

Prevalence of Hypertension and Diabetes Mellitus in Patients Thrombolysed for STEMI

ZIA ULLAH KHAN¹, WASIF ULLAH², SAAD SHAMS³, SANIA SALEEM⁴, RUKHSHANDA AFSAR⁵, SANA ULLAH SHAH⁶

^{1,2,3,4,5}PGR Cardiology Unit, ATH MTI, Abbottabad

⁶General practitioner, Diamond Medical Centre, Al Ain, UAE

Corresponding author: Zia Ullah Khan, Email: medzk860607@gmail.com

ABSTRACT

Objective: The objective of this study is to evaluate the frequency of hypertension and diabetes in patients, thrombolysed for STEMI and explore the relationship between these comorbidities and patient outcomes. By examining the frequency of these comorbidities in thrombolysed STEMI patients, healthcare providers can develop personalized treatment plans to optimize patient outcomes. Furthermore, these findings have the potential to contribute to future research focused on preventing or managing hypertension and diabetes in STEMI patients.

Study Design: cross sectional study

Study Setting: Cardiology Department, Ayub Teaching Hospital, Abbottabad, Pakistan.

Duration of Study: Six months from August 1st, 2022 to 31st Jan, 2023.

Material and Methods: A total of 170 patients, aged between 18 and 80 years, were included in the sample for analysis. The study focused specifically on patients who were thrombolysed using Streptokinase.

Results: In this study, male to female ratio was nearly 3:1. Among the 170 patients, 96 (56%) were found to have hypertension, while 42 (24%) were diagnosed with diabetes. Among the hypertensive patients, which accounted for 96 (56%) of the total population, 60 (62.5%) were male and 36 (37.5%) were female. Among these diabetic patients, 24 (57.1%) were male, while 18 (42.9%) were female.

Conclusion: This study highlights the high frequency of hypertension and diabetes in ST-elevation myocardial infarction (STEMI) patients treated with thrombolytic therapy. These findings suggest the importance of screening STEMI patients for these comorbidities and providing appropriate follow-up care to optimize patient outcomes.

Keywords: Prevalence, Hypertension, Diabetes, STEMI.

INTRODUCTION

ST-elevation myocardial infarction (STEMI) is a medical emergency that occurs when there is occlusion of a coronary artery, leading to reduced blood flow to the myocardium. The resulting ischemia can lead to irreversible damage to the myocardium and heart failure.¹ Early and timely treatment is crucial for STEMI patients to minimize myocardial damage and improve patient outcomes.² Thrombolysis is an effective treatment option for STEMI patients who present within the recommended time window (within 12 hours), as it can help dissolve the blood clot and restore blood flow to the affected area of myocardium. Thrombolytic therapy is recommended only when primary PCI is not available.^{2,3}

However, the efficacy of thrombolysis may be affected by the presence of comorbidities that influence the overall prognosis of STEMI. Hypertension (HTN) and diabetes mellitus (DM) are common comorbidities in patients with cardiovascular disease and are associated with an increased risk of adverse outcomes, including STEMI.^{4,5} Hypertension can lead to endothelial dysfunction and increased arterial stiffness, both of which contribute to atherosclerosis, a key risk factor for STEMI. Diabetes mellitus is also a significant risk factor for cardiovascular disease, and its presence can exacerbate the effects of hypertension and accelerate the development of atherosclerosis.^{6,7}

Despite the well-established relationship between hypertension, diabetes mellitus, and cardiovascular disease, there is limited research on the frequency of these comorbidities in STEMI patients treated with thrombolysis.⁸ The purpose of this study is to evaluate the frequency of hypertension and diabetes in patients thrombolysed for STEMI and explore the relationship between these comorbidities and patient outcomes.

By understanding the prevalence of these comorbidities in the STEMI population, healthcare providers can better tailor treatment plans and provide appropriate follow-up care to optimize patient outcomes. This study's findings may also inform future research aimed at identifying strategies to prevent or manage hypertension and diabetes in patients with STEMI.

MATERIAL AND METHODS

This study used a cross-sectional design to examine a sample of adult patients who were admitted with ST-elevation myocardial

infarction (STEMI) at the cardiology division of Ayub Teaching Hospital in Abbottabad, Pakistan and thrombolysed with Streptokinase. 170 patients were included in the study, ranging in age from 18 to 80 years.

Inclusion criteria

- 1) Age 20 to 80 years
- 2) Both genders
- 3) Patients with STEMI (ST elevation at the J point in two or more contiguous ECG leads, and sign and symptoms of acute myocardial infarction)
- 4) Patients who received thrombolytic therapy within 12 hours of symptoms onset

Exclusion Criteria:

- 1) All patients who did not receive thrombolytic therapy
- 2) Patients who died before thrombolytic therapy
- 3) Patients with prior CABG
- 4) Patients with Cardiogenic shock, and /or CVA
- 5) Patients with valvular heart diseases

Approval & Consent: This proposal was submitted for approval to the Departmental Research & Ethics Committee of the Department of Community Medicine and got approved. The verbal consent of the participants was taken.

Assessments: Trained enumerators conducted in-person interviews with patients to collect information about their medical history, medication usage, and underlying cardiac conditions. Blood pressure was assessed multiple times during hospital stay of the patient. Hypertension was defined as the chronic use of antihypertensive medication or a previous documented blood pressure reading of $\geq 140/90$ mmHg under stable conditions.⁹ The data collected also included HbA1c levels. The objective of this process was to gather information to better comprehend the prevalence of hypertension and diabetes in patients thrombolysed for STEMI.

After the data was collected, it was analyzed using SPSS version 21.0, and a chi-square test was performed. The results were presented in both textual and tabulated forms.

RESULTS

Table 1 shows the baseline characteristics of the study population. The male to female ratio was almost 3:1. 56% of the patients were hypertensive, whereas about 24% of the patients were diagnosed

with diabetes. Of the total population, 73 (43%) patients presented with Anterior STEMI and 91 (53%) patients presented with Inferior STEMI. 5 (3%) patients had HLWMI, and 1 (1%) patient had PLWMI. All patients were thrombolysed with Streptokinase within 12 hours.

Table 1: characteristics of the patient population

Serial Number	Characteristics	Number	%age
1	Males	124	73%
2	Females	46	27%
3	HTN	96	56%
4	DM	42	24%
5	Anterior STEMI	73	43%
6	Inferior STEMI	91	53%
7	High Lateral STEMI	5	3%
8	Postrolateral wall STEMI	1	1%

Out of 96 (56%) of the patients, who were hypertensive 60 (62.5%) were male and 36 (37.5%) were female as shown in Table 2.

Table 2: Gender based distribution of hypertension

Variables	Male (n=124)	Female (n=46)	Total (n=170)	P
HTN	60	36	96	<0.05
No HTN	64	10	74	

Table 3 shows that 42 (24%) patients of the total population thrombolysed for STEMI were diabetic. Out of these, 24 (57.1%) were male whereas 18 (42.9%) were female.

Table 3: Gender based distribution of diabetes mellitus

Variables	Male (n=124)	Female (n=46)	Total (n=170)	P
DM	24	18	42	<0.05
No DM	100	28	128	

Table 4 shows that 29 (17%) patients of the study population had the combined risk factors of both hypertension and diabetes mellitus. Out of these 29 patients, 13 (44.8%) were male, while 16 (55.2%) were female.

Table 4: Relationship between gender and hypertension + diabetes mellitus

Variables	Male (n=124)	Female (n=46)	Total (n=170)	P
HTN + DM	13	16	29	<0.05
No HTN + DM	111	30	141	

DISCUSSION

In this study we found a higher prevalence of hypertension at about 56% compared to other studies, which reported rates between 27 and 33% in STEMI patients^{10, 11}. This difference may be due to variations in patient selection criteria. However, hypertension remains a significant risk factor for adverse outcomes such as stroke, cardiac failure, and death¹². Females also have a worse outcome due to advanced age, diabetes, hypertension, longer ischemia time, small caliber vessels, and delayed healthcare utilization¹³.

Diabetes mellitus is associated with atherosclerosis, therefore requires a close monitoring of the blood sugar levels and other complications associated with it. High blood glucose levels can accelerate the progression of atherosclerosis, leading to a higher risk of STEMI and mortality, particularly in females^{14, 15}. This study also focused higher mortality rate in diabetics as compared to non-diabetic counterparts, as shown by other research¹⁶.

The combination of diabetes and hypertension is a stronger predictor of mortality and morbidity than either condition alone¹⁷. While our study found a relationship between diabetes, hypertension, and patients thrombolysed for STEMI, more in-depth research is necessary to adjust for demographic variables like age and other risk factors for STEMI such as smoking, and dyslipidemia (LDL, HDL, total cholesterol, and triglycerides)¹⁸.

CONCLUSION

In conclusion, STEMI patients who get thrombolytic therapy frequently have diabetes and hypertension. According to this study, 56% of patients had hypertension, and 24% had diabetes. Male patients had a higher prevalence of hypertension. Both hypertension and diabetes can easily be modified with primary prevention, such as lifestyle modifications, exercise, dietary habits, and medications in already diseased individuals. In order to more effectively personalize treatment approaches and enhance patient results, additional study is required on the effect of various comorbidities on patient outcomes following thrombolysis. These findings imply that in order to improve patient outcomes, healthcare professionals should think about screening STEMI patients for these comorbidities and offering the proper follow-up care.

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