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ASSOCIATION OF ARRHYTHMIAS WITH ACUTE MYOCARDIAL INFARCTION IN THE PERI-INFARCTION PERIOD: A PROSPECTIVE STUDY

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HOW TO CITE THIS ARTICLE:

Ravi Kumar Navsk, Madhusudhana Babu M, Srinivas Vaddadi, Vishnu Priya V, Vikramvardhan R. "Association of Arrhythmias with Acute Myocardial Infarction in the Peri-Infarction period: A Prospective Study". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 71, September 03; Page: 12316-12321, DOI: 10.14260/jemds/2015/1779

ABSTRACT: BACKGROUND: Arrhythmias have been frequently associated with Myocardial Infarction (MI) since long. There are many studies about monitoring or recording of arrhythmias in the post MI period ranging from weeks to years. But there is a scarcity of studies in our region (Visakhapatnam) regarding the association of arrhythmias with acute myocardial infarction observed within 48 hours of the acute episode. Hence the present study was conducted with an objective of studying the association of arrhythmias in the PERI-infarction period. **MATERIALS AND METHODS:** One hundred consecutive patients were studied who were admitted to the Intensive Cardiac Care Unit (ICCU) after being diagnosed with Acute Myocardial Infarction (AMI). Recruitment lasted for one year. Inclusion criteria: Patients ≥ 18 years of age admitted to ICCU with AMI with the occurrence of acute episode within 48 hours. Exclusion criteria: Patients < 18 years of age, Myocardial infarction > 48 hours. Patients' ECGs were continuously monitored. Risk factor for heart disease were investigated. **RESULTS:** Anterior wall MI accounted for a larger group (58%). Overall incidence of ventricular arrhythmias was 33%. Sinus arrhythmia was predominantly associated with antero-lateral and inferior wall MI. Bundle branch blocks were more accounted for with anterior wall MI. Reperfusion arrhythmias were observed in 33 % of subjects. **CONCLUSIONS:** Acute Myocardial Infarction (AMI) is commonly seen in anterior wall with high incidence of tachyarrhythmias and higher mortality whereas inferior wall MI is less common and generally associated with bradyarrhythmias and lesser mortality. Sinus bradycardia, if transient, has a protective role in AMI whereas persistent sinus tachycardia is associated with high mortality. Early streptokinase therapy has a favourable impact on mortality in MI and hence should be tried in all the Acute MI patients who do not have contraindications for streptokinase therapy.

KEYWORDS: Arrhythmias, Myocardial infarction, Bundle branch blocks, Reperfusion arrhythmias.

INTRODUCTION: BACKGROUND: Arrhythmias have been frequently associated with Myocardial Infarction (MI) since long. There are many studies about monitoring or recording of arrhythmias in the post MI period ranging from weeks to years. But there is a scarcity of studies in our region (Visakhapatnam) regarding the association of arrhythmias with acute myocardial infarction observed within 48 hours of the acute episode

The study was conducted to know the incidences of various types of arrhythmias associated with Acute Myocardial Infarction in relation to the peri-infarction period (i.e., within 48 hours of the episode) and their outcome.

METHODS: One hundred consecutive patients were studied who were admitted to the Intensive Cardiac Care Unit (ICCU) after being diagnosed with Acute Myocardial Infarction (AMI). Recruitment lasted for one year.

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Inclusion Criteria: Patients ≥ 18 years of age admitted to ICCU with AMI with the occurrence of acute episode within 48 hours.

Exclusion Criteria: Patients < 18 years of age, Myocardial infarction > 48 hours Patients' ECGs were continuously monitored. Risk factor for heart disease were investigated.

RESULTS: Incidence of Arrhythmias: Most of the patients presented with more than one type of arrhythmia. Ventricular arrhythmias were present in 32% of them of which 24% had Ventricular Tachycardia (VT) and 28% had Ventricular Premature Beats (VPB). Sinus tachycardia was present in 23% and sinus bradycardia in 12% of the sample population. Bundle branch block, AV block and complete heart block were respectively present in 22%, 19% and 13% of the patients. Other types of arrhythmias that were recorded are Supra Ventricular Tachycardia (3%), Atrial Fibrillation (2%), Atrial Ectopics (1%).

In relation to the site of infarct, sinus tachycardia was mostly associated with antero-lateral MI (35.3%) and was least associated with infero-lateral MI (12.5%). Complete heart block was seen in 13% of subjects of which 31% each had inferior and anterior MIs. AV block (First and second degree) was seen in 19% of patients of which majority (58%) had inferior wall MIs.

Reperfusion arrhythmias:

Ventricular premature beats were the most common type of reperfusion arrhythmias followed by accelerated idio-ventricular rhythms. Most of the arrhythmias were transient and were self-terminated except for VT which had to be terminated with cardio-version.

Effect of Streptokinase: Of the total study population, 64% received streptokinase. Mortality (28% of total study population) was higher in the non-streptokinase group (20%) than in the streptokinase group (8%).

Fig. 1: Distribution of the study population with respect to age and gender

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Diseases	No. of cases	Percentage
Hypertension	10	10
Diabetes	8	8
Ischemic Heart Disease (IHD)	7	7

Table 1: Family history of non- communicable diseases

Fig. 2: Distribution of risk factors for heart disease

Fig. 3: Pattern of various symptoms of Acute Myocardial Infarction

Fig. 4: Pattern of incidence of Acute Myocardial Infarction based on site of infarct

DISCUSSION: The maximum incidence of Acute MI as seen in the present study was in the age group of 41-70 years (78%). Only 5% of cases aged below 40 years. Incidence of this study almost compares well with incidence being 85% between 35 years and 75 years of age as reported by MartinTC et al in 2007.⁽¹⁾

Incidence of type 2 diabetes mellitus was 23% in the present study as compared to 19% in Svensson AM et al study of 2007.⁽²⁾ In the present study, 23% had hypertension showing higher prevalence of Acute MI in disease groups which is in agreement with Kokubo Y et al study in 2008.⁽³⁾

Bradycardia is most common in proximal occlusion of right coronary artery commonly leading to inferior wall MI because of reflexes arising from ischemic right ventricle. In the present study, 12% had Sinus Bradycardia (SB) out of which 10 were purely in inferior and one each in inferior wall with right ventricular extension and inferior+ posterior wall MI. In all these patients, SB was transient and majority of them had a normal sinus rhythm (NSR) by the end of one day. All the patients had NSR at discharge. Similar observations were made by Swart G et al.⁽⁴⁾ There was high mortality associated with Sinus tachycardia (ST) making it an adverse prognostic sign. In the present study, the mortality rate in patients with ST was 22% which is comparable to the study done by Crimm et al.⁽⁵⁾

Atrial fibrillation is associated with increased in-hospital mortality probably because it is associated with large infarction and is seen more commonly in patients with cardiac failure, complex ventricular arrhythmias, advanced AV block, atrial infarction and pericarditis. AF increases in incidence with age. In our study 100% mortality was seen in cases with AF. AF can be predicted as an independent risk factor for mortality in Acute MI. This goes in conjunction with Asanin M et al,⁽⁶⁾ and Pizzetti F et al.⁽⁷⁾

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In the present study, the frequency of Ventricular tachycardia (VT) was seen more in anterolateral MI than in antero-septal MI which goes well with the study done by Horvat D et al.⁽⁸⁾ In the present study, mortality seen in patients with VT was 50% whereas that in studies done by Gibson CM et al.⁽⁹⁾ and Al Khatib et al.⁽¹⁰⁾ was 25.2% and 24% respectively. This discrepancy could be explained by larger infarcts and older age in our study.

Our study reported 21 patients (32.8%) of a total of 64 patients had Reperfusion Arrhythmia (RA) on the basis of rapid clinical and non-invasive marker (ST segment resolution) following streptokinase (STK). The same was reported by Osmanik PP et al.⁽¹¹⁾

CONCLUSION: Acute Myocardial Infarction (AMI) is one of the major causes for hospital admission in the elderly with a male preponderance between 4th and 7th decade of life, the incidence being equal in both sexes beyond the 7th decade.

Cardiac arrhythmias routinely manifest during or following an acute MI. Early recognition and management of post myocardial infarction arrhythmias can significantly modify the morbidity and mortality in myocardial infarction.

In this study, diabetes mellitus and hypertension were commonly associated with Acute MI. These are modifiable risk factors and can be tackled with drugs, public health education and life style modification.

Acute MI was commonly noticed in association with anterior wall with high incidence of tachy-arrhythmias and higher mortality rates whereas inferior wall MI was less common and was mostly associated with brady-arrhythmias with lesser mortality. Sinus bradycardia, if transient, had a protective role in Acute MI whereas persistence of sinus tachycardia was associated with higher mortality rates in Acute MI.

In this study, patients who developed Reperfusion Arrhythmias (RA) after thrombolysis had a better prognosis (associated with lower mortality) than in patients who did not have RA. Thus RA is not an event of serious concern as they are usually well tolerated and are amenable to treatment. They in-fact indicate an effective reperfusion when present.

Early streptokinase therapy has a favourable impact on mortality in MI and hence should be tried in all the Acute MI patients who do not have contraindications for streptokinase therapy.

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FINANCIAL OR OTHER

COMPETING INTERESTS: None

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Date of Submission: 29/08/2015.
Date of Peer Review: 30/08/2015.
Date of Acceptance: 31/08/2015.
Date of Publishing: 01/09/2015.