admission. R.S.N Murthy *et al.* [11] reported incidence of 72.5% of arrhythmia occurring within 24 hours of admission.

Sinus tachycardia was the commonest arrhythmia seen in this study. It was observed in 30 patients (30%) which is comparable with studies of Julian *et al.* [6].

Sinus tachycardia was more frequent in anterior wall MI (26%) when compared to inferior wall MI (4 %). This is in conformity with study by Julian *et al.* [6] and Jewitt *et al.* [12] who have reported a higher incidence of 48.5% and 53.4% respectively in

anterior wall MI. 24 of the 30 patients (80%) had developed sinus tachycardia within 24 hours of admission.

Conclusion

The commonest arrhythmias encountered were sinus tachycardia followed by ventricular premature beats, sinus bradycardia. Atriventricular blocks were more common in IWMI whereas ST, VPC were more common with AWMI. In addition to arrhythmias, Cardiogenic shock added to the mortality. 70% of patients developed arrhythmias in one or the other form within 24 hours of admission

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