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Study of Various Cardiac Arrhythmias in Patients with Acute Myocardial Infarction Presenting to Emergency Department in A Tertiary Care Hospital

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Abstract

Aim: Study aimed to study the pattern of various cardiac arrhythmias in patients with Acute Myocardial Infarction (AMI) along with to study the incidence of arrhythmia and their nature in relation with the site of infarction and to evaluate prognostic value of arrhythmias in Acute Myocardial Infarction during first 48 hours of hospitalization. *Method*: The present study included 100 cases admitted in ED with chest pain and diagnosed as AMI between Oct 2015 and Nov 2017 in narayana medical college and hospital. *Results*: In present study 78 cases were males with mean age of 56.33 ± 10.47 and 22 were females with mean age of 59.82 ± 10.032. In present study 53% of cases were smokers, 50% patients had hypertension and 48% of patients were diabetics. Most common site of infarction is Anterior wall followed by inferior wall. Incidence of AWMI was 57%, IWMI 36%, PWMI 4% and LWMI 3%. Most of the cases presented to ED within 8 hours of symptom onset. Most common presenting symptoms were chest pain and sweatings. In present study 61% & 79% of cases constitutes high risk group with TIMI score ≥ 5 & HEART SCORE ≥ 8 respectively. Over all 58% of cases developed arrrhythmias, of which Tachyarrhythmias were the most common rhythm abnormality. But SB is the most common single arrhythmia type noted in the study and found to be statistically significant. In present study increased risk of arrhythmias were noted in smokers and diabetics. Statistically significant correlation was found between the incidence of arrhythymias and diabetes. Patients with LV dysfunction had increased risk of arrhythmias which was found to be statistically significant and 53.5% of arrhythmias occurred within 4 hours of presentation to ED. Out of all arrhythmias 55.2% were seen in pre thrombolytic period, among post thrombolytic arrhythmias VPC's were the most common type and most of them were persistent. In present study overall mortality was 7.0% and most common rhythm abnormality seen in these cases was VF(57.14%). All deaths due to arrhythmias were occured within 4 hours of arrival to ED and 85.71% of these were males and asociated with smoking and diabetes. These patients constitutes to high risk group with TIMI and HS ≥ 8. *Conclusion*: Early recognition and management of arrhythmias can significantly modify the morbidity and mortality in AMI patients. All emergency ambulances should be equipped with defibrillators, 12-lead electrocardiographs and staffed with at least one person proficient in advanced cardiac life support. ECG transmission/ teleconsultation may be useful in preventing delay in recognition and initiation of thrombolytics in AMI patients.

Keywords: Acute Myocardial Infarction; Cardiac Arrhythmias; Emergency Department.

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Introduction

Acute Coronary Syndrome (ACS) represents a Global epidemic, and is intimidating large as the new epidemic afflicting population worldwide, especially in the sub-continent.[1]

The current status of heart disease in India is alarming, with projections suggesting that by the year 2020, the burden of cardiovascular diseases in India will surpass that of any other country in the world.[2]

The Global Burden of Disease study estimate age-standardized CVD death rate of 272 per 100 000 population in India is higher than the global average of 235 per 100 000 population.[3] CAD affects Indians with greater frequency and at a younger age than in the developed countries, as well as many other developing countries.[4]

The prevalence of IHD in 1960 in urban India was 2%, and increased 7-fold to ≈14% by 2013. Similarly, it more than quadrupled in rural areas, from 1.7% to 7.4% between 1970 and 2013.[3]

Sedentary lifestyle and physical inactivity is associated with obesity and cardiovascular disease risk.[5]

Hypertension and its complications remain a major health problem, causing high mortality and morbidity all over the world.[6]

By 2020 it is estimated that ACS will become a major cause of death in all the regions of the world. Many of these deaths are attributed to the development of arrhythmias during periods of myocardial infarction.[7]

A substantial number of patients with acute myocardial infarction have some cardiac rhythm abnormality, and approximately twenty-five percent have cardiac conduction disturbance within 24 hours following infarct onset.[8]

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.[9]

Despite considerable progress in management over the recent years, coronary artery disease (CAD) remains the leading cause of death in the industrialized world.[10]

Aim of the present study is to study the pattern of various cardiac arrhythmias in patients with Acute Myocardial Infarction (AMI) along with to study the incidence of arrhythmia and their nature in relation with the site of infarction and to evaluate prognostic value of arrhythmias in Acute Myocardial Infarction during first 48 hours of hospitalisation in a population of 100 patients in a tertiary care hospital presenting to ED.

Materials And Methods

Study Design:

This study is conducted in a tertaiary care hospital over a period of two years from November 2015 to October 2017 in Department of Emergency Medicine. A total of 100 patients presented to the Emergency Department with chest pain are selected for the study . Patients were monitered for arrythmias in ICCU for a period of 48 hours.

Inclusion criteria:

Patients 18 years of age or above presented to emergency department with acute myocardial infarction.

Myocardial infarctions in less than 48 hours old.

Presence of classical ECG changes of hyperacute or acute MI with transient rise in cardiac biomarkers.

Presence of new onset LBBB with rise in cardiac biomarkers 5 Presence of wall motion abnormalities in 2D echo.

Presence of pathological q waves accompanied by ST segment elevation and symmetrical inversion of T waves with rise in cardiac enzyme levels.

Exclusion criteria

Patients less than 18 years of age

Myocardial infarction 48 hours old or more

A total of 100 patients were recruited on admission to the emergency deartment in a tertiary care hospital. They include 78 males and 22 females. Patients with confirmed diagnosis of acute myocardial infarction and satisfying the inclusion and exclusion criteria were included in the study group. The diagnosis ofacute myocardial infarction was based on the revised definition of myocardial infarction.

Typical rise and gradual fall (troponin) of biochemical markers of myocardial necrosis with at least one of the following:[11]

Ischemic symptoms

Development of pathologic Q waves on the ECG reading ECG changes indicative of ischemia (ST - segment elevation or depression).

New onset LBBB

For all the patients coming with chest pain first 12 lead ECG was taken within 10 min of arrival to ED. Patient was connected to cardiac monitor,Oxygen supplementation was done with face mask if spo2 < 94% on room air, IV line was secured. Detailed history regarding chest pain, palpitation, sweating, vomiting, dyspnea, giddiness was asked, past personal and family history was asked. General and systemic examination was done with emphasis on the cardiovascular system.

All patients has been evaluated for risk factors like diabetes,alcohol, hypertension, hypercholesterolemia and smoking. The diagnosis of AMI was made on the basis of clinical presentation, ECG changes and serum cardiac bio marker (Troponin-T) levels. Serial ECG were taken. Risk stratification is done by caliculating TIMI score and Heart score.

Following standard treatment was given in Emergency: Oxygen via mask, opioids such as fentanyl, Anti-platelets and Vasodilators such as Sublingual nitroglycerine, Tab. Aspirin (325mg), Tab. Clopidogrel (300mg), Tab. Atorvastatin (160mg) was given according to the ECG findings. Anticoagulant therapy with low molecular weight heparin was given unless contraindicated.

Patients presented with signs of heart failure were treated with diuretics, initiated inotropic support (e.g. Nor adrenaline) in patients with shock. Initial ABC stabilsation was done in patients presented to ED with history of chest pain and unstable haemodynamics.

Patients presented with accelerated hypertension and AMI treated with Sublingual nitrates, diuretics (e.g. furosemide), antihypertensives. Patient was defibrillated if presented with ventricular tachycardia or ventricular fibrillation.

Cardiology consultation was obtained within 15 min of arrival to ED. 2-D echocardiography was performed to look for regional wall motion abnormalities. Reperfusion therapy was initiated with Streptokinase: 1.5million IU (diluted in 45ml NaCl) over 1 hour in ED, shifted to ICCU after thrombolysis and stabilisation. Continuous cardiac monitoring done in ICCU, sreial ECGs were taken at frequent intervels in view of increased risk of arrythmias. Coronary angiogram was done wherever possible, during the first week of hospitalization.

Statistical analysis:

The data has been entered into MS-Excel and statistical analysis has been done by using IBM SPSS Version 22.0. For categorical variables, the data values are represented as number and percentages. To test the association between the groups, chi-square test was used. For continuous variables, the data values are shown as mean and standard deviation. All the p values having less than 0.05 are considered as statistical significant.

Results

The maximum incidence of AMI in males was in 61-70 years of age group and in females it was

Table 1: Age and Gender incidence

	No. of patients	Males	Females	% of Males	% of Females
31-40	10	10	0	100	0
41-50	19	14	5	73.7	26.3
51-60	31	24	7	77.4	22.6
61-70	32	25	7	78.1	21.9
71-80	8	5	3	62.5	37.5
Total	100	78	22	78	22

Chi-square value = 4.153, P value = 0.386 (Not sig.)

Table 2: Co - Morbidities in AMI

CM	Frequency	Percent (%)
CKD	6	33.3
COPD	4	22.2
CVA	6	33.3
HYPOTHY	2	11.1
Total	18	100.0

in those who were older than 50 years. There were only 10 % cases below the age 40 years, and all were males. Overall, 78% cases were males and females constitutes 22 % of study.

Mean age of presentation of AMI in present study is 57.10 ± 10.33. In males mean age is 56.33 ± 10.478, in females it is 59.82 ± 10.032 which is statistically not significant with P value 0.168.

Risk factors:

In present study, majority of cases were smokers (53%), 50% of cases were hypertensive and 48% had diabetes and alcoholics constitutes 31% of the study.

In present study 18 cases with AMI had comarbiditiess of which CKD (33.3%), CVA (33.3) constitutes the majority of cases. Hypothyroidism is seen in 11.1% of patients with AMI who developed arrhythmias

Majority of the cases in present study came to ED with chest pain and sweatings, followed by nausea, vomiting. 7% of cases presented to ED with Syncopal episode. 3% cases presented with altered mental status.

Incidence of AMI in relation to anatomical site

Overall anterior wall is the most common site of infarction (57%), followed by Inferior wall. Lateral wall MI constitutes 3% of cases.

In present study AF was observed in 5.2% of cases, Ventricular arrhythmias noted in 32.76% of cases, of which VT was noted in 10.3 %, VF in 8.6 %, VPCs alone in 13.8 % cases.

ST was noted in 20.7 % cases and SB noted in 22.4% of patients.

1^0 degree heart block and 2^0 degree heart block was noted in 1.7% cases.

10.3 % of patients presented with AMI had complete heart block.

Time window of Arrhythmias

In present study 58% cases developed arrhythmias. Majority of arrhythmias occurred within 4 hours of arrival to ED, 32.8% of which occurred within one hour. In 8.6% of cases arrhythmias occurred after 12 hours of arrival to ED.

Incidence of Arrhythmias in relation to Hypertension

In present study 58 % of patients with and without hypertension were eveloped arrhythmias which is not statistically significant.

Incidence of Arrhythmias in relation to Diabetes

In present study 68.75% of diabetics had arrhythmias and 48.08% of non diabetics developed cardiac rhythm abnormality during the course of study. Which is statistically significant with P value 0.0364.

Incidence of Arrhythmias in relation to smoking

In present study 56.61% of smokers who presented with AMI developed arrhythmias and in non smokers 59.57% of cases developed arrhythmias which lacks statistical significance with P value 0.764.

Incidence of Arrhythmias in relation to Alcohol

In present study total number of alcoholics constitutes 31%, of which arrythmias were seen in 45.16% of cases and 63.77% of non alcoholics developed cardiac rhythm abnormalities which is statistically not significant.

Chi-Square Tests

In present study majority of arrhythmias were noted in Anterior wall infarction (AWMI > ASMI > ALMI) followed by IWMI and ILMI, this association was found statistically not significant. Fig. 2: Arrhythmias in relation to site of infarction in AMI Relation of Arrhythmias in AMI with W.P

In present study 58 cases had arrhythmias, most of the arrhythmias were observed within 8 hours of symptom onset. Majority were seen between 5-8 hours of symptom onset which is statistically not significant with P value 0.074.

Chi-Square Tests

	Value	df	P VALUE
Pearson Chi-Square	94.603a	45	<0.0001 VHS
Likelihood Ratio	96.364	45	.000
N of Valid Cases	58		

Incidence of arrhythmias in relation to LV function

In present study 74% of cases with LV dysfunction (LVEF ≤ 40%) had arrhythmias and 42.0% of cases with LVEF > 40% developed arrhythmias which is statistically significant with P value 0.001.

Relation of Arrhythmias in AMI with LOS

In present study 51.0% patients stayed in the hospital for ≥ 7 days of which 58.82% had arrhythmias .This association was statistically not significant with P value 0.0865.

Table 3: Presenting Symptoms of AMI

Symptoms	Frequency	Percent (%)
SOB	43	43.0
CP	100	100.0
PLAP	30	30.0
SYNCO	7	7.0
VOM	24	24.0
NAUS	71	71.0
SWT	97	97.0
DIZZ	26	26.0
AMS	3	3.0
GW	18	18.0

Table 4:Distribution of Arrhythmias in AMI

Type of Arrhythmia	Number	Percent (%)
10 AVB	1	1.7
AF	3	5.2
20 AVB	1	1.7
CHB	6	10.3
LBBB	3	5.2
SB	13	22.4
ST	12	20.7
VF	5	8.6
VPC	8	13.8
VT	6	10.3
Total	58	100.0

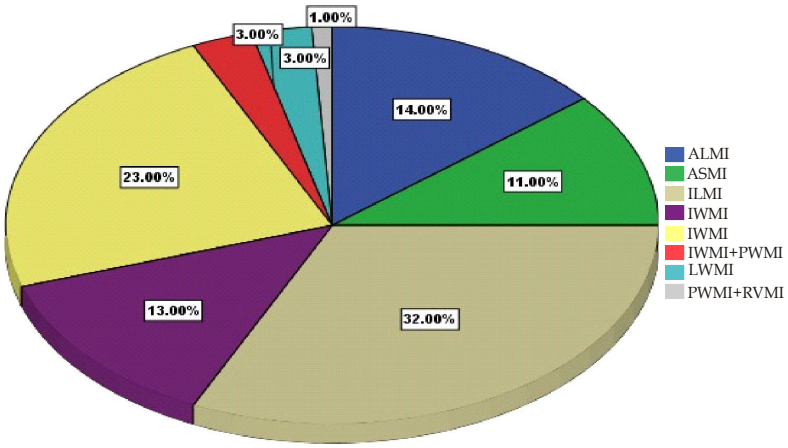

Fig. 1: Incidence of AMI in relation to anatomical site

Table 5: Arrhythmias in relation to site of infarction in AMI

1^0 AVB		ARY										Total
		AF	2^0 AVB	CHB	LBBB	SB	ST	VF	VPC	VT		
	Count	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**3**	**2**	**7**
ALMI	% within diagnosis	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	14.3%	42.9%	28.6%	100.0%
	% within ARY	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.3%	20.0%	37.5%	33.3%	12.1%
	Count	0	1	0	0	3	0	3	1	0	0	8
ASMI	% within diagnosis	0.0%	12.5%	0.0%	0.0%	37.5%	0.0%	37.5%	12.5%	0.0%	0.0%	100.0 %
	% within ARY	0.0%	33.3%	0.0%	0.0%	100.0%	0.0%	25.0%	20.0%	0.0%	0.0%	13.8%
	Count	0	2	0	0	0	0	8	2	5	3	20
	% Within Ary	100.0%	0.0%	0.0%	50.0%	0.0%	76.9%	0.0%	20.0%	0.0%	0.0%	25.9%
	Count	0	0	0	0	0	1	0	0	0	0	1
IWMI + PWMI	% Within Diagno Sis	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	100.0 %
	% Within Ary	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	1.7%
	Count	1	3	1	6	3	13	12	5	8	6	58
Total	% Within Diagno Sis	1.7%	5.2%	1.7%	10.3%	5.2%	22.4%	20.7%	8.6%	13.8%	10.3%	100.0 %
	% Within Ary	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

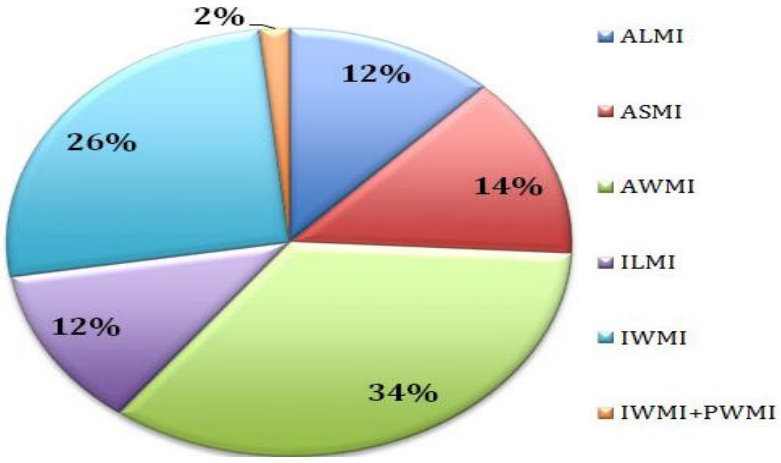

Fig. 2: Arrhythmias in relation to site of infarction in AMI Relation of Arrhythmias in AMI with W.P

Table 6. Relation of Arrhythmias in AMI with TIMI score

Timi	No Ary	Ary	Total
< 4	24 (61.54%)	15 (38.46%)	39 (39.0%)
>= 5	18 (29.51%)	43 (70.49%)	61 (61.0%)
TOTAL	42 (42.0%)	58 (58.0%)	**100 (100.0%)**

Chi-square value = 10.02, P value = 0.002 (Sig.)

Table 7: Relation of Arrhythmias in AMI with HS

Hs	No Ary	Ary	Total
6	0 (0.00%)	6 (100.0%)	6 (6.0%)
7	6 (40.0%)	9 (60.0%)	15 (15.0)
8	29 (48.33%)	31 (56.67%)	60 (60.0%)
9	7 (36.84%)	12 (63.16%)	19 (19.0%)
TOTAL	42 (42.0%)	58 (58.0%)	100 (100.0%)

Chi-square value = 5.565, P value = 0.135 (Not Sig.)

Onset of arrhythmias in relation to thrombolysis

In present study 58% of the cases had arrhythmias of which 44.8 % were seen in post thrombolysis period.

Relation of Arrhythmias in AMI with TIMI score

Most of the arrhythmias (70.49%) in present study observed in patients with TIMI score ≥ 5(High risk group) which is statistically significant with P value 0.002.

Most of the arrhythmias in present study observed in patients with HS ≥ 8 which is not statistically significant with P value 0.135.

In present study overall mortality was noted as in 7% cases and Arrhythmia related mortality was 12.1%, majority of deaths were observed in Anterior wall infarction of which ALMI has highest mortality rate of 28.6% followed by ILMI 14.3% which is not statistically significant with P value 0.782.

In present study out of 58 AMI patients who developed arrhythmias, overall mortality rate was 12.07% (7 cases). Out of which VF was the most common arrhythmia type which was associated with 80% arrhythmia specific mortality followed by CHB with 50% mortality ,this association was found statistically significant with P < 0.0001 value .

Type of Arrhythmia and mortality

In present study out of 100 AMI patients, arrhythmias were noted in 58 cases with mortality of 12.07%(7 cases) which is statistically significant with P value 0.02.

Association between mortality in AMI with WP

In current study 60% of cases presented to ED within 8 hours of symptom onset, most of the arrhythmias were noted between 5 - 8 hours with mortality rate of 7.7% with VT being the most common arrhythmia, which was found to be statistically significant with P value 0.003.

Table 8: Association between mortality and Infarction site.

Diagnosis		Outcome	Total	
		Disch	Death	
	Count	5	2	7
Almi	% Within Diagnosis	71.4%	28.6%	100.0%
	% Within Outcome	9.8%	28.6%	12.1%
	Count	7	1	8
Asmi	% Within Diagnosis	87.5%	12.5%	100.0%
	% Within Outcome	13.7%	14.3%	13.8%
	Count	18	2	20
Awmi	% Within Diagnosis	90.0%	10.0%	100.0%
	% Within Outcome	35.3%	28.6%	34.5%
	Count	6	1	7
Ilmi	% Within Diagnosis	85.7%	14.3%	100.0%
	% Within Outcome	11.8%	14.3%	12.1%
	Count	14	1	15
Iwmi	% Within Diagnosis	93.3%	6.7%	100.0%
	% Within Outcome	27.5%	14.3%	25.9%
	Count	1	0	1
Iwmi+Pwmi	% Within Diagnosis	100.0%	0.0%	100.0%
	% Within Outcome	2.0%	0.0%	1.7%
	Count	51	7	58
Total	% Within Diagnosis	87.9%	12.1%	100.0%
	% Within Outcome	100.0%	100.0%	100.0%

Chi-Square Value =2.461, P Value = 0.782 (Not Sig.)

Table 9: Type of Arrhythmia and Mortality

		Outcome		Total
		Disch	Death	
	Count	1	0	1
1^0 Avb	% Within Ary	100.0%	0.0%	100.0%
	% Within Outcome	2.0%	0.0%	1.7%
	Count	3	0	3
Af	% Within Ary	100.0%	0.0%	100.0%
	% Within Outcome	5.9%	0.0%	5.2%
	Count	1	0	1
2^0 Avb	% Within Ary	100.0%	0.0%	100.0%
	% Within Outcome	2.0%	0.0%	1.7%
	Count	4	2	6
Chb	% Within Ary	66.7%	33.3%	100.0%
	% Within Outcome	7.8%	28.6%	10.3%
	Count	3	0	3
Lbbb	% Within Ary	100.0%	0.0%	100.0%
	% Within Outcome	5.9% 13	0.0% 0	5.2%13
Ary	Count			
Sb	% Within Ary	100.0%	0.0%	100.0%
	% Within Outcome	25.5%	0.0%	22.4%
	Count	12	0	12
St	% Within Ary	100.0%	0.0%	100.0%
	% Within Outcome	23.5%	0.0%	20.7%
	Count	1	4	5
Vf	% Within Ary	20.0%	80.0%	100.0%
	% Within Outcome	2.0%	57.1%	8.6%
	Count	8	0	8
Vpc	% Within Ary	100.0%	0.0%	100.0%
	% Within Outcome	15.7%	0.0%	13.8%
	Count	5	1	6
Vt	% Within Ary	83.3%	16.7%	100.0%
	% Within Outcome	9.8%	14.3%	10.3%
	Count	51	7	58
Total	% Within Ary	87.9%	12.1%	100.0%
	% Within Outcome	100.0%	100.0%	100.0%

cont..../-

Association between TIMI score and mortality

In present study out of 61 cases with TIMI score ≥ 5, 43 cases (70.49%) developed arrhythmias with mortality of 11.5% (7 cases) which is statistically significant with P value 0.028.

Association between HS and mortality

In present study majority of patients with AMI had Heart score more than 6 and constitutes high risk group, out of which mortality was observed in 7.45% cases, this association was found statistically not significant.

Discussion

In the present study, the mean age of presentation in men was 56.33 ± 10.478 years and in women was 59.82 ± 10.032. In a study by Moshki et. al. (2015)[11] mean age of male and female case were 59.46 ± 3.11, 64.12 ± 13.25 respectively.Similar observations were noted by Lincoff et. al. (1993)[12]

Males formed 78% of the study and females constituted 22% of the study , similar to observations of the Framingham Heart study.[13]

The youngest age at presentation was 31 years and the maximum age at presentation was found to be 80 years. Maximum incidence of AMI was seen between 4 to 7 decade of life as reported by Martin TC et. al. (2007).[14]

In the present study, 38% female and 62% males were hypertensive. In a study by Wilkinson et. al. (1994)[15], 41.7% women and 27.3% men were hypertensive. In another study by Jenkins et. al. (1994)[16], 46.5% females and 34.4% males were hypertensive.

Incidence of diabetes was 48% in the present study as compared to 19% in Svensson AM et. al. (2007)[17] study.

In the present study, 53 (53%) patients were smokers, 30 (56.6%) of whom developed Arrhythmias The Framingham study demonstrated that smokers have a 2-3 fold increase in sudden cardiac death in each decade of life at entry between 30 and 50 years and that this is one of the few risk factors in which the proportion of CAD deaths that are sudden increases in association with the risk factors.

In present study 31 (31%) were alcohol consumers. Arrhythmias were noted in about 45.2% of Alcohol consumers. In a study by Djousse L et. al. (2004)[18] it was concluded that there was little association between long-term moderate alcohol consumption and the risk of AF, but a significantly increased risk of AF among subjects consuming >36 g/day .

In the present study incidence of various AMI, according to the site overall all together anterior wall (i.e. anterior + anterolateral + anteroseptal) predominates which was in 57% of patients followed byinferior wall (i.e. inferior + inferolateral) and lateral wall both accounted for 42%. PWMI was seen in 1% of cases Which correlates well with a study by Mhatre MA et. al. (2017)[19] which is statistically significant. In Mohit J shah et. al. (2014)[20] study AWMI is seen in 69% of cases, followed by IWMI (26%).

In the present study arrhythmia was detected in 58 % of the patients. VPCs were observed in 13.8% of the patients when they occurred alone. However they also occurred in the same patient along with other arrhythmias like heart blocks and tachyarrhythmias. Observations noted in this study very well correlated with a similar study conducted by Kumar V et. al.(2017)[21]

In the present study, ST was observed in 12 (20.7%) patients and it was most commonly associated with anterior wall (77.5%) & Antero lateral MI (14.3%). Similar observations were noted in a study by Mhatre MA et. al. in which 23% of AMI cases were associated with ST. Same observation of anterior wall being commonly involved was made by Crimm A et. al.[22] In the present study, sinus bradycardia was observed in 22.4% of the patients. similar observations were found by Kumar V et. al. (2017) in which 23% of case with AMI were asssociated with SB. In a study by Pantridge J.F et. al. (1969)[23] sinus bradycardia was observed in 25 to 40 percent of the patients.

Heart block in an inferior MI is frequently a result of increased vagal tone or ischemia, with consequent block within the atrio ventricular node. This usually results In first - degree AV block or Mobitz type I second degree AV block and requires only simple observation unless there is associated hemodynamic instability. Different degrees of AV nodal conduction delay and block may occur in inferior wall infarction, especially when the proximal RCA is involved. High degree (second or third) AV nodal block is present in about 20% of acute inferior infarction ECGs and should suggest a proximal RCA occlusion with RV involvement AV nodal block is accompanied by higher in hospital morbidity and mortality, not only in the pre thrombolytic but also in the thrombolytic era. Early reperfusion indicated to reduce infarct size and restore normal AV conduction.

In the present study, first degree heart block was observed in 1.7%, second degree heart block in 1.7% of the patients. Complete heart block was observed in 10.3% of patients. Similar observations were noted in Mohit J shah et. al. in which 15% of AMI were associated with AVB. Similar observations were noted by Ravi kumar V et. al. and Kumar V et. al. AVB were seen in 10% and 10.8% of cases respectively.

In the present study LBBB was noted in 5.2% of patients. Mohit J Shah et. al. noted that 10% of cases with AMI were associated with LBBB. In Kumar V et. al. study this association was 2.5%.

Archbold RA et. al. (1998)[24] observed that LBBB and RBBB occurred in 2.4% and 3.6% of the patients respectively and bifascicular block occurred in 2.9% cases.

In the current study, atrial fibrillations occurred in 5.2 % of patients . Incidence of atrial fibrillation very well correlated with McMurray et. al. (2005),[25] Wong et. al. (2000)[26] Novaro GM et. al. (2008)[27] and Mohit J Shah et. al. studies.

Ventricular fibrillation observed in 8.6% patients of the present study which correlates with Rathod et. al.(2014)[28] and GUSTO – I study (1998)[29] which showed incidence of VT 6.8 % during acute MI. In a study by Tofler GH et. al. (1987)[30] the incidence of ventricular fibrillation is highest during first 24 to 48 hours, particularly within the first 4 hours after the acute event, and may occur in up to 5% of patients.

Patients with VT occurring late in the course of AMI is more common in patients with transmural infarction and left ventricular dysfunction, is likely to be sustained, usually induces marked hemodynamic deterioration, and is associated with both an increased hospital mortality and long term mortality.

Volpi A et. al. (1989)[31] concluded that primary VF, irrespective of timing, was an independent predictor of in-hospital mortality. In a study by Behar S et. al. (1993)[32] incidence of secondary VF complicating AMI was 2.4%

The frequency of ventricular fibrillation has declined over the past 20 years as noted by Antman et. al. (1992),[33] who demonstrated from the randomized trials of prevent ion of ventricular fibrillation that the frequency in the 1970s was 5 to 10%, dropping through the 1980s to less than 2%. The reasons for this may include the admission of lower With the risk patients to coronary care units, wider use of beta blocking drugs and more effective treatment of ventricular dysfunction and electrolyte imbalances in the coronary care unit. The prognosis of ventricular fibrillation depends on the associated clinical state. Ventricular fibrillation occurring in the presence of hemodynamic compromise has a high hospital mortality of 80%.[34]

In a study by Tofler GH et. al. (1987),[35] sustained VT occurring within 48 hours of MI seen in 2% of patients is often transient and is not associated with long term risk of sudden cardiac death. In a study by Wolfe CL et. al. (1991), polymorphic VT seen in 2% of patients with MI is often rapid, symptomatic and hemodynamically and electrically unstable. Presence of VT may be a sign of extensive myocardial damage and may serve as an independent predictor of mortality.[36]

The study by Newby KH et. al.,[37] showed that sustained VT and VF occur in up to 20% of patients with AMI and have been associated with poor prognosis.

In the present study, post thrombolysis arrythmias were observed in 44.8 % of patients similar observations were noted in a study done by Ravi kumar et. al. in which post thrombolysis arrhythmias were noted in 45.16% of study population.

The commonest arrhythmia during thrombolysis was Sinus tachycardia.In a study by Maria Cecilia Solimene et. al. arrhythmias were observed in 75% patients and consisted of ventricular arrhythmias and/ or sinus bradycardia.[38] This study group was compared to another group with AMI treated conventionally and there was no difference between both groups in regard to the incidence and type of ventricular arrhythmia.

The present study showed that VF occurs in upto 8.6% of patients with AMI and have been associated with poor prognosis, despite the use of thrombolytic therapy, occurrences of ventricular arrythmias were associated with a higher risk of mortality (45.45%); patients with VF had the worst outcomes, with a mortality of 80% well correlated with Mohith J shah et. al. study.

In this present study first degree heart block was seen in 1.7%, second degree heart block in 1.7% of the patients, CHB presenting alone in 10.3% of all AMI patients. Among these arrythmias 50% of CHB &1st degree AVB occurred in IWMI, second degree AVB & 50% CHB occurred in ILMI. So in our study AV conduction defects occurs with more incidence in Inferior wall MI patients.

Despite the use of pharmacotherapy and TPI in present study CHB is associated with high mortality in 33.3% of patients which correlates well with Mohith J shah et. al. study.

In present study most common site of infarction is anterior wall (57%) followed by inferior wall (36%) and rest constitutes 7% of cases.

In present study overall mortality rate was 7.0%, mortality in relation to arrhythmias was 12.1%. Mortality according to site of infarct, in present study it is higher with Anterior wall infarction (8.80%) than inferior wall (5.55%) correlates very well with Rathod et. al. study.

In present study most common mode of arrhythmia termination is spontaneous (46.55%), followed by pharmacotherapy (18.97%) and D.C shock (13.79%). In 20.69% of study population arrhythmias remains persistent Similar observations were noted in a study conducted by Kumar v et. al. spontaneous termination seen in 56.41% of cases, by pharmacological intervention in 17.95%, with D.C shock in 12.82% and persistent in 12.82% of patients.

In present study most of the patients who developed cardiac rhythm abnormality had LV dysfunction. 74.0% of cases with arrythmia had LVEF < 40% .Similar observations noted by Kumar v et. al. in a study showing LVEF < 40% in 54.2% patients who developed rhythm abnormality in AMI patients.

L.V. dysfunction was found in majority of patients who had VPC, VT, sinus tachycardia.

In a study by Scott DS et. al. (2005)[39] the risk of sudden death is highest in first30 days after myocardial infarction among patients with left ventricular dysfunction(LVEF ‹ 40%) .

In present study most of the arrhythmias in AMI patients occurred within 12 hours of hospitalization, majority of them seen between 1 – 11 hrs time period followed by 12 – 24 hr.

In present study 43 cases with TIMI score ≥ 5 developed cardiac dysrhythmias of which 78.95% were ventricular arrhythmias. In a similar study by González- Pacheco H et. al.[40] 54% of cases with TIMI score ≥ 5 developed ventricular arrhythmias.

When compared regarding mortality in González-Pacheco H et. al. study 77.14% of cases had TIMI score ≥ 5, In present study all cases with mortality were in TIMI high risk group (TIMI score ≥ 5). Differences in these observations may be due to difference in sample size in these two studies.

TIMI score is one of the most useful bed side tools in ED for risk stratification of patients with AMI. The TIMI risk score for STEMI prior to primary PCI can predict in hospital mortality and identifies a group of high-risk patients who might develop adverse events.

Conclusion

Early recognition and management of arrhythmias can significantly modify the morbidity and mortality in AMI patients. Modifiable risk factors should be managed optimally by drugs and public health education measures in order to decrease the incidence of AMI. All emergency ambulances should be equipped with defibrillators, 12-lead electrocardiographs and staffed with at least one person proficient in advanced cardiac life support. ECG transmission/ teleconsultation may be useful in preventing delay in recognition and initiation of thrombolytics in AMI patients.

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