

Ejection fraction and mortality rate of patients with isolated acute inferior myocardial infarction reperused by streptokinase

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Abstract

BACKGROUND: This study aimed to evaluate the effects of streptokinase on left ventricular ejection fraction and mortality rate of patients with inferior acute myocardial infarction (AMI) without right ventricular myocardial infarction (RVMI).

METHODS: Fifty five consecutive patients with the diagnosis of inferior AMI without RVMI in the coronary care unit (CCU) of Shariati Hospital in Isfahan were selected for this study. Patients who had a history and/or electrocardiogram (ECG) evidence of previous myocardial infarction, evidence of bundle branch block, historical or clinical findings of valvular or other non-coronary heart diseases or heart failure were excluded. Participants were divided into two groups. Group one (n = 28) had no contraindication for taking thrombolytic therapy and group two (n = 27) had at least one contraindication for this treatment. Patients in group one took 1,000,000 units streptokinase for one hour. Three days later, LVEF of all participants was measured by an experienced cardiologist using 2-dimensional echocardiography. Patients were followed up until four weeks to assess the mortality rate.

RESULTS: One death in the first 24 hours was reported in group one. However, no death was reported in any group until four weeks after discharge. There was no significant difference in mortality rate during the first 24 hours and four weeks after discharge between the two groups. Mean LVEF in the two groups did not show any significant difference (P = 0.21).

CONCLUSION: Probably streptokinase has no effects on one-month mortality rate and LVEF in patients with inferior AMI without RVMI. Therefore, streptokinase side effects must be taken into consideration when being administered for this group of patients.

Keywords: Inferior Acute Myocardial Infarction, Left Ventricular Ejection Fraction, Streptokinase, Mortality Rate.

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Introduction

Thrombolysis is claimed to be the treatment of choice for patients with acute myocardial infarction (AMI) less than 12 hours in duration who present ST segment elevations on their admission electrocardiogram (ECG), irrespective of the site of AMI.^{1,2}

The risk to benefit ratio of thrombolytic therapy in patients with inferior AMI continues to be controversial.³⁻⁶ It has been suggested that only patients with inferior AMI presenting larger ST segment deviations would benefit from thrombolytic therapy.⁷ In addition, the effects of thrombolytic therapy on left ventricular ejection fraction (LVEF) have been small and inconsistent.⁷⁻⁹

Although hemorrhagic stroke is a rare and serious complication of thrombolytic therapy, if a patient has had a history of thrombolytic therapy before, an allergy against the thrombolytic agent may have developed. These two side effects of thrombolysis are worsened using streptokinase.¹⁰⁻¹²

In Iran, the most available thrombolytic agent used is streptokinase. Therefore, according to the side effects of this drug, we designed this study to assess streptokinase effects on LVEF and mortality rate in patients with inferior AMI without right ventricular myocardial infarction (RVMI).

Materials and Methods

This cross-sectional study was approved by the Ethics Committee of Islamic Azad University of Najaf Abad

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. In addition, all participants signed an informed consent.

Samples were selected from patients admitted in the coronary care unit (CCU) of Shariati Hospital in Isfahan, during September 23-March 19, 2008, diagnosed with inferior AMI without RVMI. Sampling method was convenient.

The diagnosis of inferior AMI without RVMI criteria included^{9,13,14} chest pain or discomfort compatible with myocardial ischemia lasting longer than one hour, an elevation of 0.1 mV or more of the ST segment in three inferior leads (II, III, aVF) documented in the ECG within 4 hours of the onset of the symptoms, an elevation of serum creatinine phosphokinase (CPK) to 125% or more of the upper limit of the respective laboratory associated with the presence of MB-CPK, an ST segment elevation of 0.1 mV or more in the right precordial chest lead without V4R.

Patients were excluded if one of these items were present: historical or ECG evidence of previous myocardial infarction, evidence of bundle branch block, or historical or clinical findings of valvular heart disease or heart failure.

Finally, 55 patients were selected and divided into two groups. Patients in group one (n = 28) had no contraindication for thrombolytic therapy and patients in group two (n = 27) had at least one contraindication for taking thrombolytic agent.

The patients' weight and height were measured while they were barefoot wearing light indoor clothing. Body mass index (BMI) was then calculated for each subject as weight (kg) divided by height squared (m²).

Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured twice with 5 minutes intervals using a standard mercury sphygmomanometer in a quiet and comfortable room.

Patients' blood samples were taken after 12 hours of fasting for measuring total cholesterol (TC), triglyceride (TG), high-density lipoprotein (HDL-C), low density lipoprotein (LDL-C), and fasting blood sugar (FBS).

Patients were considered hypertensive if they had a history of high blood pressure and/or were using any anti-hypertensive drugs, and/or SBP \geq 140 mmHg. Dyslipidemic patients were defined as having a history of dyslipidemia and/or TC \geq 200 and/or TG \geq 150 and/or LDL-C \geq 100 and/or HDL-C \leq 40 in males and \leq 50 in females. Patients with FBS \geq 126, and/or a history of diabetes mellitus, and/or taking anti-diabetic drugs were considered diabetic.

The contraindications for taking thrombolytic agent included a history of cerebrovascular

hemorrhage at any time, a non-hemorrhagic stroke or another cerebrovascular event within the past year, SBP $>$ 180 mmHg and/or DBP \geq 110 mmHg at any time during the acute presentation, suspicion of aortic dissection, and active internal bleeding except for menses.¹⁰

Aspirin and intravenous heparin were administered to all patients. Other medications, including nitrates and calcium channel blockers, were used if considered necessary after the clinical examination by the physician. In addition, 1,000,000 units streptokinase during a one-hour period was ordered only for group one. An experienced cardiologist measured LVEF of patients using a 2-dimensional echocardiography 3 days after AMI.

In order to evaluate the mortality rate, the patients were followed up every week by phone until four weeks after discharge. Data were analyzed using SPSS version 13 and independent t-test was used to compare the two groups' data. P-value less than 0.05 was considered as statistically significant.

Results

As Table 1, including patients' physical and demographic data, shows, there were not any significant differences between the two groups.

Only one patient died in group one in the first 24 hours and no death was recorded during the 4 weeks after discharge in both groups. There was not a significant difference between the two groups in mortality rate at the first 24 hours (P = 0.51) and 4 weeks after discharge (P = 0.43).

Mean ejection fraction was 46.96 + 11.96% in group one and 51.11 + 12.58% in group two. Although ejection fraction in group one was 1.08 times more than group two, the difference was not significant (P = 0.21).

Discussion

Present study findings showed that mortality rate and LVEF of patients with acute inferior myocardial infarction without RVMI who took streptokinase is not higher than those who did not take this medication.

Despite more than a decade of extensive clinical trials, the use of thrombolytic treatment in patients with inferior wall AMI continues to be controversial.^{1,4,12} Some studies have claimed that thrombolytic treatment should be given to all patients presenting an ST segment elevation.¹³ Although the results are less convincing in patients with inferior AMI, treatment may save tens of thousands of lives worldwide each year.^{1,2}

Borgia et al. concluded that thrombolytic therapy in patients with inferior AMI would improve the

Table 1. Demographic and physical characteristics of patients in the two groups

Data	Group one N = 28	Group two N = 27	P-value
Age (mean ± SD)	59.48 + 13.05	61.88 + 16.16	0.49
BMI (mean ± SD)	25.44 + 1.9	25.53 + 2.4	0.88
DM	39.1%	60.9%	0.09
HTN	45.8%	54.2%	0.30
DLP	63.2%	36.8%	0.14

BMI = body mass index; DM = diabetes mellitus; HTN = hypertension; DLP = dyslipidemia.

patients' prognosis (ST segment depression persisting for more than 24 hours) to a better prognosis (ST segment depression persisting for less than 24 hours).¹² Another study with the same aim showed that thrombolytic therapy in patients with inferior AMI presenting larger ST segment deviations is associated with improved 6-year survival rates.¹⁰

However, the risk to benefit ratio, in terms of early mortality in patients who have an ST of 0.5mm or less no pericardial ST segment depression may be unfavorable.⁹ In Iran, a study evaluating the role of thrombolytic therapy in inferior AMI with RVMI found LVEF in patients who received streptokinase decreased less than patient who did not receive streptokinase.¹²

In our study, there was no significant difference in ST segment depression in precordial leads between the two groups. Moreover, patients had no RVMI and their age, sex, history of diabetes mellitus, hypertension, dyslipidemia, smoking and addiction were matched. We found no significant differences in the mortality rate during the first 24 hours and one month after discharge between the two groups. This result is in agreement with a study conducted by Robalino, et al.¹³ but our sample size was small. In addition, in this study ST segment depression was not significantly different between the two groups and we did not evaluate the effects of thrombolytic therapy on patients with RVMI.

Generally, this study shows that streptokinase has no effect on LVEF and mortality rate in the first 24 hours and one month after discharge. Considering that streptokinase is the only available thrombolytic agent in our country, the drug's side effects must be considered for administration in patients with inferior AMI without RVMI.

We suggest a study with a larger sample size for comparing the effects of streptokinase in patients with inferior AMI with or without RVMI.

Conflict of Interests

Authors have no conflict of interests.

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