Reperfusion Arrhythmias in Patients Presenting with Acute Myocardial Infarction

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Abstract

Introduction: Reperfusion arrhythmias in patients presenting with acute myocardial infarction factors are common and cause of sudden cardiac death. There is a need to get evidence for local population.

Objective: To determine the frequency of reperfusion arrhythmias in patients presenting with acute myocardial infarction.

Study design: Cross-sectional survey.

Study setting: Department of Cardiology, Jinnah Hospital, Lahore.

Duration of study: Study was conducted from 1st April to 30th September 2017.

Subjects and methods: A total of 315 consecutive patients admitted via emergency department with a diagnosis of myocardial infarction were enrolled. Patients were managed as per departmental protocol and eligible candidates were given thrombolytic therapy.

Results: 315 patients with mean age of 54.58 ± 10.18 years ranged from 40 to 75 were included. 164 patients (52.1%) had uncontrolled diabetes, 229 patients (72.7%) were male and 97 (32.3%) were female. 268 patients (85.1%) were given thrombolytic therapy. Out of total sampled population of 315, 43 patients (13.7%) developed reperfusion arrhythmia. Among them, 21 patients (6.7%) had VPCs, 8 (2.5%) had VT, 9 (2.9%) had VF, 5 patients (1.6%) had AIVR. There was no effect of age and gender on outcome. Patients with shock at presentation and thrombolytic therapy are at higher risk of developing reperfusion arrhythmia.

Conclusion: Reperfusion arrhythmia are common in myocardial infarction after thrombolysis. Patients with shock and thrombolytic therapy need more surveillance.

Keywords: Reperfusion arrhythmia; Ventricular tachycardia; Premature beats; Myocardial infarction

Introduction

About 30% of the total yearly deaths in developing world are due to cardiovascular disease (CVD) which is also the leading cause of mortality worldwide [1-4]. Acute Myocardial Infarction (AMI) shares a major portion of this death toll. Prompt diagnosis and treatment determine the outcomes of MI. In various studies, arrhythmias occurring during coronary perfusion have been analysed [5-7]. Those arrhythmias increase mortality risk. In addition to the arrhythmias observed in the acute phase of infarction, reopening of the infarct-related artery may increase the risk of arrhythmia even further and serious arrhythmias may appear known as reperfusion arrhythmias [5,7].

Thrombolytic therapy has changed the epidemiology of complications in patients with myocardial infarction [8,9]. A study was conducted to analyse the factors that predispose the occurrence of Ventricular Arrhythmia (VA) in young patients with a first acute myocardial infarction, which showed that the incidence of life-threatening VA with first attack of ST elevation acute myocardial infarction (AMI) was 8% [10]. Similarly, in a local study to evaluate the safety of most commonly used thrombolytic streptokinase in elderly patients presenting with acute myocardial infarction, arrhythmias were noted in the 6% of population [11]. “This frequency of arrhythmias is associated with thrombolytic therapy,” has not been answered by available studies. The current study is planned to answer the question.

There is no local study available neither regarding the frequency of arrhythmias in patients presenting with acute myocardial infarction. A cross sectional study will be carried out to determine the link between thrombolytic therapy and development of reperfusion arrhythmias.

Results of this study may form the basis of future research. The results will also help to triage the patients for more intensive care.

Objective

To determine the frequency of reperfusion arrhythmias in patients presenting with acute myocardial infarction.

Materials and Methods

Study design

Cross sectional study.

Settings

Department of Cardiology, Allama Iqbal Medical College, Jinnah Hospital, Lahore.

Duration of study

April 1st to September 30th, 2017.
Sampling technique

Non-probability/consecutive sampling.

Sample size

A sample size of 315 cases is calculated with 95% confidence level, 3% margin of error and taking the expected percentage of arrhythmias 8% in patients with acute myocardial infarction.

Inclusion criteria

- 20 to 90 years.
- Both male and female.
- Patient with first episode of STEMI presenting within 24 hours of chest pain.

Exclusion criteria

- Pt. already having arrhythmias at presentation.
- Patients with history of cardiac or thoracic surgery.
- Patients with advanced liver or kidney disease (AST/ALT>40 IU/L, Urea/ Creatinine>Urea>200 mg/dl, Crt >1.3 mg/dl.
- Patients with thyroid diseases.
- Patients with previous history of arrhythmias.
- Patients with history of angiography or cardiac catheterization.
- Patients with cardiomyopathies.

Data collection procedure

A total of 315 consecutive patients admitted via emergency department, fulfilling the inclusion and exclusion criteria were enrolled in the study at Jinnah Hospital Lahore, after obtaining informed consent. A proforma was filled for each patient, designed to mention the patients’ demographics (name, age, gender, admission number) and patients were managed as per departmental protocol and eligible candidates were given thrombolytic therapy. Treatment was noted down on proforma. Then patients were monitored in hospital for reperfusion arrhythmias (as per operational definition) 12 hourly until 72 hours. Thrombolytic therapy, if given, was noted.

Data analysis

Data analysis was done on software Statistical Package for the Social Sciences (SPSS) version 21. Numerical variables like age were presented by mean and standard deviation. Qualitative variables like gender and the presence or absence of reperfusion arrhythmias were presented as frequency and percentage. Data was further stratified for age, gender, presence and type of shock at presentation, uncontrolled diabetes and thrombolytic therapy to deal with effect modifiers. Post stratification, Chi Square test was applied to determine the level of significance. p value ≤ 0.05 was considered significant.

Results

A total of 315 Patients were included in sampled population with mean age of 54.58 ± 10.185 ranged from 40 to 75 years of age. The age of 233 patients (74%) was below 60 years while the remaining 82 patients (26%) were having age either 60 year or above. 229 patients (72.7%) were male while rest of the 86 (27.3%) were female. 164 patients (52.1%) had uncontrolled DM while the rest of the 151 (47.9%) did not. 268 patients (85.1%) had thrombolytic therapy. Thirty-six patients (11.4%), out of total sampled population had cardiogenic shock at presentation. Out of total sampled population of 315, 43 patients (13.7%) developed reperfusion arrhythmia (Table 1). Arrhythmias was developed in 43 (14%) cases (Figure 1). When study population was distributed according to arrhythmia types, 21 patients (6.7%) had VPCs, 8 (2.5%) had VT, 9 (2.9%) had VF, and 5 patients (1.6%) had AIVR (Table 2).

When age groups were cross tabulated with arrhythmia, results came up as statistically insignificant when using the Pearson Chi-square test (p=0.294). Among the 43 patients with arrhythmia symptoms, 29 were below 60 years of age while 14 were either 60 years of age or above. When we cross tabulated gender and arrhythmia, results came up as statistically insignificant when using the Pearson Chi-square test (p=0.081). Among the 43 patients with arrhythmia symptoms, 29 were male while 14 were female.

When uncontrolled DM was cross tabulated with arrhythmia, results came up as statistically insignificant when using the Pearson Chi-square test (p=0.391). Among the 43 patients with arrhythmia symptoms, 25 were uncontrolled DM while 18 were not.

When thrombolytic therapy was cross tabulated with arrhythmia, results came up as statistically insignificant when using the Pearson Chi-square test (p=0.01). Among the 43 patients with arrhythmia symptoms, 31 were thrombolytic therapy while 12 were not.

When shock was cross tabulated with arrhythmia, results came up as statistically insignificant when using the Pearson Chi-square test (p=0.001). Among the 43 patients with arrhythmia symptoms, 20 were shock while 13 were not.

Table 1: Baseline characteristics.

| Variables            | Total | p-value |
|----------------------|-------|---------|
| n                    | 315   |         |
| Age in years         |       |         |
| Age <60 years        | 233   | 0.294   |
| Age ≥ 60 years       | 82    |         |
| Male 229             | -72.70%|         |
| Female 86            | -27.30%|         |
| Uncontrolled DM      | 164 (52.1%)|      |
| Thrombolytic therapy | 47 (14.9%)|         |
| Shock                | -11.40%|         |

Table 2: Type of arrhythmia.

| Variables            | Arrhythmia | Total |
|----------------------|------------|-------|
|Age (years)           |            |       |
|<60                   | 29         | 204   |
|≥60                   | 14         | 68    |
|Gender                |            |       |
|Male 36               | 193        | 229   |
|Female 75             | 79         | 86    |
|Uncontrolled DM       |            |       |
|Yes 25                | 139        | 164   |
|No 18                 | 133        | 151   |
|Thrombolytic therapy  |            |       |
|Yes 32                | 237        | 268   |
|No 20                 | 16         | 36    |
|Shock                 |            |       |
|Yes 23                | 256        | 279   |

Table 3: Comparison of arrhythmias in different strata.
up as statistically insignificant when using the Pearson Chi-square test (p=0.081). Among the 43 patients with arrhythmia symptoms, 36 were male while seven were female. When we cross tabulated thrombolytic therapy and arrhythmia, results came up as significant when we used the Pearson Chi square test (p=0.01). Among 43 arrhythmia patients, 31 patients had thrombolytic therapy. When we cross tabulated thrombolytic therapy and arrhythmia, results came up significant when we used Pearson Chi square test (p=0.01). Among 43 arrhythmia patients 20 patients had shock (Table 3). Among the sampled population, 229 patients (72.7%) were male and 97 (32.3%) were female. There was no effect of age and gender on the outcome.

**Conclusion**

It is concluded that reperfusion arrhythmia is common after myocardial infarction. Patients with shock at presentation and receiving thrombolytic therapy need more surveillance.

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