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Indian	ARIPET PRI	LE OF EARLY 2D ECHOCARDIOGRAPHY IN IENTS WITH ACUTE ST ELEVATION OCARDIAL INFARCTION IN CORELATION TH ELECTROCARDIOGRAPHY AND CLINICAL SENTATION	<b>KEY WORDS:</b> Echocardiography, Myocardial Infarction, Electrocardiography.	
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ABSTRACT	<ul> <li>BACKGROUND: Echocardiography is non-invasive, most frequently used usually the initial imaging test to evaluate all cardiovascular disease related to structural, functional, or hemodynamic abnormality of the heart or great vessels. The present study was undertaken to Correlation of early 2D echo findings with electrocardiogram findings and clinical presentation in patients of acute ST elevation myocardial infarction.</li> <li>MATERIALS &amp; METHODS: The present hospital based cross sectional study was carried during period March 2016 to February 2018 in GMC Aurangabad. 100 diagnosed patients with first episode of Acute ST elevation myocardial infarction and who have given written informed consent were included in the study.</li> <li>RESULTS: The mean age was 56.6 ±12.76. Most of (29%) patients were seen in the age group 61-70 years. 73 patients (73%) were in Killip class 1. About half of the patients (55%) were classified as anterior MI as per ECG changes. The mean LVEF was 43.48 (SD=13.43), Mortality is much higher in the LVEF &lt;40% group.</li> <li>CONCLUSION: Acute myocardial infarction is seen more commonly in the age group of 61-70 years and it is more common among males. 55% were classified as anterior MI as per ECG changes. The association between ejection fraction and mortality was statistically significant. Mechanical complications of AMI can be detected by 2D echo and can an order and work in the ADD end within 20 be deno writing for the patients or in a demonstration of AMI can be detected by 2D echo and can an order apprendict on the ADD end with the advector of AMI can be detected by 2D echo and can and who have more common and mortality was statistically significant. Mechanical complications of AMI can be detected by 2D echo and can an order apprendict on the ADD end writing for the patient of the patient of the patient with the truth end of the patient of the patient of the patient of AMI can be detected by 2D echo and can be detected by 2D echo and can be independed on the patient of the pat</li></ul>			

**INTRODUCTION:** 

A large number of patients present to emergency department with chief complaint of chest pain. These patients should be diagnosed promptly when acute ST elevation myocardial infarction(STEMI) presents with typical or atypical symptoms, as early treatment is crucial in these patients perhaps life saving.<sup>1</sup>

identify mechanical complications and can aid in the treatment accordingly.

The diagnosis of STEMI is based on patient's history and ECG findings, but it should be taken into account that patients may present with atypical symptoms, also it takes cardiac enzymes some time to elevate above the normal range after the onset of chest pain. Enzyme levels are also likely to elevate even in the absence of STEMI, although this increase depends on renal function and underlying disease.<sup>23</sup>

2D echo is a non-invasive, rapid, investigation which enables us to visualize the heart directly in real time using ultrasound ,can help in such situations in diagnosing AMI by detecting any regional wall motion abnormality. It is also useful for the amount of myocardium at risk and final infarct size after reperfusion therapy; evaluation of patients with unstable hemodynamic findings and detecting mechanical complications. Hence 2D echo in patients with acute STEMI patients is needed to be performed early.<sup>446</sup>

### MATERIALS & METHODS:

The present hospital based cross sectional study was carried out in Department of General Medicine of Government Medical College and teaching Hospital, Aurangabad (Tertiary Health Care Centre) city in Maharashtra during period March 2016 to February 2018. Permission from the Institutional Ethical Committee was taken before the start of the study.

All diagnosed patients with first episode of Acute ST elevation myocardial infarction and who have given written informed consent were included in the study. Patients having age less than 18 years of age, having prior history of acute myocardial infarction, who were a known case of valvular heart disease, those who were known case of cardiomyopathy, having prior history of cardiac surgery, patients who were a known case of congenital heart disease and those who were diagnosed as non ST elevation MI were excluded from the study.

Total 100 samples were selected by non-probability convenient sampling method. After admission a detailed history was collected using predesigned, pre-tested, semistructured questionnaire.

On admission patients with typical or atypical ischemic symptoms and ECG changes of ST segment elevation of >0.1 mV (1 mm) in leads 2, 3, avF, V4, V5, V6, 1 and avL, and in leads V2, V3 >0.2 mV (2 mm) in males >40 years, >0.25 mV in males <40 years and >0.15 mV in females, in 2 contiguous leads were diagnosed as acute STEMI.

2D echo/Doppler was performed on all patients within 24 hours of admission to evaluate the overall performance with the help of PHILIPS model HD11XE. 2D echo parameters used for examining the patient included left ventricular internal dimension at the end of systole (LVIDs), left ventricular internal dimension at end of diastole (LVIDd), left ventricular Ejection Fraction (LVEF), regional wall motion abnormality (RWMA). Depending on the wall motion pattern patients were be classified as normokinetic, hypokinetic, akinetic and dyskinetic. If more than one regional wall motion abnormality were detected, predominant abnormality was assigned. Diastolic dysfunction, mitral regurgitation, papillary muscle rupture, free wall rupture, inter ventricular wall rupture, pericardial effusion, clots, or other mechanical complications of acute myocardial infarction were evaluated with 2D echo/Doppler studies. Appropriate investigations were done such serum triglyceride, serum cholesterol. Data analysis was done using SPSS trial version 20.0.

### **RESULTS:**

In present study, age of patients ranged from 27 years to 86

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years. The mean age was  $56.6 \pm 12.76$ . Most of (29%) patients were seen in the age group 61-70 years, followed by 27%patients in the age group of 41-50 years, followed by 22%patients in the age group of 51-60 years. (Table No.1) In our study total male were 69% and total female were 31%. While considering the BMI of study subjects, most of were in obese category (44%)

Out of 100 study subjects, 34 patients were having antecedent hypertension, 15 patients were having co-morbid hypertension .17% were having antecedent diabetes mellitus. Study subjects in which more than two risk factors are present, mortality is more. (Table No.3)

In our study we found that 73 patients (73%) were in Killip class 1,48 patients (48%) were in Killip class 2,9 (9%) were in Killip class 3 and 10 patients (10%) were in Killip class 4. Patients with Killip class 4 had maximum mortality, i.e. 7 out of 10 patients of Killip class 4 died (70%), followed by Killip class 3 with 4 deaths out of total 9 patients (44.4%), Killip class 2, was having 25% mortality with 2 patients deaths out of total 8 patients. The least mortality was observed in Killip class 1 patient and it was 9.5% with 7 deaths out of total 73 patients. (Table no.4)

About half of the patients (55%) were classified as anterior MI as per ECG changes, followed by inferior MI category (21%) (Table no.5) Echocardiographic regional wall motion abnormality shows that 79 patients were having Hypokinesia followed by 11 patients were having Dyskinesia & 6 were having Akinesia. Among 11 patients having dyskinesia , 5 (45.45%) were had LV clot formation. The association between type of RWMA and LV clot formation was statistically significant. (Table no.6)

The mean LVEF was 43.48 (SD=13.43), we observed that mortality is much higher in the LVEF <40% group as compared to LVEF >40% group. Out of 34 patients with LVEF<40% 17 patients (50%) died as compared to only 3 deaths (4.68%) among 64 patients who have had LVEF >40%. The association between ejection fraction and mortality was statistically significant. (Table no.7)

In this study mechanical complication of AMI were detected on 2D echo, of which, mitral regurgitation was found in 23% patients, ventricular septal rupture was found in 3% patients, ventricular free wall rupture in 2%, papillary muscle rupture in 11%, pericardial effusion was found in 13% and LV clot was found in 11% patients.

### DISCUSSION:

Acute myocardial infarction is seen more commonly in the age group of 61-70 years and it is more common among males. Similarly, in a study of 132 patients of AMI conducted by **Adhikari et al**,<sup>7</sup> out of 119 patients of STEMI, maximum patients 33 (27.72%) were found in the age group of 61-70 years. **Abraham et al**,<sup>8</sup> in a study of 100 patients of AMI, found that total 27 patients (27%) were in the age groups of 61 to 70 years, which was highest among all the age groups studied. These above mentioned studies have a common finding of maximum patients in age group of 61-70 years and comparable with the finding of our study. **Misiriya et al**,<sup>8</sup> found that mean age of 821 patients of STEMI was 58.5 years, which is comparable to mean age of 56.65 (SD=12.76), found in our study.

**Dr. Hafiz Mughees Ather**, <sup>10</sup> in his study found 76% male and 23% female. **Lerner et al.**<sup>11</sup> had reported 60% of all coronary events were in male patients. **Channama G. et al**, <sup>12</sup> on analysis of gender distribution, found 92.5% were males and only 7.5% were female. **Shabbir et al**, <sup>13</sup> studied 250 patients out of which, 186 (74.4%) were males and 64 (25.6%) were females.

In our study, we find that obese category comprises maximum www.worldwidejournals.com number of patients 44% regarding distribution of BMI among patients. **Das et al**, <sup>14</sup> in a study of their 351 patients, found that 28% patients of acute myocardial infarction were obese. **Singh et al**, <sup>15</sup> in a study of 200 patients of acute coronary syndrome, 26 patients (13%) were found to be obese.

In present study, 34 patients were having antecedent hypertension, 15 patients were having co-morbid hypertension .17% were having antecedent diabetes mellitus. Study subjects in which more than two risk factors are present, mortality is more. **Brunori et al**, <sup>16</sup> studied 150 patients of ACS and found that out of 109 patients of STEMI 79 patients (72.5%) were antecedent hypertensive and 64 patients (58.7%) were having comorbid hypertension & out of 109 patients of STEMI 46 patient (42.2%) were having antecedent diabetes mellitus **Adhikari et al**, <sup>1</sup> found that 42.85% of STEMI patients were hypertensive & out of 119 patients of STEMI 39 patients (32.7%) were having diabetes mellitus.

**Canto et al**, <sup>17</sup> in their study found hospital mortality rates as 14.9%, 10.9%, 7.9%, 5.3%, 4.2%, and 3.6% for patients with 0, 1,2,3,4, and 5 risk factors respectively. After adjusting for age and other clinical factors, there was an inverse association between the number of coronary heart disease risk factors and hospital mortality adjusted odds ratio (1.54; 95% CI, 1.23-1.94) among individuals with 0 vs.5 risk factors.

In our study we found that 73 patients (73%) were in Killip class 1, 48 patients (48%) were in Killip class 2, 9 (9%) were in Killip class 3 and 10 patients (10%) were in Killip class 4. Patients with Killip class 4 had maximum mortality. Similarly **Kodilkar et al**, <sup>18</sup> carried out a study on 55 patients of acute MI. Their results were 11 patients (20%) were in Killip class 1, 21 patients (38.18%) were in class 2. 16 patients (29.09%) were in class 3 and 7 patients (12.72%) were in class 4, there was no mortality in class 1 patients. 4.76% died in class 2, while 12.5% died in class 3& 71% died in class 4.

Present study we found that about half of the patients (55%) were classified as anterior MI as per ECG changes, followed by inferior MI category (21%). In a study carried by **Shivpuje et al**, <sup>19</sup> 29 (58%) out of 50 patients had anterior wall AMI and 7 (14%) out of 50 patients had Global MI. **Jewitt et al**, <sup>20</sup> in their study of 222 patients of AMI, found that 124 cases (55.8%) had anterior wall AMI. These studies had a common finding that anterior MI was more common than other types.

Echocardiographic regional wall motion abnormality in present study shows that 79 patients were having Hypokinesia followed by 11 patients was having Dyskinesia & 6 were having Akinesia. Among 11 patients having dyskinesia , 5 (45.45%) were had LV clot formation. The association between type of RWMA and LV clot formation was statistically significant. **Kodilkar et al**, <sup>18</sup> found that 3.3% of patients with hypokinesis, 26.3% with akinesis and 66.7% with dyskinesis had LV thormbus. This is in correspondence with our study in that LV clot formation frequency increases as RWMA increases from hypokinesia to aneurysm. **Lamas et al.**<sup>21</sup> found that frequency of LV thrombus goes on increasing will motion abnormality. All the patients in our study who have had LV thrombus were having RWMA.

In our study, the mean LVEF was 43.48 (SD=13.43), we observed that mortality is much more higher in the LVEF <40% group of patients than it is in LVEF >40% group. That is out of 34 patients with LVEF <40% 17 patients (50%) died as compared to only 3 deaths (4.68%) among 64 patients who have had LVEF >40%.

**Toth et al.**<sup>22</sup> in their study found that ejection fraction of less than 40 were associated with increased mortality. **Darbar et al,**<sup>23</sup> & **Dr. Hafiz Mughees Ather**<sup>10</sup> also had similar findings

showing significant association between ejection fraction & Mortality.

In our study mechanical complication of AMI were detected on 2D echo, of which, mitral regurgitation was found in 23 patients (23%), ventricular septal rupture was found in 3 patients (3%), ventricular free wall rupture in 2%, papillary muscle rupture in 11%, pericardial effusion was found in 13% and LV clot was found in 11% patients. **Kodilkar et al**, <sup>18</sup> found mitral regurgitation in 11 of total 55 patients, ventricular septal defect in 1 patient(1.8%), and pericardial effusion in 2 patients (3.6%).

### Tables & Diagrams

## Table No. 1: Distribution of study subjects according to age of study subjects (n=100)

Age group	Frequency	Percentage
21-30	3	3
31-40	6	6
41-50	27	27
51-60	22	22
61-70	29	29
71-80	12	12
81-90	1	1
Total	100	100



Pie diag.1: Distribution of study subjects according to gender of study subjects (n=100)



Pie diag.2: Distribution of study subjects according to BMI of study subjects (n=100)

### Table No. 2: Distribution of study subjects according to risk factors of study subjects (n=100)

Risk factor	Present	Absent	Total
Hypertension			
Anticedent Hypertension	34	66	100
Comorbid Hypertension	15	85	100
Both anticident & Comorbid	10	90	100
Hypertension			
Antecedent Diabetes mellitus	17	83	100
Tobacco consumption	47	53	100
Alcohol consumption	23	77	100
Dyslipidemia	37	63	100

Table No. 3: Distribution of study subjects according to presence of risk factors & Morbidity

No. of risk factor	<b>Risk factor present</b>	<b>Died patients</b>
0	16	5
1	24	5
2	21	5
3	19	3
4	15	1

(X<sup>2</sup>=2.29, df=4, p=0.68)

### Table No.4: Distribution of patients according to killip class and mortality in each class

Killip class	Yes	No	Total
4	73	27	100
2	8	92	100
3	9	91	100
4	10	90	100

# Table No.5: Distribution of patients according to type of AMI on ECG findings

Type of AMI	Frequency	Percentage
Anterior MI (AMI)	55	55
Inferior MI (IMI)	21	21
Posterior MI (PMI)	2	2
RVMI	1	1
Combination of any of AMI, IMI, PMI, RVMI	21	21
Total	100	100

# Table No.6: Distribution of patients according to RWMA types and LV clot

requency	LV Clot formation
79	1 (1.26)
6	2 (33.33)
11	5 (45.45)
	79 6 11

(X<sup>2</sup>=20.56, df=2, p=0.00003)

### Table No.7: Distribution of patients according to LVEF and mortality

<b>Ejection fraction</b>	Frequency	Patient died
<40%	34	17 (50%)
>40%	66	3 (4.54%)
Total	100	20 (20%)

(X<sup>2</sup>=17.74, df=1, p<0.005)



Bar diag. 1: Distribution of study subjects according to Mechanical complications of AMI in study subjects (n=100)

### CONCLUSION

Acute myocardial infarction is seen more commonly in the age group of 61-70 years and it is more common among males. Hypertension, Diabetes mellitus, tobacco consumption, alcohol consumption, obesity, dyslipidemia, male gender are major risk factors for acute myocardial infarction. Killip classification of patients has prognostic value and helps in accessing the severity of myocardial infarction. Anterior MI is common than other types of acute myocardial infarction. IV clot formation is more common in patients with aneurysm and dyskinesia. As severity of RWMA increases from hypokinesia to aneurysm, frequency of LV clot formation also increases.

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Amongst AMI patients those with LVEF <40% are associated with more frequencies of LVF and mortality than those with LVEF >40%. Mechanical complications of AMI can be detected by 2D echo and can aid accordingly in treatment. Thus early 2D echo done within 24 hours of admission can predict patients at risk can identify mechanical complications and can aid in the treatment accordingly.

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