ORIGINAL ARTICLE

EFFICACY OF STREPTOKINASE IN DIABETIC PATIENTS WITH ACUTE ST ELEVATION MYOCARDIAL INFARCTION

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Background: The efficacy of streptokinase in Myocardial Infarction is usually evaluated either by coronary angiographic measurement of thrombolysis in myocardial infarction or by the measurement of ST segment resolution at 90 minutes after streptokinase infusion, in 12-lead electrocardiogram (ECG). This study was carried out to determine the efficacy of streptokinase in diabetic patients with acute ST Elevation Myocardial Infarction (STEMI). **Methods:** This was a descriptive cross-sectional study carried out at the Cardiology Department of Ayub Teaching Hospital from June 2015 to July 2016. A total of 169 patients with STEMI were included in the study using non-probability consecutive sampling. Patients were administered injection Streptokinase in a dose of 1.5 million units, diluted in 100 ml of normal saline, in 1 hour and repeat ECG was done at 90 mins to assess ST segment resolution. A repeat ECG was performed within 90 minutes of start of therapy to check the efficacy of fibrinolytic therapy. Fifty percent or >50% reduction in height of ST segment elevation (ST resolution) towards baseline within 90 minutes after start of streptokinase infusion was considered effective. **Results:** Mean age of the patients was 53.76±4.76 years. Most of the patients were >55 years of age. Out of 169 patients, 69.23% (n=117) were male while 30.77% (n=52) were female. Streptokinase administration in acute STEMI in diabetics revealed ST segment resolution at 90 mins in 15.38% (n=26), while 84.62% (n=143) showed no ST segment resolution. **Conclusion:** Thrombolytic therapy is not effective in diabetic subjects with STEMI. In diabetics to improve outcome, newer strategies such as peri-infarction metabolic control and primary angioplasty should be investigated.

Keywords: ST segment elevation myocardial infarction, STEMI, Streptokinase, diabetes mellitus

INTRODUCTION

After sudden cardiac death, ST-segment elevation myocardial infarction (STEMI) is the most severe form of acute coronary syndrome (ACS). Acute ST segment elevation myocardial infarction usually occurs when thrombus forms on a ruptured atheromatous plaque and occludes an epicardial coronary artery.

According to the Fourth National Registry of Myocardial Infarction (NRMI-4), 29% of infarction patients experience STEMI. The risk of acute myocardial infarction (AMI) is 2–4 times higher in diabetics.[1] The coronary artery disease is much more serious in diabetics with 4 times higher morbidity/ mortality in men, while 8 times in women.[2,3] Patients with diabetes mellitus who presented with acute STEMI often have a higher risk of adverse outcomes than non-diabetic counterparts, probably due to extensive coronary disease or poor left ventricular function.[4]

There has been a profound fall in the fatality of patients treated in hospital in contrast to community mortality and that is mostly due to administration of thrombolytics. Thrombolytics such as streptokinase represents one of the major advances in the management of STEMI. Approximately 400,000–500,000 patients world over receive this thrombolytic therapy yearly.[5] The success of fibrinolytic therapy is largely dependent on timely administration. Use of streptokinase in patients with acute STEMI is considered up to 12 hours after the onset of chest pain.

The outcome of AMI treated with fibrinolytic therapy, i.e., the efficacy of streptokinase can be evaluated either by coronary angiographic measurement of thrombolysis in myocardial infarction blood flow or by the measurement of ST segment resolution at 90 minutes after start of streptokinase infusion, in 12-lead electrocardiogram (ECG) which is a simple measure of assessing reperfusion in patients receiving fibrinolytics.[6,7] The ST segment changes reflect myocardial rather than epicardial blood flow and yield prognostic information beyond that provided by coronary angiogram alone.

This study was carried out to determine the efficacy of streptokinase in diabetic patients with acute ST segment elevation myocardial infarction.

METHODOLOGY

This was a descriptive cross-sectional study carried out at the Cardiology Department of Ayub Teaching Hospital from June 2015 to July 2016. A total of 169 patients with STEMI were included in the study using non-probability consecutive sampling. The sample size was calculated keeping efficacy of streptokinase among

STEMI with diabetes at 19.7%, with 95% confidence interval, and 6% margin of error.

Patients were administered Streptokinase in a dose of 1.5 million units, diluted in 100 ml of normal saline, in 1 hour. A repeat ECG was performed within 90 minutes of start of therapy as evaluation of ECG segment resolution is a simple and readily available technique to check the efficacy of fibrinolytic therapy. Fifty percent or more than 50% reduction in height of ST segment elevation (ST resolution) towards baseline within 90 minutes after start of streptokinase infusion was considered effective as resolution of more than 50% of ST-segment elevation at 60–90 minutes after the initiation of therapy is a good indicator of improved myocardial perfusion.[8,9] The information along with social and demographical information of the patients was recorded on a pre-designed performa. The ECGs were reported by single expert Physician to avoid inter observer bias. Data were analysed using SPSS-16.

RESULTS

A total of 169 patients were enrolled. Mean age of the patients was 53.76±4.76 years. Most of the patients, i.e., 46.74% (n=79), were >55 years of age; 37.28% (n=63) were aged 51–55 years, and only 15.98% (n=27) were in 45–50 years of age group. Males were 69.23% and females were 30.77% (Table-1).

Efficacy of streptokinase administration in STEMI in diabetics revealed ST segment resolution within 90 mins in 15.38% (n=26) while 84.62% (n=143) showed no ST segment resolution even after 90 mins. Out of 26 cases effectively treated, 30.77% (n=8) were between 45 and 50 years, 42.31% (n=11) between 51 and 55 years, and only 26.92% (n=7) had >55 years of age. Out of effectively treated patients, 38.46% (n=10) were male and 61.54% (n=16) female (Table-2).

Table-1: Age groups and gender ratio (n=169)

		Number (%)
Gender	Male	117 (69.23)
	Female	52 (30.77)
Mean age		53.76±4.76
Age Groups	45–50 years	27 (15.98)
	51–55 years	63 (37.28)
	>55 years	79 (46.74)

Table-2: Efficacy of streptokinase in diabetic patients

		Number (%)
Gender	Male	10 (38.46)
	Female	16 (61.54)
Effectively Treated	45–50 years	8 (30.77)
	51–55 years	11 (42.31)
	>55 years	7 (26.92)
Not treated		143 (84.62)

DISCUSSION

Patients having diabetes mellitus presenting with acute STEMI are commonly at greater risk of adverse outcomes as compared to non-diabetics possibly extreme coronary disease or having poorer left ventricular function.[2]

We recorded 15.38% efficacy of streptokinase on ST Segment elevation MI in diabetic subjects. Zairis et al[10] recorded that diabetic subjects had significantly lower incidence of sustained ST recovery than non-diabetic subjects (p=0.03). These findings are in accordance to the findings of our study. In another study, Chowdhury AR et al[7] compared the thrombolytic effect of streptokinase between diabetic and non-diabetic myocardial infarction patients and determined that successful reperfusion was significantly higher in non-diabetic than diabetic (p<0.001), while failed reperfusion was significantly higher in diabetic patients (p<0.001), and concluded that diabetes mellitus might affect the thrombolytic outcome of acute myocardial infarction patients with diabetes mellitus. These findings strongly support the findings of our study.

Type 2 diabetes is a strong predictor of acute intravenous thrombolysis failure during STEMI. This association may contribute significantly to the worse prognosis of type 2 diabetic subjects compared with non-diabetic ones. If it is validated with larger prospective studies, more appropriate therapeutic approaches that accelerate and increase the achievement of satisfactory reperfusion in the cellular level may further improve prognosis in type 2 diabetic subjects suffering from STEMI. However, these finding reinforces the need for increased efforts to discover newer pharmacological agents to reduce failed reperfusion after streptokinase therapy in diabetic patients with myocardial infarction.

The limitation of this study was that we did not compare the results of streptokinase in non-diabetics but the studies mentioned above compared diabetics and non-diabetics which further clarifies that streptokinase therapy is not highly successful in patients of STEMI with diabetes.

CONCLUSION

Thrombolytic therapy is not highly effective in diabetic subjects with STEMI, however, special attention should be given to the diabetic individuals before administration of thrombolytic therapy. Newer strategies such as peri-infarction metabolic control and primary angioplasty should be investigated to further improve outcome after myocardial infarction and thrombolysis among patients with diabetes.

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