



Pattern of Arrhythmias in Patients of Acute ST Elevation Myocardial Infarction with Impaired Renal Function

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Abstract

Introduction: Acute MI is a common presentation of acute coronary syndrome. All acute MI are classified as ST elevation and Non-ST-elevation MI. Acute STEMI is defined by at least two of the followings in which typical ECG changes is a must and any one either typical chest pain of cardiac origin or significantly raised troponin I level. Despite tremendous advances in the primary and secondary prevention of coronary artery disease, ST-elevation myocardial infarction (STEMI) still occurs in vast numbers. 80 percent people, who are living in developing country, die from cardiovascular disease.

Objective: The main objective of the study was to evaluate the pattern of arrhythmias in patients of acute ST elevation myocardial infarction with impaired renal function.

Methods: Prospective observational study. 100 patients of STEMI diagnosed by clinical, biochemical and ECG criteria were included in the study. After getting serum creatinine level, eGFR was calculated and if it is <60ml/min then the patient was selected for the study. Patients were followed up to hospital stay to see the outcome. Data was analyzed by computer based software SPSS-20.

Results: STEMI hypertension was found in 61%, smoker was 52%, dyslipidemia was present in 78%, DM was in 31%, sedentary life style was found in 23% patients obesity was common among 23% of total patients and family history of IHD was found in 24% of patients. Pattern of arrhythmias divided into two categories – Tachyarrhythmias and Brady arrhythmias. The results of the two categories mentioned in this article. From the present study it can be concluded that impaired renal function among MI patients has an adverse outcome. Early detection of renal impairment is necessary to avoid increased mortality and morbidity.

Keywords: Myocardial infarction, ST-elevation myocardial infarction, arrhythmias.

Introduction

Myocardial infarction (MI) is a common cardiac disease caused by occlusion of atherosclerotic blood vessels by thrombus composed of fibrin &

platelets. Long standing renal impairment is an important contributor of atherosclerosis and may adversely influence the outcome of acute coronary events especially acute STEMI^[1]. In STEMI

cigarette smoking, male gender and a family history of cardiovascular and renal disease are associated with adverse prognosis in young patients, whereas dyslipidemia, hypertension and diabetes mellitus are associated with adverse prognosis in the elderly. [2] Most of the complication of acute MI occur within few minutes to few days of initial attack. A study shows that the incidence of various complication of acute MI was maximum during the first week.

Death could be occurred due to ventricular fibrillation and cardiogenic shock during the first week. But, the good news is, some complications (which are known as early complications) are benign and require no treatment and some are life threatening. [3] Mild renal impairment is associated with an increased risk of coronary artery disease and stroke, suggesting that cardiovascular disease may develop early in the course of renal dysfunction. [4]

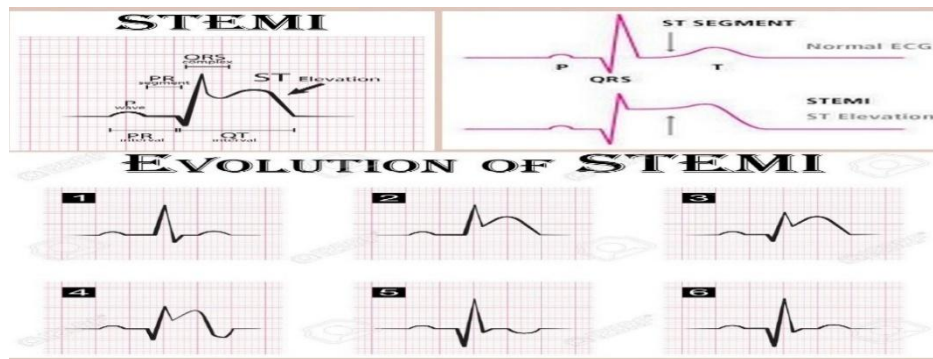


Figure 1: Pattern of arrhythmias in patients of acute ST elevation myocardial infarction

Renal impairment can be easily detected and its severity assessed by serum creatinine, age, sex and body weight of the patient by Cockcroft-Gault formula. Early recognition of renal impairment in acute STEMI patients is essential for risk stratification and may assist in development of management strategies to improve outcome in such patients. Those who have renal impairment previously or develop after acute STEMI have adverse outcomes. In our country management facilities of complications of acute STEMI are limited. Early detection of renal impairment may help to avoid complications. So it is a time demand to do a study related to see the outcome of acute STEMI patients with impaired renal function.

Objectives

General Objective

- To evaluate the pattern of arrhythmias in patients of acute ST elevation myocardial infarction with impaired renal function.

Specific objectives

- To identify risk factors among the acute STEMI patients.

- To detect renal impairment among the hospitalized acute STEMI patients.
- To estimate short term mortality.

Materials and methods

Type of study

- Prospective observational study.

Place and Period of study

- This study was conducted in Cardiology Department of Chittagong Medical College Hospital from 1 year.

Study population

- Patients of acute STEMI with impaired renal function admitted in CMCH Cardiology Department.

Sampling technique:

- Statistical formula used to determine the sample size. To observe the outcome of sample size was determined by the following formula.

$$n = \frac{z^2 pq}{e^2};$$

Where, Z= 1.96,

p = 50% = 0.50 (Assumed percentage of MI among the patients of impaired renal function),

$$q = 1 - p = 0.50, e = 10\%$$

$$So, n = \frac{(1.96)^2 \cdot 0.50 \cdot 0.50}{(0.1)^2} = 96.4$$

From the above result we have collected 100 samples purposively for the study.

Selection criteria

Inclusion criteria

- Patients of acute STEMI within twelve hours after the onset of chest pain who are eligible for thrombolysis
- eGFR <60ml/min (Cockcroft-Gault formula)
- Voluntarily given consent to participate in the study

Exclusion criteria

- Non- STEMI
- Patients who are not eligible for thrombolysis
- STEMI with previous history of MI
- STEMI Patients with history vulvar heart disease, cardiomyopathy and congestive heart failure
- Patients with STEMI presenting with VT or VF

Ethical consideration and Study procedure

A patient with diagnosed case of MI or his/her legal guardian was thoroughly informed about the aims, objectives and detailed procedure of the study before examination. She/he was encouraged for voluntary participation and allowed freedom to withdraw from the study whenever he/she liked even after participation. From all eligible subjects after getting consent clinical history was taken and clinical examination was done to elicit findings related to MI. Related investigations like blood sugar and serum creatinine were done. Blood was collected within two hours after admission of the patient in the hospital. If the patients calculated eGFR is less than 60 ml/min and ECG criteria confirm the acute STEMI then he/she was included in the study as case. Patients were followed up till discharge with special attention to serum creatinine and development of other complications. The researcher did not influence the ongoing hospital treatment. The endpoint of

the study was sudden cardiac death or rise of serum creatinine double of the baseline value. All relevant data was noted in the pre tested data sheet. All data were checked and rechecked to avoid error. All investigations were done in the Biochemistry Departments of CMCH and if not possible in the standard laboratories of Chittagong.

Data collection methods

- All relevant information for each individual study subject was recorded after getting informed written consent on a pre-formed data sheet. Collected data was checked repeatedly. Data was collected by the researcher himself. Case record form, ECG tracing.

Result

Table 1 showing age group distribution where among the 100 patients most of the patients were in age group 51-60 years (35%) next to which was 41-50 years (32%). Mean \pm SD of age was 52.84 \pm 8.40 years. The following table is given below:

Table 1: Distribution of age between the study groups (n = 100)

Age in Groups	(n = 100)	
	Frequency	%
<40 yrs	14	14.0
41-50 yrs	32	32.0
51 – 60 yrs	35	35.0
61 – 70 yrs	19	19.0
> 70 yrs	0	0.0
Total	100	100

Figure 1 is showing gender distribution where Among 100 patient's male was 77% and female

was 23%. Male to female ratio was 3.34:1. The following chart is given below:

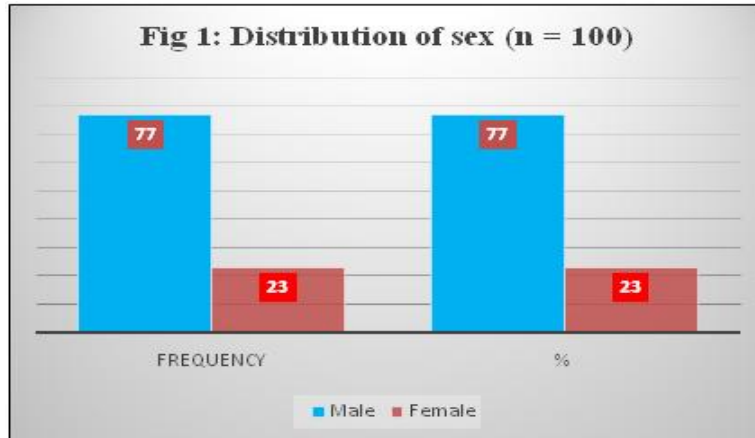


Figure 2 is showing risk factor analysis where STEMI hypertension was found in 61%, smoker was 52%, dyslipidemia was present in 78%, DM was in 31%, sedentary life style was found in 23%

patients' obesity was common among 23 % of total patients and family history of IHD was found in 24% of patients. The following chart is given below:

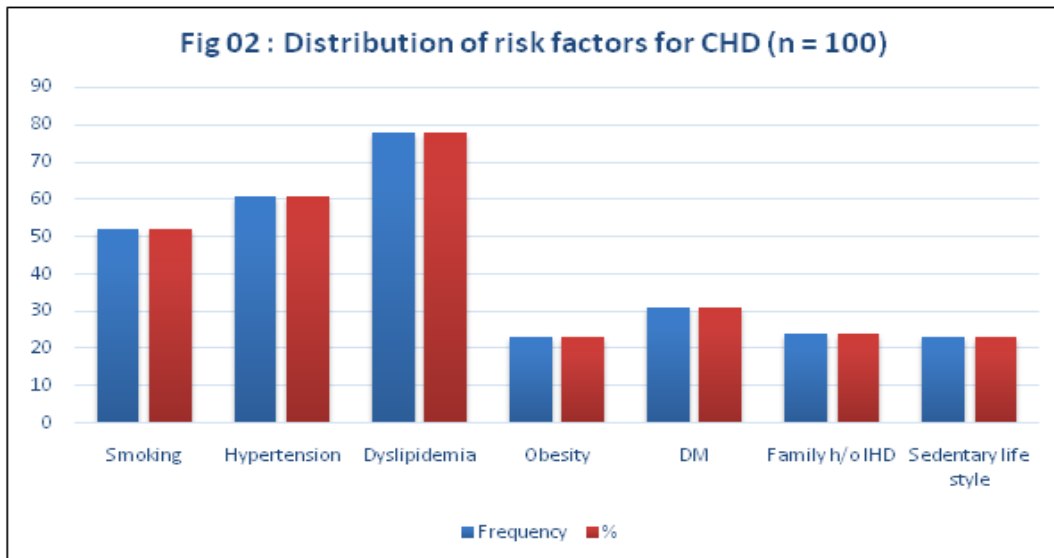


Table 4 is showing pattern of arrhythmias in n=100 patients. They are divided into two categories— Tachyarrhythmias and

Bradyarrhythmias and the table describes the number and percentage of those patients. The following table is given below:

Table 4: Pattern of arrhythmias (n = 100)

Variable		Number	Percentages
Tachyarrhythmias	Sinus tachycardia	24	24%
	Atrial fibrillation	3	3%
	Ventricular ectopic	48	48%
	Accelerated idioventricular rhythm	6	6%
	ventricular tachycardia	5	5%
	ventricular fibrillation	3	3%
Bradyarrhythmias	Sinus bradycardia	13	13%
	1 st degree AV block	11	11%
	2 nd degree AV block	3	3%
	Complete heart block	5	5%
	Bundle branch block	4	4%

Discussion

Hazard factors and in-doctor's facility results of AMI in youngsters.^[5] Recent research demonstrates that greater part of young AMI patients was male. IHD, smoking (84.4 %), hypertension (46.9 %), dyslipidemia (56.3 %), diabetes (12.5 %), family history (34.4 %) with higher triglyceride level and lower HDL were the most well-known hazard factors among patients. Another study in Bangladesh showed that AMI in young patients is most commonly seen in males and the most frequent risk factor was smoking. Among 100 patients' male was 77% and female was 23%. Male to female ratio was 3.34:1.^[6]

Young patients demonstrated an alternate hazard factor profile and better survival rates and in-doctor's facility results contrasted with the more established gathering. Thus, the present results are in agreement that male population is more prone to STEMI which may be linked to genetic/hormonal difference.

The present study showed among the 100 patients most of the patients were in age group 51-60 years (35%) next to which was 41-50 years (32%). Mean \pm SD of age was 52.84 ± 8.40 years. In an examination done in Pakistan,^[7] it was discovered that the mean age was 55.69 ± 13.45 . It was discovered that patients with hazard factors had underneath age 40 aggregate which proposes that STEMI is presently happening in moderately youngsters in Bangladesh. In another study,^[8] STEMI happened in 26.5% cases in age under 55 years, in 23.1% cases in age 55-64 years, in 27.7% cases in age 65-74 years, in 18.9% cases in age 75-84 years and 3.8% cases in age over 85 years. Along these lines the consequences of the present investigation were reliable with the past reports.^[6,8]

With respect to assessment of variables of STEMI hypertension was found in 61%, smoker was 52%, dyslipidemia was available in 78%, DM was in 31%, stationary way of life was found in 23% patients weight was normal among 23% of aggregate patients and family history of IHD was found in 24% of patients. The after effects of

present examination with reference to hazard factors were like those distributed before that type 2 diabetic patients were more hypertensive than non-diabetic.⁶³ 48% patients were discovered hypertensive in the diabetic patients whereas just 36% patients were discovered hypertensive in non-diabetic patients. The greater part of the above discoveries is steady with the prior study.^[9] Of the 100 patients in inferior MI was 34%, anterior MI was 20%, extensive anterior MI was 18%, anteroseptal MI was 12%, Inferolateral MI was 10%, lateral MI was 2%, high lateral MI was 3% and anteroinferior was 1%. The present investigation discovered non-significant difference in the site of infarction among all patients. Inferior and anterior infarction was discovered commonest. In a few studies lateral infarction was discovered basic in diabetic group. But the present investigation shows it was not discovered which might be because of little size.

With respect to of inconveniences and result Mean \pm SD of healing facility remain of the investigation patients was 4.51 ± 0.77 days. Left ventricular discharge part was found in $50.82 \pm 9.99\%$ and arbitrary glucose was found in 222.82 ± 72.16 mg/dl. Among the 100 patients cardiogenic shock was found in 14% patients, heart failure was found in 21%, arrhythmias were found in 73% and death happened in 4% of cases. These discoveries are found from the patients with STEMI. Atherosclerosis is caused to a limited extent by different instruments in patients with serious renal deficiency. Hyperphosphatemia has been identified with atherosclerosis, blood vessel solidifying, and calcification and might be specifically identified with mortality. Patients with renal deficiency may have comorbidities that expansion their hazard, both cardiovascular, (for example, further developed heart failure or arrhythmias) and non-cardiac, that are unaffected by treatment decisions. Distinctive pathophysiological components may have an influence in clarifying these discrepant outcomes. This incorporate quickened atherosclerosis and a more noteworthy predominance of comorbidities acting

over a more extended timeframe. The GRACE discoveries are in concurrence with the consequences of a prior study of 2763 patients, in which renal deficiency was an autonomous hazard factor for cardiovascular occasions in patients with known coronary supply route ailment.

In many studies reported that Remote ischemic conditioning (RIC) is a noninvasive therapeutic strategy on patients for acute STEMI, found significant improvement in the primary outcome of myocardial salvage index as well as a significant reduction in myocardial infarct size. RIC is emerging as a promising adjunctive treatment for the prevention of reperfusion injury in STEMI patients; however, additional high quality research is required before a change in practice can be considered.^[10]

Conclusion

Our outcome indicating better clinical result among more youthful patient is in concurrence with past reports. Nonetheless, thinks about in different nations have recommended that in spite of the fact that in-healing center results are better in youthful AMI patients because of less extreme coronary vessel associations, over the long haul intricacies, for example, history of past MI, fringe vascular illness and low launch part are high dangers for mortality.

Arrhythmia and sudden cardiovascular death are expanded in patients with renal failure, in spite of the fact that not all investigations have shown it. Indeed, even mild reductions in kidney capacity can adjust the electrophysiological properties of the myocardium and increment the danger of ventricular arrhythmias and sudden heart attack.

The present survey stresses vital elements for the wellbeing of patients with chronic kidney disease and empowers various connections amongst cardiology and nephrology divisions and clinical research facility, beating obstructions, inspiring nephrologists to consider cardiologists' opinion and lab information so as to anticipate sudden cardiovascular passing in end arrange renal

difficulties. All patients with kidney disease ought to be screened for cardiovascular ailment.

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