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A study of arrhythmias in the first week of acute myocardial infarction-an experience of a rural medical college hospital

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INTRODUCTION

Acute coronary syndrome (ACS) represents a global epidemic, and is emerging as a public health problem, especially in the Indian sub-continent. According to the National Commission on Macro-economics and Health, there would be an estimated 62 million patients with coronary artery disease (CAD) by 2015 in India.[1] Of these, 23 million would be younger than 40 years of age.[1] Indians also show higher incidence, morbidity and mortality due to CAD than other ethnic groups. Many of these deaths are attributed to the development of arrhythmias during periods of myocardial infarction.[2,3]

The purpose of this study was to evaluate the burden and study the profile of cardiac arrhythmias in the first one week of hospitalisation in patients with acute myocardial infarction.

MATERIAL AND METHODS

This observational, descriptive clinical study was conducted in PES Hospital, Kuppam, from December 2013 to November 2014. Fifty patients aged over 18 years admitted to the intensive coronary care unit (ICCU) with acute myocardial infarction were studied. Patients aged less than 18 years of age, and patients who had sustained a myocardial infarction 48 hours or earlier were excluded from the study. The diagnosis of acute myocardial infarction was based on the following criteria.[4] If there was a typical rise and gradual fall in troponin or more rapid rise and fall of biochemical marker of myocardial necrosis [creatinine kinase - muscle brain fraction (CK-MB)] with at least one of the following: (i) ischaemic symptoms; (ii) development of pathologic Q waves on the electrocardiogram (ECG); (iii) ECG changes indicative of ischaemia (ST-segment elevation or depression); (iv) coronary artery intervention (e.g., coronary angioplasty).

RESULTS

Most patients with acute myocardial infarction were in the age group 50-59 years followed by older than 70 years. Only 2/50 cases were aged below 40 years. Overall, men (n=34, 68%) out numbered women (n=16, 32%) (Table 1). In subjects aged over 70 years, women outnumbered men. Both patients under age of 40 years were men. The site(s) of occurrence of myocardial infarction is shown in Table 2.

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Table 1: Age and gender incidence in 50 patients with acute myocardial infarction

Age (years)	No. of patients	Males	Females
30-39	2	2	0
40-49	9	8	1
50-59	19	12	7
60-69	7	6	1
> 70	13	6	7
Total	50	34	16

Table 2: Site of involvement in 50 patients with acute myocardial infarction

Site	No. (%)
Anteroseptal	12 (24)
Lateral	12 (24)
Anterolateral	9 (18)
Inferior	7 (14)
Inferolateral	5 (10)
Anterior	5 (10)5
Total	50 (100)

In the present study 45.2% of arrhythmias occurred during the first hour and 35.7% during 1-12 hours of hospitalization. According to the site, anterior wall (i.e., anterior + anterolateral + anteroseptal) was most commonly affected (52%) followed by inferior wall (i.e., inferior + infero-lateral) and lateral wall (24 % each) (Table 3). Sinus tachycardia was observed most frequently in anterior (50%) and antero-lateral (16.6%) followed by inferior (8.3%) myocardial infarction. Arrhythmias were noted in 80% of patients with left ventricular dysfunction. Arrhythmia were noted in 75% patients who were thrombolysed compared to 36/42 patients who were not thrombolysed. Sinus bradycardia (24%) and sinus tachycardia (28.5%) were the most frequently seen arrhythmia (Table 3).

DISCUSSION

Myocardial ischaemia is characterised by ionic and biochemical alterations, creating an unstable electrical substrate capable of initiating and sustaining arrhythmia. Acute myocardial infarction creates areas of electrical inactivity and blocks conduction, which also promotes arrhythmias. At least 75% of patients with acute myocardial infarction develop arrhythmias in the peri-infarct period, and majority of deaths occur secondary to development of arrhythmias. The age and gender distribution in the present study was similar to that observed in the report by Lincoff et al[5] and the Framingham study.[6]

A substantial number of patients with acute myocardial infarction have some cardiac rhythm abnormality, and approximately 25% have cardiac conduction disturbances within 24 hours following of infarct onset. Almost any rhythm disturbance can be associated with acute myocardial infarction, including bradyarrhythmias, supraventricular tachyarr-hythmias, ventricular arrhythmias, and atrio-ventricular block, among others. 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.[3]

Our observations suggest that arrhythmias are an important cause of morbidity in patients with

Table 3: Various types of arrhythmias seen in 50 patients with acute myocardial infarction

Type of arrhythmia	No. of patients
Supraventricular tachyacardia	1
Atrial fibrillation	2
Atrial ectopics	1
1st degree AV block	2
2nd degree AV block	2
Bundle branch block	2
Ventricular tachycardia	3
Ventricular fibrillation	1
VPC	2
Sinus tachycardia	12
Sinus bradycardia	10
sinus tachycardia + VPC	1
LBBB + VPC	2
RBBB + VPC	1

VPC = ventricular premature complex; LBBB = left bundle branch block; RBBB = right bundle branch block

AV = atrioventricular

acute myocardial infarction. Diligent monitoring for arrhythmias and instituting appropriate treatment can be life-saving.

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