

**PREVALENCE OF MECHANICAL VS. NON-MECHANICAL COMPLICATIONS  
IN PATIENTS WITH ACUTE STEMI**

**Owais Shams<sup>1</sup>, Nandlal Rathi<sup>2</sup>, Jagdesh Kumar<sup>3</sup>, Abdul Aziz Sahito<sup>4</sup>, Kartik Kumar Rathi<sup>5</sup>**

**ABSTRACT; OBJECTIVE:** The aim behind this study was to scientifically determine the prevalence of mechanical vs. non-mechanical complications in patients with acute STEMI. **PATIENTS AND METHODS:** A prospective observational study has been conducted in the department of cardiology Isra University Hospital Hyderabad through a convenience sampling technique on all patients presented and admitted with acute STEMI after taking written and informed consent. Patients were evaluated for non-mechanical and mechanical complication during 48 hours after admission. Data were entered and analyzed by using Statistical Package for the Social Sciences version 19.0. **RESULTS:** The mean age of patients was 52.56 years ( $14.39 \pm SD$ ) and the study subjects consisted of 43 males (70%) and 18 (30%) females. Out of 61 patients majority of the patients were presented between the ages of 51 – 65 years ( $N = 22.25\%$ ). The overall prevalence of non-mechanical and mechanical complications was 10 (16.39%) and 24 (39.34%), respectively. The most common non-mechanical complication was development of arrhythmias 8 (80%) and the most common mechanical complication was development of left ventricular failure 12 (33.33%), respectively. **CONCLUSION:** The present findings indicate that most of the STEMI patients were belongs to middle aged population and among them mechanical complications were more prevalent than non-mechanical complications.

**KEY WORDS:** ST-Elevation Myocardial Infarction, Mechanical and non-mechanical complications

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1. PG Student, Department of Cardiology, Isra University Hospital Hyderabad
2. Assistant Professor, Department of Cardiology, National Institute of Cardiovascular Disease, Tando Muhammad Khan  
[drnand69@gmail.com](mailto:drnand69@gmail.com)
3. Assistant Professor, Department of Cardiology, Peoples University of Medical & Health Sciences Nawabshah
4. FCPS , MCPS (Medicine), Associate Professor of Medicine Peoples University of Medical & Health Sciences for Women Nawabshah, Sindh, Pakistan
5. A-Levels Nixor College Karachi

**Corresponding Author: Nandlal Rathi (Corresponding author)** Assistant Professor, Department of Cardiology, National Institute of Cardiovascular Disease, Tando Muhammad Khan. [drnand69@gmail.com](mailto:drnand69@gmail.com)

Cardiovascular diseases particularly coronary artery disease imposes major health burden worldwide and associated with higher rates of morbidity and mortality. Patients with acute ST-segment elevation myocardial infarction (STEMI) is one of the most common causes of hospital admissions in emergency department. Statistics from United States of America has shown that more than one million people presented with acute myocardial infarction but unfortunately data from Pakistan is still lacking(1). Patients with acute myocardial infarction are at higher risk for the development of complications including mechanical and non-mechanical. Previous studies have suggested that non-mechanical complications such as arrhythmias (atrial

and ventricular) are more common than mechanical complications (5 – 10%) particularly in a non primary coronary intervention centers(2-4). Fatal arrhythmic complications occur within one hour after acute STEMI and those who survive are at greater risk of re-event in 72 hours(5) but in this era of reperfusion, complications rate associated with acute STEMI after reaching hospital has been drastically reduced (6) but due to lack of scientific data in our area we are unable to comment the actual burden of complications associated after acute STEMI, that is why this study has been conducted to evaluate the burden of mechanical and non-mechanical complications after acute STEMI presented at Isra University Hospital, Hyderabad.

#### **PATIENTS AND METHODS:**

A prospective observational study has been conducted in the department of cardiology Isra University Hospital Hyderabad through a convenience sampling technique on all patients presented and admitted with acute STEMI after taking written and informed consent.

#### **DATA ANALYSIS:**

A structured questionnaire was used to collect the baseline and clinical relevant data. Patients basic demographic characteristics along with clinical data such as type of complications were noted. On admission all the patients assessed for complications via ECG echocardiogram. Patients were continuously monitored in coronary care unit for minimum of 48 hours to observe any change in rhythm (non-mechanical complication). On admission and after 48 hours all the patients underwent for Echocardiographic

assessment for any mechanical complication.

#### **DATA ANALYSIS:**

All the collected data was entered and analyzed using Statistical Package for the Social Sciences (SPSS) Version 19.0. Quantitative data were presented in the form of mean  $\pm$  SD while qualitative data were assessed and presented in the form of frequencies and percentages.

#### **RESULTS:**

A total of 61 patients were selected for this study after fulfilling the already made inclusion and exclusion criteria. The study subjects consisted of 43 males (70%) and 18 (30%) females. The mean age of patients was 52.56 years ( $14.39 \pm$  SD). For the better understanding of the age group involved, we have stratified the age in to four equal groups, the age ranges selected were between 20-35 years, 36-50 years, 51-55 years, and 56-80 years. Out of 61 patients majority of the patients were presented between the ages of 51 – 65 years (N = 22.25%). The overall prevalence rate of complications among patients with STEMI was 55.73% (N = 34) among them non-mechanical and mechanical complications was 10 (16.39%) and 24 (39.34%), respectively [Presented via Figure No: 1]. Among these patients, the most common non-mechanical complication was development of arrhythmias 8 (80%) and the most common mechanical complication was development of left ventricular failure 12 (33.33%), respectively [Presented via Figure No: 2 and 3].

#### **DISCUSSION:**

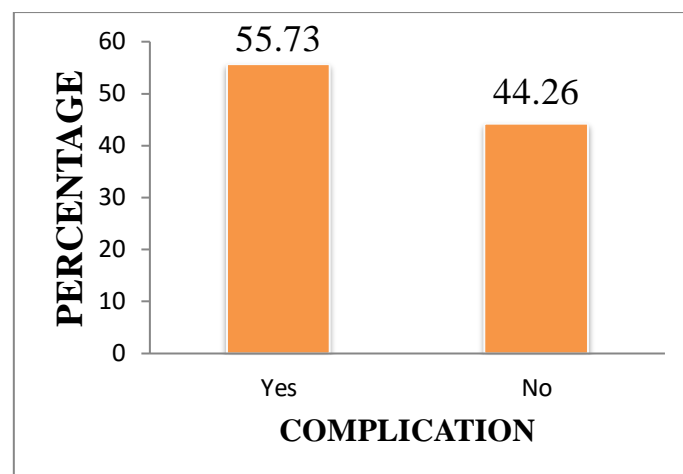
Acute coronary syndrome is an umbrella term and is the most common cause of

patient's referral and presentation in emergency department. Delay in presentation of such patient may lead to serious and fatal complications particularly in patients who suffered from acute STEMI. In the reperfusion era, the rate of complications associated has been greatly reduced but countries where centers are not equipped with reperfusion therapy and lack of knowledge regarding the disease causing more harm than any other country (7-9). Means of patients presented with acute STEMI in our study was 52.56 years, which is quite younger when compared it with the SPACE registry in which the mean age was 58 years but patients registered in GRACE registry were even more older (66 years) (10;11). Multiple reasons can explain this difference in age in different regions one of them could be better health facilities and control of risk factors associated with CVD causing disease at older age(12). Our main objective was to observe the complications associated with acute STEMI. The overall burden of complications was observed 55.73% (N = 34) and most of them were non-mechanical than mechanical, 24 (39.34%) vs. 10 (16.39%), respectively. Our findings are consistent with the previously conducted studies but number of studies also showed higher prevalence of mechanical complications than non-mechanical complications(1;13-15). The reason behind this difference is multifactorial such as those patients who did not received reperfusion therapy and had large territory involved in myocardial infarction are more prone to mechanical complications than non-mechanical complications. Heart failure is the most common mechanical complication observed in most of the studies and our

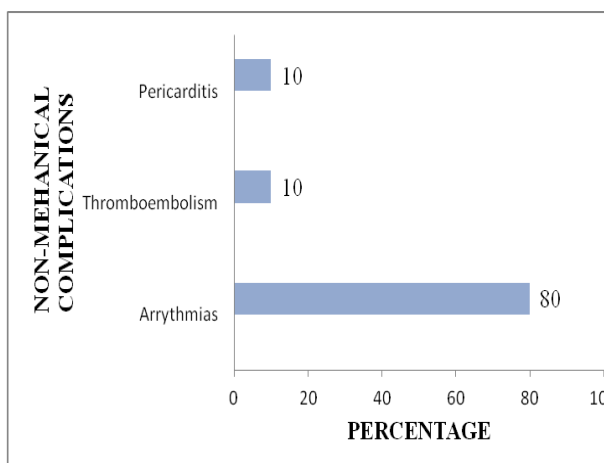
findings are consistent with previously conducted studies rate of heart failure in our study is less common than theirs, 33% vs. 60%, respectively (16-18). In non-mechanical complications, arrhythmias particularly ventricular origins are of great concern because of their higher fatality rates while supraventricular arrhythmias such as atrial fibrillation are more common occurring cardiac arrhythmias(19;20). In our study we have observed arrhythmias as the most common cause of non-mechanical post STEMI complication while left ventricular dysfunction was observed more frequently as a mechanical complication. Our findings are consistent with the previously conducted studies.

#### **CONCLUSION:**

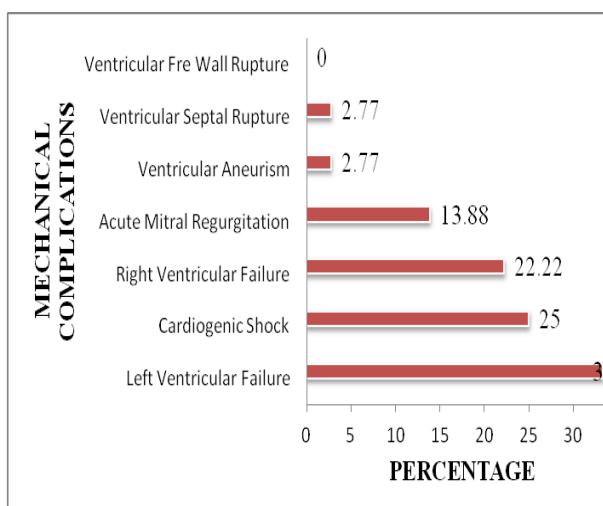
The present findings indicate that more than half of patients with STEMI develop any sort of mechanical or non-mechanical complications and considerably high number of patients had mechanical complications.



**CHART 1: OVERALL PREVALENCE RATE OF COMPLICATIONS IN PATIENTS WITH STEMI(N= 61)**



**CHART 2: TYPES AND FREQUENCY OF NON-MECHANICAL COMPLICATIONS IN PATIENTS WITH STEMI (N= 10)**



**CHART 3: TYPES AND FREQUENCY OF MECHANICAL COMPLICATIONS IN PATIENTS WITH STEMI (N= 24)**

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