

Original Research Article

Study of rhythm disturbances in acute myocardial infarction in Government Dharmapuri Medical College Hospital, Dharmapuri

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Abstract

Background: Despite impressive strides in diagnosis and management of acute myocardial infarction in the past three decades, acute myocardial infarction continues to be a major health problem. About 50% of death from acute myocardial infarction occur within 1 hour of the event and are attributable to arrhythmias most often ventricular fibrillation. Ischemic injury can produce conduction blocks at any level of the atrioventricular or Intraventricular conduction systems. Such conduction block can occur in the atrioventricular node producing various grades of AV block. Conduction block can occur in either main bundle branch producing right or left bundle branch block or in the anterior and posterior fascicle of left bundle branch, producing left anterior & left posterior fascicular blocks respectively.

Aim of The Study: To study the incidence of rhythm disturbances in acute myocardial infarction, to evaluate the age, sex distribution and various other risk factors in relation to rhythm disturbances occurring in acute myocardial infarction, to correlate between the different types of rhythm disturbances in relation to the location and type of acute myocardial infarction.

Materials and methods: The study was conducted in Government Dharmapuri Medical College Hospital during the period from November 2016 to May 2017. The patients admitted to ICCU were taken up for study. A detailed history physical examination & laboratory work up was done in all patients.

Results: 100 Patients of acute myocardial infarction were included in this study. They consisted of 77 male and 23 female patients. The youngest patient was a 23 year old male and the oldest patient was an 84 year old male. Out of 100 patients with myocardial infarction 80 were males and 20 were females. Out of 80 males 37 had rhythm disturbances with a percentage of 46.25 and out of 20

females 9 had rhythm disturbance with a percentage of 45. 8 patients had previous ischemic heart disease prior to present episode. Of these 4 developed rhythm disturbances. All female patients were postmenopausal. 6 patients had COPD and 3 developed rhythm disturbances. Out of 100 patients 25 patients had Intraventricular block, of these right bundle branch block was common with an incidence of 10.

Conclusion: The distribution of rhythm disturbances were almost equal in males and females (p value 0.3365). Rhythm disturbances were more common in the age group 50-59. The incidence of rhythm disturbances in patients with Diabetes mellitus and hypertension was high.

Key words

Acute Myocardial Infarction, Rhythm Disturbances, Intraventricular Conduction Block.

Introduction

It is defined by either electrocardiogram or echocardiography. It is an important independent risk factor roughly doubling the risk for cardiovascular death in both men and women [1]. Left ventricular hypertrophy is associated with obesity, excessive salt intake, advanced age and heredity [2]. Several studies have found that Angiotensin converting enzyme inhibitor reduces left ventricular mass by 12%, calcium channel blockers by 11%, beta blockers by 5% and diuretics by 8%. The risk for CHD is positively correlated with total serum cholesterol concentration [3], which in turn is highly correlated with Low Density Lipoprotein (LDL). The risk is inversely related to plasma High Density Lipoprotein (HDL) cholesterol concentration. LDL lowering can be accomplished by pharmacological and non-pharmacological interventions. Achieving a desirable body weight will reduce LDL cholesterol level in most overweight individuals [4]. Among cholesterol lowering drugs, Statins are found to be highly useful Lipoprotein(a) – Lp(a). It consists of an LDL particle linked via a disulphide bond to an Apo lipoprotein (a) of polypeptide chain. Because of homology between Lp (a) and plasminogen, it serves as a competitive inhibitor for plasminogen binding and thus may inhibit fibrinolysis. Nicotinic acid and oestrogens appear to lower Lp (a) levels [5].

Materials and methods

The study was conducted in Government Dharmapuri Medical College Hospital during the

period from November 2016 to May 2017. The patients admitted to ICCU were taken up for study. A detailed history physical examination & laboratory work up was done in all patients. Total No of Patients were 100. Among them the age was between Group: 20 to 90years. Clinical presentation, Enzyme levels, ECG findings, Echocardiography findings were taken into account.

Inclusion criteria

- History of chest pain lasting more than 30 minutes not relieved by nitrates or rest.
- Typical ECG changes of acute myocardial infarction

Exclusion criteria

All patients with evidence of pre-existing rhythm disturbances were excluded from the study. Variable recorded at admission. ECG was taken in all patients. ECG recording were done immediately after admission, if thrombolysed one hour later, once daily for 7 days, whenever complications occurred and at discharge. Special right precordial leads V3R V4R V5R were taken in patients with inferior wall MI & also posterior leads were taken in suspected cases of posterior wall MI. Long strips in L II, V I were taken to study the rhythm disturbances.

Results

Out of 100 patients of AMI, 46 patients had Rhythm disturbances (**Table – 1**).

Table – 1: Incidence of Rhythm Disturbances in Patients with Acute MI.

No of patients with rhythm disturbances	No of patients without rhythm disturbances	Total patients
46	54	100

Table – 2: Incidences of rhythm disturbances in patients with acute MI according to age.

Age	3 rd decade (20-29 years)	4 th decade (30-39 years)	5 th decade (40-49 years)	6 th decade (50-59 years)	7 th decade (60-69 years)	8 th decade (70-79 years)	9 th decade (80-89 years)	Total
No of patients	2	3	20	32	28	11	4	100
No of rhythm disturbances	2	1	6	17	13	6	1	46

Table – 3: Incidences of Rhythm Disturbances in patients with Various Risk Factors in Acute MI.

Risk factors	Patients with MI (Total 100)	Patients with rhythm disturbances		P value
		No of patients	%	
Smoking	57	38	66.7	0.0000
Diabetes	55	37	67.3	0.0000
Hypertension	38	23	60.5	0.0225
Alcohol	33	25	75.8	0.0000
Hypercholesterolemia	51	19	37.3	0.0734

Type – 4: Incidence of different types of rhythm disturbances in acute myocardial infarction.

Type of AV Block	1 st degree	2 nd degree	3 rd degree	Total
No of patients	6	6	6	18

Table - 5: Incidence of other rhythm disturbances in acute myocardial infarction.

Type of Arrhythmias	No of Patients
Ventricular ectopic beat	24
Atrial fibrillation	7
Ventricular fibrillation	2
Ventricular tachycardia	8

Table – 6: Time of appearance of rhythm disturbances in relation to onset of acute MI.

Type of block	Time of appearance			
	At admission	Within 1 st 24 hours	2-5 days	>5 days
1 st degree AV block	3	2	0	1
2 nd degree AV block	3	2	1	0
3 rd degree AV block	4	2	0	0
RBBB	5	2	2	1
LBBB	3	3	1	0
LAFB	3	1	1	0
Others	1	2	1	0

The maximum incidence of MI is in the age group 50 to 59 years. The rhythm disturbances were also maximum in this age group. The minimum incidence of myocardial infarction was

in the age group 20 to 29 years. The oldest patient was 85 year old male. The youngest patient was 23 year old male (**Table – 2**).

Table – 7: Distribution of Death according to Type of rhythm Disturbances.

AV BLOCK	No. of patients	No of death	Percentage
1st degree	6	0	0
2nd degree	6	0	0
3rd degree	6	3	50

8 patients had previous ischemic heart disease prior to present episode. Of these 4 developed rhythm disturbances. All female patients were postmenopausal. 6 patients had COPD and 3 developed rhythm disturbances (**Table – 3**).

AV blocks all second degree blocks were mobitz type 1 and there were no patients with mobitz type two block. Out of 100 patients there were 18 patients with AV block (**Table – 4**).

The other arrhythmias associated with acute myocardial infarction were ventricular ectopic beat, atrial fibrillation, ventricular tachycardia, ventricular fibrillation whose incidence were as follows. Sinus tachycardia was noted in 43 patients immediately after admission. It could be attributed to stress and anxiety leading to increased sympathetic activity. Hence it was not included as rhythm disturbances in our study (**Table – 5**).

Most of the rhythm disturbances occurred within first 24 hours (**Table – 6**).

Distribution of Death according to Type of rhythm Disturbances was as per **Table – 7**.

Discussion

In this study that included 100 patients of acute myocardial infarction, the maximum incidence of acute myocardial infarction occurred in the age group 50 to 59. The rhythm disturbances were also maximum in this age group. The youngest patient was a 23 year old male [6]. The oldest patient was an 84 year old male. With increasing age there was a greater incidence of death in those with arrhythmia; despite the fact that the incidence of serious arrhythmias remains relatively constant at various ages. In this study male patient constituted 80% Of study group. Female population constituted 20% of study

group [7]. According to literature males in the age group 40 to 70 are prone for myocardial infarction which correlates with our study. Among 80 males with MI 37 developed rhythm disturbances with a percentage of 46.25. Among 20 females 9 had developed rhythm disturbances with a percentage of 45. p value was 0.3665, hence they were not statistically significant. The proportion of patients with rhythm disturbances appeared to be almost equal in both sexes. All females with rhythm disturbances were postmenopausal. Smoking was present in 57 patients among 100 with Acute MI [8]. It is the most common risk factor in our study group. Diabetes is the second most common risk factor with an incidence of 55%. HARRIS et al found that coronary heart disease accounts for 69% of death in adults with diabetes [9]. In this study group the total incidence of hypertension was 38%. When serum cholesterol above 200mg% is taken as hypercholesterolemia, the incidence of this risk factor was 51%. According to LAW et al a 10% increase in cholesterol is associated with 20 to 30% increase in risk of coronary artery disease. 38 patients with smoking developed rhythm disturbances with a percentage of 66.6 [10]. Among diabetic patients 37 developed rhythm disturbances with a percentage of 67.3. The correlation between smoking, diabetes mellitus and rhythm disturbances was found to be statistically significant with a P value of 0.000. The correlation between alcohol consumption and rhythm disturbances was also found to be statistically significant with a P value of 0.000 as the incidence of alcohol consumption among 100 patients. In this study of 100 patients with acute MI 46 developed some form of rhythm disturbances [11]. Among 61 patients with anterior wall MI 39 developed rhythm disturbances with a percentage of 50.8 and in 39 patients with inferior wall MI 15 developed rhythm disturbances with a percentage of 38.5. In

our study the relation between anterior wall MI and inferior wall MI and the rhythm disturbances was not statistically [12] Significant as the P value was 0.2265. Thus in our study rhythm disturbances occurred equally in both anterior wall and inferior wall MI. According to the literature the overall incidence of atrioventricular conduction blocks in acute MI is 12 to 25 % [13]. The incidence of 1st degree AV block is 4 to 14%, 2nd degree AV block is 6 to 10 %, and 3rd degree AV block is 5 to 8%. AV blocks are more common in inferior wall MI than in anterior wall MI. If it occurs in anterior wall MI it is associated with extensive myocardial necrosis and signifies poor prognosis with MI was 38 and the percentage developing rhythm disturbances among them was 75.8.19 patients with hypercholesterolemia developed rhythm disturbances with a percentage of 37.3 [14]. In our study the association between hypercholesterolemia and rhythm disturbances was not statistically significant as the P value was 0.0734. Study shows that multiple risk factors are associated with increase in the risk of rhythm disturbances. 58% of our patients with rhythm disturbances had multiple risk factors. 8 patients had previous history of coronary heart disease and 4 of them developed rhythm disturbances. 6 patients had chronic obstructive pulmonary disease and 3 developed rhythm disturbances [15]. The result of our study coincides well with the literature. In our study the incidence of atrioventricular conduction block was 18%. The incidence of 1st degree, 2nd degree, 3rd degree AV blocks were 6, 6, and 6 respectively [16]. There were 11 patients with inferior wall MI developing AV block and 7 patients with anterior wall MI developing AV blocks (p value 0.05). Thus from our study it was concluded that AV blocks are more common in inferior wall MI than in anterior wall MI [17]. Most of the 1st and 2nd degree AV block developed on the first day of the MI and all of them disappeared before discharge. In our study group ventricular ectopic was the most common rhythm disturbances with an incidence of 24%. Ventricular tachycardia is seen in 8% of cases, all of them occurring in anterior wall MI. The

incidence of Ventricular fibrillation in patients with acute MI was 5%. In our study it is 2% which occurred in patients with extensive anterior wall MI [18].

Conclusion

100 patients with acute myocardial infarction were studied with reference to clinical presentation, risk factors, ECG findings, and echocardiographic finding and observed rhythm disturbances were correlated and following conclusions were derived. The incidence of rhythm disturbances in acute myocardial infarction is 46% [19]. The distribution of rhythm disturbances is almost equal in males and females (p value 0.3365). Rhythm disturbances were more common in the age group 50-59. The incidence of rhythm disturbances in patients with Diabetes mellitus and hypertension is high (p value 0.0000). The incidence of rhythm disturbances in patients who smoke is high (p value 0.0000). The incidence of rhythm disturbances in patients who consume alcohol is high (p value 0.0000) [20].

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