**Clinical Outcome of Patients with Acute Myocardial Infarction in a tertiary care hospital: A prospective observational study**

**Abstract**

**Background:** The noncommunicable disease has taken place on communicable disease in recent years. Acute myocardial infarction most common cause of cardiovascular death. In this subcontinent it occurs at an early age and more aggressively. Thrombolytics therapy remains cornerstone of treatment despite advancement of coronary revascularization. Streptokinase is widely use due to high cost of tPA (tissue plasminogen activators). Urokinase is similar drugs as streptokinase but has additional benefit like it is not immunogenic so can be used in recurrent MI, rate of thrombolysis is faster than streptokinase, and exerts some degree of fibrin specificity.

**Aim:** We assess the role of urokinase as a thrombolytic in our acute ST elevation myocardial infarction patient.

**Design and methods:** This is an observational study. The respondent number was fifty as per selection criteria. All data analyzed by using computer-based SPSS (statistical programmed for social science) programmed.

**Results:** Out of fifty patients male were 42(84%) and female were 8(16%). Highest number of patients 16(32%) between age group 45-54 years in male and in female 6 (12%) was in age group 55-64 years. Thirty (60%) patients suffered from anterior myocardial infarction and twenty (40%) patients suffered from inferior myocardial infarction. Thirty-six (72%) patients experienced complete relief of chest pain and resolution of ST segment after urokinase therapy. Regarding outcome forty-two (84%) patients successful recovered and eight (16%) patients had died.

**Conclusion:** The study has shown that male was affected by myocardial infarction more than the female and in earlier age. Although good number of patients recovered after thrombolysis with urokinase, still a few patients succumbed to death.

**Keywords**: Acute myocardial infarction, urokinase, primary percutaneous coronary intervention, coronary artery

**Introduction:**

Cardiovascular diseases are the number one cause of death globally. Majority of the deaths due to cardiovascular diseases are due to coronary heart disease. Cardiovascular diseases have emerged as a major health burden in developing countries (Adhikari & Baral, 2018). Acute myocardial infarction (AMI) is one of the most common diagnoses in hospitalized patient in industrialized country.1 In South-Asian people coronary artery disease (CAD) occur in significantly in younger age and presentation was more aggressive. More than 25% of death occur in this subcontinent due to cardiovascular disease.2 Majority of them had age above 40 years but good numbers of patient belong to age group under forty.3 About 50% of death associated with AMI occur within one hour of the event are attributed to arrythmias most often ventricular fibrillation. Acute myocardial infarction is defined as necrosis of a portion of myocardium due to cessation of blood flow documented by the appearance of cardiac enzymes in the circulation.6 Myocardial infarction is almost always due to formation of occlusive thrombus at the site of rupture of an atheromatous plaque in a coronary artery.7 When primary percutaneous coronary intervention cannot be provided within 90 minutes of diagnosis, patient with a ST elevation acute coronary syndrome should receive immediate thrombolytic therapy.8 Thrombolytic therapy is being used in our country since 1991. Several studies done at NICVD were streptokinase based.

Urokinase is now available in our country. Urokinase has some advantages over streptokinase. It is not immunogenic so can be used in recurrent MI, rate of thrombolysis is faster than streptokinase, and exerts some degree of fibrin specificity.11 Urokinase is a cost-effective drug that can be alternative to streptokinase. I used urokinase as a thrombolytic in management of acute myocardial infarction patients. The purpose of this study was to assess the role of urokinase as a thrombolytic in our acute ST elevation myocardial infarction patient.

Materials and methods:

This observational study conducted at department of cardiology of National Institute of Cardiovascular Disease (NICVD), Dhaka from 15th June to 30th September 2010. Total fifty patients who suffered from acute ST elevated myocardial infarction (STEMI) were included in this study. Patients having ischemic symptoms and within 12 hours of admission ECG showing ST segment elevation or new onset left bundle branch block and patient with recurrent ST elevation myocardial infarction previously treated by streptokinase comes within 12 hours of attack enrolled in this study. All relevant data collected from each patient by a predesigned questionnaire. All data analyzed by using computer-based SPSS (statistical programmed for social science) programmed. Continuous data expressed as median or mean ±SD. Dichotomous data expressed as percentage, comparison between groups done by unpaired t-test. Categorical data analyzed by chi-square (X2) test. p value<0.05 considered as significant. Patients who had any malignancies or other cardiovascular complications or patients with kidney diseases were excluded from this study.

Results:

Among fifty patients, male were 42(84%) and female were 8(16%) in number. (Figure-1)

Fig 1. Distribution of patients according to sex

Table 1 show the mean age of the patients were 53.86±10.74 years in male and 62.50±4.62 years in female. Highest number of patients between age group 45-54 years (32.0%) in male and 55-64 years (12.0%) in female. In male age group 45-54 years was statistically significant (p<0.033) and in female age group 55-64 years was statistically significant (p<0.019).

Table 1. Distribution of patients by age (n=50)

|  |  |  |  |
| --- | --- | --- | --- |
| Age in years | Study subject | | P value |
| Male | Female |
| <45 | 04(8.0%) | 0 | 0.49NS |
| 45-54 | 16(32%) | 0 | 0.033S |
| 55-64 | 12(24%) | 6(12.0%) | 0.019S |
| ≥65 | 10(20%) | 2(4.0%) | 0.71NS |
| Total | 42(84%) | 8(16%) |  |
| ΩMean±SD | 53.86±10.74 | 62.5±4.62 | 0.031S |

Ω= p value reached from unpaired student’s t-test

P value reached from Fisher’s exact test for age groups

NS= not significant

S= significant

N= sample size

Table 2 shows electrocardiographic location of myocardial infarction in which 60% were anterior myocardial infarction (including anterior, antero-septal and extensive anterior myocardial infarction). Forty percent of patients suffered from inferior myocardial infarction.

Table 2. Electrocardiographic location of myocardial infarction

|  |  |  |
| --- | --- | --- |
| Location | Male | Female |
| Anterior | 18(36.0%) | 6(12.0%) |
| Antero-septal | 06(12.0%) | 00 |
| Inferior | 18(36.0%) | 2(4.0%) |
| Total (50) | 42(84.0%) | 8(16.0%) |

Table 3 shows distribution of patients by “relief of chest pain” in comparison to ST segment resolution. 50 % ST segment resolution occur in 36 (72%) patients who were completely relieved from chest pain which was statistically significant (p<0.0001). Partial relief of chest pain occur in 10 (20%) patients along with < 50% ST segment resolution which was also statistically significant (p<0.002). 4 (8.0%) patients had persistent chest pain with no resolution of ST segment at all, which was also statistically significant (p<0.0001)

Table 3. Distribution of the patient by ‘relief of chest pain’ in comparison to ST segment resolution

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Diagnosis | ST segment resolution | | | P value |
| 50% | <50% | No resolution |
| Complete relief | 32 (64.0%) | 04 (8.0%) | 00 | 0.0001S |
| Partial relief | 04 (8.00%) | 06(12.00%) | 00 | 0.002S |
| Persistent chest pain | 00 | 00 | 04 (8.00%) | 0.0001S |
| Total | 36 (72.0%) | 10 (20.0%) | 04 (8.00%) |  |

Table 4 shows distribution of patients by hospital outcome. In the present study uneventful outcome occur in 32 (64%) patients with 50% ST segment resolution and in 10 (20%) patients with <50% ST segment resolution, which was statistically very significant (p<0.0001). LVF occur in 4(8%) patients with 50% ST segment resolution and in 4 (8.0%) patients with no resolution of ST segment at all, which was statistically significant(p<0.032). Malignant arrythmias occur in 4 (8%) patients, with no resolution of ST segment, which was statistically incredibly significant(p<0.0001). In this study, cardiogenic shock occurs in 4(8%) patients with no resolution of ST segment, which was also statistically incredibly significant. Among the patient 4 (8%) suffered from hypotension with no resolution of ST segment which was statistically incredibly significant(p<0.0001). Anginas occur in 4 (8%) patients with no resolution of ST segment at all, which was statistically incredibly significant(p<0.0001). in this study cardiac arrest and death occur in 4 (8%) patients with no resolution of ST segment, which was also statistically significant(p<0.0001).

Table 4. Distribution of patients by in hospital outcome (n=50)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Outcome | ST segment resolution | | | P value |
| 50% | <50% | No resolution |
| Uneventful | 32 | 10 | 00 | 0.0001S |
| LVF | 04 | 00 | 04 | 0.032S |
| Malignant arrythmias | 00 | 00 | 04 | 0.0001S |
| Cardiogenic shock | 00 | 00 | 04 | 0.0001S |
| Hypotension | 00 | 00 | 04 | 0.0001S |
| Angina | 00 | 00 | 04 | 0.0001S |
| Cardiac arrest | 00 | 00 | 04 | 0.0001S |
| Death | 00 | 00 | 04 | 0.0001S |

P value reached from Chi square analysis for individual outcome

S= significant

n = sample size

Discussion:

This current investigation was an observational study that was carried out to see the in hospital outcome of AMI patient admitted in National institute of cardiovascular disease (NICVD). 50 patients were selected for this study.

The study conducted among 42(84%) male and 08(16%) female patient. The number of female patients were low in all studies in Rahim et al 5, Khalil 6 and Haque et al7. Khandaker 8 reported 11.37 % of female and Malik 9 reported 11.2 % in their series.

Age is an unmodifiable risk factor, frequency and severity of atherosclerotic heart disease in crease with age. The mean age was 53.86±10.74 years for male and 62.50±4.62 years for female. Among the 50 patients 4(8.0%) had age group below 45 years, 16 (32.0%) patients had age group between 45-54 years, 18 (36%) had age group between 55-64 years and 12(24%) had age group ≥65 years. Similar age incidence reported by different authors Jalaluddin10, Malik 8, Rahman11 found 9.5% of patients were below 45 years of age.

In this study 30 (60%) patients had anterior surface and 20(40%) had inferior surface myocardial infarction. Among them 44% had an isolated anterior, 12% had isolated antero-septal and 4% had isolated extensive anterior. In one study at home, Rahman et al found an anterior MI in 46 % of patients and an inferior MI in 40% of patients. Haque et al found 53% of patients suffered from anterior MI and 47% of patients suffer from inferior MI in their study. Dechellon12et al found anterior MI in 45% and inferior MI in 55% of patient in their study.

After thrombolytics (Urokinase) therapy chest pain is complete relief in 72% of patients, partial relief in 20% of patients and 8% of patients had persistent chest pain. Choudhury13 et al found 63.33% of patients had complete relief of chest pain and 13.33% patient had persistent chest pain after streptokinase therapy.

In this study ST segment resolution after urokinase therapy analyzed and categorize as 50% resolution, <50% resolution and no resolution of ST segment. It found that 50% ST segment resolution occur in 72% of cases and <50% ST segment resolution occurs in 20% of case and 8% of patient had no resolution of ST segment at all. Choudhry et al13 found in their study that 50% ST segment resolution occur in 64.28% of patient, <50% ST segment resolution occurs in 25% of patient and 10.7% of patient had no resolution of ST segment.

Regarding hospital outcome, 16% of patients developed complications during hospital stay. Ten percent of patients developed acute LVF, followed by malignant arrythmia 6%, cardiogenic shock 6%, hypotension 6%, recurrent chest pain 6% and cardiac arrest 6% of patients. Ullah14 and Nicod15 et al found similar types of complications in their study. Zhaojin16 found 4.41% of patients developed complications in their study.

In this study, in hospitals, the mortality was 16%. Nicod15 et al found 8.1% in hospital death and Choudhury13et al shown that over all in hospital mortality was 13.24%.

Conclusion:

In this study, most of the respondent were male 42(84%), highest number of patients 16(32%) between age group 45-50 years in male and 6(12%) females had age between 55-64 years. Among the study population 30(60%) suffered from anterior myocardial infarction and 20(40%) suffered from inferior myocardial infarction. According to study relieved of chest pain and resolution of ST segment occur in 36 (72%) patient and 4(8%) patients had persistent chest pain and no resolution of ST segment at all. In this study uneventful outcome occur in 42(84%) patients among them 4(8%) patient developed left ventricular failure despite ST segment resolution of 50%. Among the study population 4(8%) patient developed malignant arrythmia, cardiogenic shock, cardiac arrest and death.

Recommendation:

There is need for further study with large sample size including evaluation of coronary artery status by coronary angiography after urokinase therapy to see its efficacy.

Study limitation:

Though most of the results of this study are in favor of successful thrombolysis, there are some limitations like-

1. It was a non-randomized study.
2. The sample size was small.
3. All the patients with acute myocardial infarction not included due to different contraindications and co-morbid conditions.

Disclaimer (Artificial intelligence)

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Details of the AI usage are given below:

1.

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3.

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