RESPONSE OF STREPTOKINASE THERAPY BASED ON DIABETIC STATUS AMONG HEART PATIENTS

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ABSTRACT
OBJECTIVES
This study aims to investigate compare the success rate of streptokinase therapy among patients with and without diabetes.

METHODOLOGY
A cross-sectional descriptive study design was utilized for this research. Data from medical records of patients admitted to a tertiary care hospital between January 1, 2018, and December 31, 2022, were collected. The sample size included all patients who experienced myocardial infarction during the study period. Relevant demographic and clinical information including gender, diabetes status, and response to streptokinase therapy were extracted. The success rate of streptokinase therapy was assessed based on the resolution of chest pain and improvement in electrocardiogram (ECG) changes within 90 minutes of therapy initiation.

RESULTS
A total of 500 patients were included in the study, of which 300 (60%) were male and 200 (40%) were female. Among the entire sample, 150 patients (30%) had diabetes. There is a statistically significant association between the response to streptokinase therapy and diabetes ($\chi^2 = 241.534$, $p < 0.05$). Among patients with diabetes, 110 responded positively to streptokinase therapy while 40 did not respond. On the other hand, among patients without diabetes, 95 responded positively to streptokinase therapy while 255 did not respond. This indicates that streptokinase therapy is more effective in patients with diabetes compared to those without diabetes.

CONCLUSION
There is a statistically significant association between streptokinase therapy and diabetes, indicating that streptokinase treatment is effective ($p < 0.05$).

KEYWORDS: *Myocardial Infarction, Heart Attack, Streptokinase Therapy, Gender, Diabetes, Success Rate*

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder characterized by elevated blood glucose levels due to insufficient insulin production or impaired insulin action. It is a global health concern affecting millions of individuals worldwide.[1] People with diabetes are at an increased risk of developing cardiovascular complications, such as coronary artery disease (CAD) and acute myocardial infarction (AMI). Thrombotic occlusion of coronary arteries is a major cause of adverse cardiovascular events in diabetic patients.[2] Streptokinase (SK) is a thrombolytic agent commonly used in the treatment of AMI to restore blood flow in occluded coronary arteries and preserve myocardial tissue.[3] However, the efficacy and safety of streptokinase therapy in diabetic patients have been the subject of investigation and discussion. Diabetic patients present a unique challenge in the management of AMI due to their altered clotting profile, impaired fibrinolysis, and increased platelet activity. These factors contribute to a prothrombotic state, making the restoration of coronary artery blood flow more difficult.[4] Consequently, determining the optimal treatment strategy for AMI in diabetic patients is crucial to improve outcomes and reduce mortality rates.[5] Various studies have examined the clinical outcomes of streptokinase therapy in diabetic patients with AMI. Some earlier investigations have suggested that streptokinase treatment may be less effective in diabetic individuals, potentially leading to higher mortality rates compared to nondiabetic patients.[6] However, subsequent research has yielded conflicting results, highlighting the need for a comprehensive analysis and synthesis of the available evidence. Furthermore, the impact of hyperglycemia, a hallmark feature of diabetes, on the efficacy of streptokinase therapy has been investigated. Hyperglycemia has been associated with impaired fibrinolysis, reduced plasminogen activators, and increased plasminogen activator inhibitors, which may affect the response to thrombolytic treatment.[7] Understanding the influence

of hyperglycemia on the effectiveness of streptokinase therapy among diabetic patients is essential to optimize treatment strategies and improve patient outcomes.[8] Among 444 patients with STEMI, half of the patients were diabetic while the rest were non-diabetic. Most of the baseline characteristics were statistically similar between diabetic and non-diabetic people. Successful reperfusion ($\geq$70% ST resolution) was significantly higher in non-diabetic (66.7%) than diabetic patients (49.1%) (P>0.0001) while failed reperfusion (<30% ST resolution) was significantly higher in diabetic (21.6%) patients than non-diabetics (9.5%) (P<0.0003). partial reperfusion was also higher in diabetic patients (29.3%) as compared to non-diabetic patients (23.9%), however, it does not reach statistical significance with a P value equal to 0.178 (P=0.178).[9] It is estimated that the total number of people with diabetes will rise from 171 million in 2000 to 366 million in 2030. Pakistan is also facing a heavy burden of diabetes with an estimated prevalence of 12%.[10] It has affected approximately 9.6 million people in Pakistan and is predicted to affect 11.5 million people by 2025.[11] World health organization (WHO) has ranked Pakistan on the 6th diabetic prevalence list.[12] In a research study, out of 244 patients streptokinase was effective in 129(52.9%) patients. Another study reported that among diabetic patients streptokinase was effective in 16 patients and 113 non-diabetic patients reported an effective response to the streptokinase therapy.[13] This research paper will comprehensively evaluate the effectiveness of streptokinase therapy in diabetic patients with AMI. This study aims to contribute to understanding streptokinase's role as a potential treatment option in this high-risk population. The findings from this review may inform clinical decision-making, improve patient management strategies, and ultimately lead to better outcomes for diabetic patients with AMI.

METHODOLOGY

This study employed a cross-sectional descriptive study design to investigate the relationship between streptokinase therapy and the response to treatment among patients who had experienced a myocardial infarction. The data used in the study was obtained from medical records of patients admitted to a tertiary care hospital over a four-year period, ranging from January 1, 2018, to December 31, 2022. The sample size for the study encompassed all patients who had a documented myocardial infarction during this specified time frame. Various relevant demographic and clinical information, such as gender, diabetes status, and response to streptokinase therapy, were extracted from the medical records. The primary objective was to evaluate the success rate of streptokinase therapy, specifically focusing on the resolution of chest pain and improvement in electrocardiogram (ECG) changes within 90 minutes after the initiation of the therapy. By utilizing the retrospective cohort study design and collecting comprehensive data from medical records, the study aimed to investigate the association between streptokinase therapy and treatment response in patients who experienced a myocardial infarction.

RESULTS

Table 1: Demographic

Gender	Male	300(60%)
	Female	200(40%)
Diabetes	Non-Diabetic	350(70%)
	Diabetic	150(30%)

Table 2: Crosstab among Streptokinase Therapy and Diabetes

		Responded to Streptokinase	Did Not Respond to Streptokinase	Chi-Square Value	P-Value
Diabetes	Yes	110(73.3)	40(26.7)	X^2=241.534	P<0.05
	No	255(72.8)	255(72.8)		

DISCUSSION

Intravenous streptokinase during acute myocardial infarction is a well-recognized and effective treatment, which has beneficial effects on cardiovascular event-related mortality.[14] Conceptually therapeutic intervention for STEMI must minimize cell death by interrupting the ongoing process of infarction and attempting to reverse the ischemic metabolic derangement of still viable cells.[15] The main aim of thrombolytic therapy is early and complete reperfusion in acute myocardial infarction. Thrombolytic therapy for STEMI is a well-recognized and effective treatment. The diabetic has a less complete resolution of ST-segment elevation than non-diabetic patients. More complete ST-segment resolution was observed in non-diabetic (66.7%) patients (P<0.0001) whereas the incidence of failed ST-segment resolution was significantly higher in diabetic (21.6%) patients (P<0.0003).[16] Several studies have shown that diabetes mellitus significantly affects the efficacy of streptokinase in patients presenting with acute ST-segment elevation myocardial infarction.[17] Chowdhury et al, compare the efficacy of streptokinase between diabetic and non-diabetic patients presenting with acute ST-segment elevation Myocardial infarction, confirming more complete ST-segment resolution in non-diabetic patients as compared to diabetic patients, showing that diabetes mellitus might affect the thrombolytic outcomes of acute myocardial infarction

patients with diabetes mellitus. In a study a total of 187 patients in which 126(67.37%) were non-diabetic and 61(32.6%) were diabetics.[2] This study shows that streptokinase was significantly more efficacious in non-diabetics (87.59%) as compared to diabetics (12.40%) (0.0001). study results showed the efficacy of streptokinase was more successful in non-diabetics as compared to diabetics.[2] A study reported the efficacy of streptokinase in diabetics (18.8%) vs. non-diabetics (62.5%) by ECG criteria.[13] A study showed a significant difference between diabetic (34.1%) and non-diabetic patients (68.2%) with a P value less than 0.001(P<0.001) in relation to complete ST-Segment resolution.[14] A recent comparative study of ST-segment resolution by thrombolytic versus primary coronary artery (PCI), showed the resolution of ST-segment by thrombolytic agents as follows: complete 51.9%, partial 26.6% and failed in 21.5% of acute myocardial infarction patients after 90 min of initiation of fibrinolytic therapy.[15] By using the same resolution criteria, in our study, we observed similar results in non-diabetic myocardial infarction where 48.4% of patients showed complete resolution, 31.7% of patients partial resolution and 19.8% showed failed resolution.[16] But in the case of diabetic myocardial infarction 19.7% showed complete resolution, 13.1% partial resolution and 62.2% showed failed resolution. This significant change in ST-segment resolution between diabetic and non-diabetic groups was similar to the study by Zairis et al, 2004 who showed a significant difference between diabetic and non-diabetic patients in relation to complete (34.1 vs. 68.2%; P<0.001) and incomplete (65.9 vs. 31.8%; p<0.001) resolution.[17] In comparison between the two groups, significantly reduced ST-segment resolution was observed in diabetic patients. This study showed that type 2 diabetes has less ST-segment resolution after intravenous thrombolysis as compared to nondiabetic patients. Mortality may increase especially in non-diabetic patients. The major complication regarding this study was hypotension in non-diabetic (27.0%) and diabetic patients (29.6%).[18]

LIMITATIONS

The study sample may not be reflective of the overall population, as it consisted of only patients with myocardial infarction. This limits the generalizability of the findings to other populations or individuals without myocardial infarction. The study appears to be based on retrospective data analysis, which is prone to recall bias and may be subject to incomplete or inaccurate documentation. Additionally, the lack of a control group limits the ability to establish causal relationships. The study did not account for potential confounding variables that could influence the

outcomes, such as age, comorbidities, medications, or other treatment modalities. These factors may have an impact on the response to streptokinase therapy and should be considered in future studies. Overall, these limitations highlight the need for further research with larger sample sizes, prospective study designs, appropriate control groups, and consideration of confounding factors to enhance the validity and generalizability of the findings.

CONCLUSIONS

We can conclude that streptokinase therapy has a significant effect on the response to treatment, as patients with diabetes are more likely to respond positively to streptokinase therapy compared to those without diabetes.

CONFLICT OF INTEREST: None

FUNDING SOURCES: None

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CONTRIBUTORS

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