

## Efficacy of Streptokinase on ST Segment Elevation MI in Diabetic and Non-Diabetic

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### ABSTRACT

**Aims:** To compare the efficacy of streptokinase on ST segment elevation MI in diabetic and non-diabetic

**Study design:** It was a randomized clinical trial.

**Duration:** From May 2012 to June 2012.

**Material and method:** The patients of ST Segment Elevation Myocardial Infarction were recruited from the Department of Cardiology, Jinnah Hospital, Lahore.

**Result:** Baseline characteristics of non-diabetic and diabetic myocardial infarction patients i.e. common age of the patients in both groups were similar and having no significant difference i.e.  $49.43 \pm 4.27$  in diabetic and  $46.74 \pm 3.12$  in non-diabetic group, 82.5% were male in diabetic and 72.5% in non-diabetic group. Comparison of efficacy of streptokinase on ST Segment elevation MI in diabetic and non-diabetic was recorded which shows 85% in non-diabetic and only 30% in diabetic patients. P value was calculated as 0.00.

**Conclusion:** In light of the present results we may conclude that the thrombolytic therapy is more effective in non-diabetics than diabetic subjects with STEMI, however, more attention should be given to the diabetic individuals before administration of thrombolytic therapy

**Key words:** STEMI, Diabetic, Non-diabetics, Thrombolytic Therapy, Efficacy

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### INTRODUCTION

ST-segment elevation myocardial infarction is the most severe form of acute coronary syndrome (ACS) after sudden cardiac death. The NRMI-4 (Fourth National Registry of Myocardial Infarction), indicates 29% of infarction patients experiencing STEMI<sup>1</sup>, on the other hand a European survey, the EHS-ACS-II (Second Euro Heart Survey on Acute Coronary Syndromes), reported that 47% of ACS patients present with STEMI<sup>2</sup>.

Diabetes is becoming a universal problem coupled with the major concern at elderly age more commonly with increased BMI and the people having sedentary life style. The risk of AMI increased 2-4 time greater in patients with diabetes. The coronary artery disease presents more seriously in diabetes with 4 time higher morbidity/mortality in men, while the women are at 8 times greater risk<sup>3,4</sup>.

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<sup>5</sup>.

Thrombolytic agents i.e., streptokinase are the most popular and using agents for the management of acute MI with the availability in most of the countries of the world. Approximately 400,000-

500,000 patients receiving thrombolytic therapy annually worldwide<sup>6</sup>. Previously greater efficacy of streptokinase is recorded in non-diabetics as compared to diabetic patients<sup>7</sup>.

Our major concern to conduct this study was that in Pakistan, data regarding the effect of streptokinase in patients with ST segment elevation MI in diabetic and non-diabetic is lacking. Current thrombolytic treatment of acute myocardial infarction, derived from large clinical trials has dramatically improved survival in both non-diabetic and diabetic patients. However, despite these improvements, diabetes still doubles the fatality rate. As because diabetes profoundly affects cardiovascular disease, one could argue that clinical trial with potential implications for the care of patients with ischemic heart disease, should be specifically designed to evaluate the effect of thrombolytic therapy in diabetic patients.

### MATERIAL AND METHODS

It was a cross sectional comparative study, at Department of Cardiology, Jinnah Hospital, Lahore including 40 cases in each group (Diabetics and Non-Diabetics). We included all diagnosed patients with ST elevation myocardial infarction (within 12 hours of chest pain), known diabetic or established diabetics during hospital stay by repeated blood glucose estimation (for diabetic group) while Known non-

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diabetic or established during hospital stay by repeated blood glucose estimation (for non-diabetic group) with  $\geq 40$  years of age in both genders, while subjects with previous history of myocardial infarction, already under treatment of streptokinase were excluded from the study. Patients were administered with streptokinase at a dose of 1.5 million units, diluted in 100 ml of normal saline, in 1 hour in both groups. The efficacy of the drug in both groups was considered as reduction of height of ST segment elevation (ST resolution) towards baseline within 90 minutes after streptokinase infusion.

Data was entered and analyzed in SPSS version 11. Demographic data and frequency of efficacy of streptokinase in both groups is reported by calculating their frequency and percentages while Chi square test is applied to know any significant difference in both groups.  $P \leq 0.05$  is considered as significant.

## RESULTS

Baseline characteristics of non-diabetic and diabetic myocardial infarction patients is presented in table 1 & 2, common age of the patients in both groups were similar and having no significant difference i.e.  $49.43 \pm 4.27$  in diabetic and  $46.74 \pm 3.12$  in non-diabetic group, male patients were in majority in both groups i.e. 82.5% in diabetic and 72.5% in non-diabetic group. Comparison of efficacy of streptokinase on ST Segment elevation MI in diabetic and non-diabetic was recorded which shows 85% in non-diabetic and only 30% in diabetic patients. P value was calculated as 0.00.

Table 1: Age distribution of the subjects

Age in years	Diabetic (n=40)	Non diabetic (n=40)
30-40	8(20%)	9(22.5%)
41-50	19(47.5%)	17(42.5%)
51-60	13(32.5%)	14(35%)

Table 2: Gender distribution

Gender	Diabetic (n=40)	Non diabetic (n=40)
Male	33(82.5%)	29(72.5%)
Female	7(17.5%)	11(27.5%)

Table 3: Compare the efficacy of streptokinase on ST segment elevation MI in diabetic and non-diabetic

Efficacy	Diabetic (n=40)	Non diabetic (n=40)
Yes	12(30%)	33(85%)
No	28(70%)	7(15%)

P Value = 0.00

## DISCUSSION

Reduction in mortality in patients with acute myocardial infarction is associated with the effectiveness of thrombolytic therapy following reduction of height of ST segment elevation (ST resolution) towards baseline within 90 minutes after streptokinase infusion<sup>8</sup>.

Diabetes mellitus is among the leading primary risk factors identified for myocardial infarction. It is a dyslipidemic disease which increases the rate of atherosclerotic progression of vascular occlusion.<sup>8</sup> 10-30% of the patients among an acute myocardial infarction are diabetics<sup>9</sup>. When thrombolytics are administered, the outcome in diabetic subjects is still worse than non-diabetics, manifesting impaired post-thrombolysis left ventricular function and prognosis<sup>10</sup>.

In our country, the effect of streptokinase in patients with ST segment elevation MI in diabetic and non-diabetic is not evaluated before while thrombolytic treatment of acute myocardial infarction, derived from large clinical trials have shown dramatically improved survival in both non-diabetic and diabetic patients. This discrepancy compels us compare the efficacy of streptokinase on ST segment elevation MI in diabetic and non-diabetic.

Our comparison of efficacy of streptokinase on ST Segment elevation MI in diabetic and non-diabetic was recorded which shows 85% in non-diabetic and only 30% in diabetic patients. P value was calculated as 0.00.

Michael N. Zairis and colleagues<sup>11</sup> in their study recorded that diabetic subjects had significantly lower incidence of sustained ST recovery than nondiabetic subjects ( $P=0.03$ ), these findings are in accordance to the findings of our study.

Another study Chowdhury AR and co-workers 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.

Our findings imply that 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 nondiabetic ones in this setting. 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 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. To further improve outcome after myocardial infarction and thrombolysis among patients with diabetes, newer strategies such as peri-infarction metabolic control and primary angioplasty should be investigated.

## CONCLUSION

In light of the present results we may conclude that the thrombolytic therapy is more effective in non-diabetics than diabetic subjects with STEMI, however, more attention should be given to the diabetic individuals before administration of thrombolytic therapy.

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