Section: Cardiology

Original Research Article

CORONARY ANGIOGRAPHIC PROFILE IN PATIENTS WITH FAILED THROMBOLYSIS

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ABSTRACT

Background: The study aimed to analyses the coronary angiographic profiles of myocardial infarction patients who had failed thrombolysis and their comparison with successful thrombolysis cases. The objective is to Compare the demographics of patients who had successful and failed thrombolysis. To Compare angiographic lesion characteristics between patients who failed thrombolysis and those who successfully completed treatment. To Determine if an infarcted artery has a higher risk of effective or failed thrombolysis. To Determine the likelihood of no reflow after effective thrombolysis.

Materials and Methods: It was a single-centre, prospective observational study included 100 Patients Patients hospitalized to Government General Hospital I.C.C.U diagnosed with acute myocardial infarction, who received thrombolysis with Tenecteplase and are hemodynamically stable with normal renal parameters & could undergo coronary angiography, would be included in the study from 2022 to 2024.

Results: Failed thrombolysis was significantly more common in patients aged >60 years than in those <60 years (70.0% vs. 30.0%, p=0.001). Successful thrombolysis was more frequent in anterior wall myocardial infarction than inferior wall myocardial infarction (68.0% vs. 32.0%). Relief of chest pain within 2 hours was strongly associated with successful thrombolysis (78.0% vs. 22.0%, p<0.0001). Diabetes (52.0% vs. 48.0%, p=0.002) and smoking (70.0% vs. 30.0%, p<0.0001) were significantly associated with failed thrombolysis, while hypertension showed a higher failure rate without statistical significance (p=0.23).Failed thrombolysis was significantly associated with severe left ventricular dysfunction, with EF <35% occurring more frequently than EF >35% (p<0.0001). Among patients with successful thrombolysis, 79.6% experienced chest pain relief within 2 hours compared with 20.4% in the failed group (p<0.0001). Moderate LV dysfunction was observed predominantly in the failed thrombolysis group (96.7%), while severe LV dysfunction occurred only in failed cases. Mild LV dysfunction was more common following successful thrombolysis (p<0.0001). Early presentation was associated with better outcomes. Of patients presenting within 3 hours of symptom onset, 58.8% achieved successful thrombolysis, whereas only 26.7% of those presenting after 12 hours were successfully thrombolysed. Similarly, all patients with a reperfusion window <3 hours achieved successful thrombolysis, while most patients presenting after >6 hours experienced failed thrombolysis (p=0.012). Angiographically, Type A lesions were associated with successful thrombolysis (52%), whereas Type B/C lesions were predominantly associated with thrombolysis failure (50.7%, p<0.001). No-reflow phenomenon occurred only after failed thrombolysis (6%). TIMI 3 flow was significantly more common after successful thrombolysis, particularly in the left anterior descending artery. TIMI flow <3 was observed in 64.3% of failed cases compared with 35.7% of successful cases, showing a strong association with thrombolysis failure (p<0.0001).

Conclusion: Failed thrombolysis is strongly associated with delayed presentation, diabetes, smoking, reduced left ventricular function, and complex coronary lesions. Early thrombolysis significantly improves coronary reperfusion, TIMI flow, and ventricular function, emphasizing the importance of prompt treatment in AMI patients.
Keywords: Coronary angiography, Myocardial Infarction, Thrombolysis, LV dysfunction, TIMI3 flow.

INTRODUCTION

Coronary heart disease is defined as "impaired heart function due to inadequate blood flow to the heart compared to its need, caused by obstructive changes in the coronary circulation to the heart." Coronary artery disease has gradually developed in India, with urban areas having a two-fold higher prevalence (10%) than rural areas.[1]

Myocardial infarction is among the most common cardiovascular causes of death worldwide. Myocardial infarction occurs due to inadequate blood supply to the heart compared to its need, caused by obstructive changes in the coronary circulation to the heart". Early intervention with either thrombolytic therapy or primary angioplasty increases the likelihood of reperfusion of an obstructed coronary artery, reduces infarct size, and improves left ventricular function and survival.[2]

Thrombolysis is the first line of treatment for 30–70% of individuals with myocardial infarction worldwide.[3] Thrombolysis failed in 30-40% of patients in India.

Previously, the main treatment procedure was thrombolysis with fibrin non-specific agents; however, with more fibrin-specific agents, the infarct artery patency rate has improved compared to non-specific fibrin agents. The patency rate and T.I.M.I flow following thrombolysis are determined by the agent used, which can be fibrinspecific or non-specific, or by many parameters that predict the response to thrombolytics.

A sedentary lifestyle and physical inactivity have been linked to obesity and an increased risk of cardiovascular disease. The incidence of self-reported inactivity among adults declined from 1998 to 2016, with the most significant drop coming in the previous decade, from 40.1% to 26.9% between 2007 and 2016.[3,4] Although there has been a decrease in inactivity in recent years, < 23% of individuals reportmeeting the 2008 federal requirements for physical activity through leisure-time aerobic and muscle-strengthening activities

After controlling for other traditional risk factors and physical activity levels, a growing body of epidemiological research demonstrates that limiting inactive time is related with a lower risk of cardiovascular disease and mortality. According to a Nielsen survey from 2017, technology use is rapidly evolving, which has the potential to influence sedentary behavior. Although adult television and tablet use has fallen slightly in recent years, adult smartphone use surged by more than an hour per day between 2012 and 2017. Hypertension and its effects continue to be a serious public health issue, generating high mortality and morbidity worldwide.[5]

A considerable number of patients with acute myocardial infarction have some cardiac rhythm abnormalities, with roughly 25% experiencing cardiac conduction disturbance within 24 hours of infarction onset.

The majority of patients with myocardial infarction undergo thrombolysis as their first treatment. GISSI and ISIS-2 both confirmed that using streptokinase early on reduced mortality.[6] ISAM (intravenous streptokinase in Acute Myocardial Infarction study group) also demonstrates the usefulness of thrombolytic medicines in reducing mortality. The GUSTO-1 trial found that accelerated t-PA had a 30-day mortality rate of 6.3%, compared to 7.4% for streptokinase with intravenous heparin.[7] Because of the cost of tPA, Reteplase, Alteplase, and Urokinase. Streptokinase has become the sheet anchor for thrombolytic therapy at the government hospital. Thrombolytic therapy has transformed the treatment of acute myocardial infarction. The GUSTO angiographic sub-study demonstrated a success rate of 54% at 90 minutes with IV streptokinase and heparin.

The primary percutaneous intervention remains the current therapeutic paradigm for acute MI. Primary PCI in STEMI has been established to be the gold standard of treatment in terms of patency rate, grade of thrombolysis in myocardial infarction (TIMI) flow, and long-term reperfusion. Thrombolysis with intravenous fibrinolytic therapy is an important reperfusion technique, particularly when primary PCI is not an option for STEMI patients, with a time-dependent reduction in death and morbidity rates within 12 hours of symptom onset if delivered promptly. Time delay is more critical in fibrinolytic therapy than in PCI because fibrinolytics become less efficacious as coronary thrombi mature. ST-elevation resolution of more than 50% when assessing the lead with the strongest evidence of myocardial injury predicts coronary artery patency following thrombolytic treatment for acute myocardial infarction. Failed reperfusion following fibrinolytic therapy for STEMI is common and indicates worse short- and long-term results compared to patients who received successful thrombolysis.

Fibrinolysis has been found to increase long-term survival. Similarly, every 30-minute delay from symptom start to percutaneous intervention raises the relative risk of oneyear mortality by 8%. It has

been observed that thrombolytic therapy has failed in some of cases. There is huge scope to improve thrombolysis success rates by identifying the elements which cause thrombolysis failure. The ultimate goal of reperfusion in acute MI is tissue perfusion, whether via primary coronary intervention or fibrinolytic treatment. There is evidence that infarct-related arteries play an important role in determining whether reperfusion is achieved with fibrinolytic or PCI therapy. In India, thrombolysis is still the primary treatment as compared to percutaneous transluminal coronary angioplasty (PTCA), and the prognosis is dismal. In light of this, we conducted a research to compare & differentiate the coronary angiographic profiles of individuals who underwent successful & failed thrombolysis.

Aims & Objectives

Aim:

The study aimed to analyses the coronary angiographic profiles of myocardial infarction patients who had failed thrombolysis and their comparison with successful thrombolysis cases.

Objectives:

- To Compare the demographics of patients who had successful and failed thrombolysis.
- To Compare angiographic lesion characteristics between patients who failed thrombolysis and those who successfully completed treatment.
- To Determine if an infarcted artery has a higher risk of effective or failed thrombolysis.
- To Determine the likelihood of no reflow after effective thrombolysis.

MATERIALS AND METHODS

Type of study: It was a single-centre, prospective observational study.

Source of data: Patients hospitalized to GGH Kurnool with ECG evidence of acute myocardial infarction & meeting the criteria for thrombolysis were included in the study from 2022 to 2024.

Study duration: July 2022 to August 2024.

Sample Size: Total 100 samples, in which;

Acute myocardial infarction with successful Thrombolysis (n=50)

Acute myocardial infarction with failed Thrombolysis (n=50)

Method of collection of data: The data is collected from subjects fulfilling inclusion & exclusion criteria & admitted as in patients in GGH, Kurnool.

Inclusion criteria:

Patients hospitalized to Government General Hospital I.C.C.U diagnosed with acute myocardial infarction, who received thrombolysis with Tenecteplase and are hemodynamically stable with normal renal parameters & could undergo coronary angiography, would be included in the study.

Exclusion criteria:

1. Patients with contraindications for thrombolysis, including those with advanced myocardial infarction.
2. Patients have a history of myocardial infarction & left bundle branch block.
3. Patients with chronic renal disease, who cannot get a coronary angiography.
4. Patients who underwent thrombolysis using medicines other than Tenecteplase.

Tests that were done:

1. ECG
2. 2D Echo
3. HEMOGRAM
4. RBS
5. SERUM CREATININE
6. Troponin

Coronary Angiogram: Coronary angiography was performed on patients hospitalized with acute myocardial infarction who had undergone Tenecteplase thrombolysis, were hemodynamically stable, & had normal renal parameters.

Patients with acute MI who received a single fixed dose of Tenecteplase were considered. These 100 patients were divided into two groups: those who had successful thrombolysis & those who had failed it.

Patients with acute myocardial infarction diagnosed by electrocardiographic criteria &thrombolysed with a single weight-based bolus dose of Tenecteplase were examined.

Patients were classed as effective thrombolysis if they had more than 50% S.T. segment resolution 90 minutes after thrombolysis in the lead with the highest S.T. level. Patients were classed as failed thrombolysis if the S.T. segment did not show more than 50% resolution in the lead with the maximal S.T. elevation obtained 90 minutes after the start of the thrombolysis & ongoing chest pain. All patients received echocardiography using a PHILIPS IE33 machine. The modified Simpsons approach was used to assess left ventricular (LV) function. Patients with good LV function had an Ejection Fraction > 50%, while those with LV dysfunction were classified as mild, moderate, or severe based on their Ejection Fraction (> 40%, 40% to 30%, &< 30%).

The coronary angiography was performed within 48 to 72 hours of hospital admission. The vast majority of patients received radial coronary angiography. The best angiographic views were taken. Patients were identified with severe CAD if their stenosis was more than 50% of the normal vessel luminal diameter.

Patients in the study were classified into single vessel, double vessel, & triple vessel disorders based on the number of coronary arteries implicated.

The institutional ethical committee approved the study protocol, & all the studyparticipants of their legal relatives provided the signed informed consent.

Statistical Analysis: Data was entered into Microsoft Excel &analyzed using statistical software SPSS version 25 (IBM Corp., Armonk, NY, USA). Continuous variables were given as mean & standard deviation. Categorical variables were expressed as frequencies & percentages. A

difference in outcome variables between groups was judged statistically significant if P < 0.05. The Fischer exact test, chi-square test, t-test, & logistic regression were all performed to assess the relationship between variables. Parametric variables were compared between the two groups using the independentsample test. Logistic regression analysis was utilized to identify predictors of failure thrombolysis.

RESULTS

Table 1: Association between Age Group & Thrombolysis

			Thrombolysis		Total	Pearson ChiSquare
			Successful Thrombolysis	Failed Thrombolysis		
Age Group	41-50 Years	Count	8	5	13	ChiSquare =14.882; p=0.001
		% within Age Group	61.5%	38.5%	100.0%	
		% within Thrombolysis	16.0%	10.0%	13.0%	
	51-60 Years	Count	26	10	36	
		% within Age Group	72.2%	27.8%	100.0%	
		% within Thrombolysis	52.0%	20.0%	36.0%	
	> 60 Years	Count	16	35	51	
		% within Age Group	31.4%	68.6%	100.0%	
		% within Thrombolysis	32.0%	70.0%	51.0%	
Total		Count	50	50	100	
		% within Age Group	50.0%	50.0%	100.0%	
		% within Thrombolysis	100.0%	100.0%	100.0%	

Table 2: Association between SEX & Thrombolysis

			Thrombolysis		Total	Pearson ChiSquare
			Successful Thrombolysis	Failed Thrombolysis		
SEX	Female	Count	13	22	35	Chi-Square=3.56; p=0.059
		% within SEX	37.1%	62.9%	100.0%	
		% within Thrombolysis	26.0%	44.0%	35.0%	
	Male	Count	37	28	65	
		% within SEX	56.9%	43.1%	100.0%	
		% within Thrombolysis	74.0%	56.0%	65.0%	
Total		Count	50	50	100	
		% within SEX	50.0%	50.0%	100.0%	
		% within Thrombolysis	100.0%	100.0%	100.0%	

Table 3: Association between anterior wall MI with Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
AWMI	No	Count	16	16	32
		% within AWMI	50.0%	50.0%	100.0%
		% within Thrombolysis	32.0%	32.0%	32.0%
	Yes	Count	34	34	68
		% within AWMI	50.0%	50.0%	100.0%
		% within Thrombolysis	68.0%	68.0%	68.0%
Total		Count	50	50	100
		% within AWMI	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Table 4: Association between inferior wall MI with Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
IWMI	No	Count	34	34	68
		% within IWMI	50.0%	50.0%	100.0%
		% within Thrombolysis	68.0%	68.0%	68.0%
	Yes	Count	16	16	32
		% within IWMI	50.0%	50.0%	100.0%
		% within Thrombolysis	32.0%	32.0%	32.0%

Table 5: Association between Time to Thrombolysis & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
Time to	< 3hrs of Onset	Count	10	7	17

Thrombolysis	of Chest Pain	% within Time to Thrombolysis	58.8%	41.2%	100.0%
		% within Thrombolysis	20.0%	14.0%	17.0%
	3-12 hrs of Onset of Chest Pain	Count	36	32	68
		% within Time to Thrombolysis	52.9%	47.1%	100.0%
		% within Thrombolysis	72.0%	64.0%	68.0%
	> 12 hrs of Onset of Chest Pain	Count	4	11	15
		% within Time to Thrombolysis	26.7%	73.3%	100.0%
		% within Thrombolysis	8.0%	22.0%	15.0%

Table 6: Association between Chest Pain Relief & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
Chest Pain Relief	Yes	Count	39	10	49
		% within Chest Pain Relief	79.6%	20.4%	100.0%
		% within Thrombolysis	78.0%	20.0%	49.0%
	No	Count	11	40	51
		% within Chest Pain Relief	21.6%	78.4%	100.0%
		% within Thrombolysis	22.0%	80.0%	51.0%
Total		Count	50	50	100
		% within Chest Pain Relief	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Table 7: Association between DM & Thrombolysis

			Thrombolysis		Total	Pearson ChiSquare
			Successful Thrombolysis	Failed Thrombolysis		
DM	No	Count	39	24	63	Chi-Square= 9.653; P=0.002
		% within DM	61.9%	38.1%	100.0%	
		% within Thrombolysis	78.0%	48.0%	63.0%	
	Yes	Count	11	26	37	
		% within DM	29.7%	70.3%	100.0%	
		% within Thrombolysis	22.0%	52.0%	37.0%	
Total		Count	50	50	100	
		% within DM	50.0%	50.0%	100.0%	
		% within Thrombolysis	100.0%	100.0%	100.0%	

Table 8: Association between hypertension & Thrombolysis

			Thrombolysis		Total	Pearson Chi-Square
			Successful Thrombolysis	Failed Thrombolysis		
HT	No	Count	28	22	50	Chi-Square=1.440, p=0.230
		% within HT	56.0%	44.0%	100.0%	
		% within Thrombolysis	56.0%	44.0%	50.0%	
	Yes	Count	22	28	50	
		% within HT	44.0%	56.0%	100.0%	
		% within Thrombolysis	44.0%	56.0%	50.0%	

Table 9: Association between smoking && Thrombolysis

			Thrombolysis		Total	Pearson ChiSquare
			Successful Thrombolysis	Failed Thrombolysis		
SMOKER	No	Count	38	15	53	ChiSquare =21.236a P<0.0001
		% within SMOKER	71.7%	28.3%	100.0%	
		% within Thrombolysis	76.0%	30.0%	53.0%	
	Yes	Count	12	35	47	
		% within SMOKER	25.5%	74.5%	100.0%	
		% within Thrombolysis	24.0%	70.0%	47.0%	

Table 10: Association between alcoholism & Thrombolysis

			Thrombolysis		Total	Pearson ChiSquare
			Successful Thrombolysis	Failed Thrombolysis		
ALCOHOL	No	Count	41	43	84	Chi-Square=0.298; p=0.585
		% within ALCOHOL	48.8%	51.2%	100.0%	
		% within Thrombolysis	82.0%	86.0%	84.0%	
	Yes	Count	9	7	16	
		% within ALCOHOL	56.3%	43.8%	100.0%	
		% within Thrombolysis	18.0%	14.0%	16.0%	

Table 11: Association between EF & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
EF	> 55%	Count	30	1	31
		% within EF	96.8%	3.2%	100.0%
		% within Thrombolysis	60.0%	2.0%	31.0%
	45% - 54%	Count	19	18	37
		% within EF	51.4%	48.6%	100.0%
		% within Thrombolysis	38.0%	36.0%	37.0%
	35% - 44%	Count	1	29	30
		% within EF	3.3%	96.7%	100.0%
		% within Thrombolysis	2.0%	58.0%	30.0%
	< 35%	Count	0	2	2
		% within EF	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	4.0%	2.0%
	Total	Count	50	50	100
		% within EF	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Table 12: Association between Type of Vessel & Thrombolysis

			Thrombolysis		Total	
			Successful Thrombolysis	Failed Thrombolysis		Pearson Chi-Square
Type of Vessel	DVD	Count	7	17	24	Chi-Square =18.555; p<0.0001
		% within Type of Vessel	29.2%	70.8%	100.0 %	
		% within Thrombolysis	14.0%	34.0%	24.0 %	
	SVD	Count	43	24	67	
		% within Type of Vessel	64.2%	35.8%	100.0 %	
		% within Thrombolysis	86.0%	48.0%	67.0 %	
	TVD	Count	0	9	9	
		% within Type of Vessel	0.0%	100.0%	100.0 %	
		% within Thrombolysis	0.0%	18.0%	9.0%	

Table 13: Association between TIMI Score & Thrombolysis

			Thrombolysis		Total	
			Successful Thrombolysis	Failed Thrombolysis		Pearson ChiSquare
TIMI Score	3	Count	29	15	44	ChiSquare=
		% within TIMI Score	65.9%	34.1%	100.0%	
		% within Thrombolysis	58.0%	30.0%	44.0%	
	4	Count	21	9	30	
		% within TIMI Score	70.0%	30.0%	100.0%	

Table 14: Association between TOTAL Occlusion & Thrombolysis

			Thrombolysis		Total	Pearson Chi-Square
			Successful Thrombolysis	Failed Thrombolysis		
TOTAL Occlusion	No	Count	50	43	93	Chi-Square=7.527;p=0.006
		% within TOTAL Occlusion	53.8%	46.2%	100.0%	
		% within Thrombolysis	100.0%	86.0%	93.0%	
	Yes	Count	0	7	7	
		% within TOTAL Occlusion	0.0%	100.0%	100.0%	
		% within Thrombolysis	0.0%	14.0%	7.0%	

Table 15: Association between Type of lesion & Successful Thrombolysis/Failed Thrombolysis

Type A lesion	Successful Thrombolysis		Failed Thrombolysis		Total
	n	%	n	%	
Yes	13	52	12	48	25
no	37	49.33	38	50.66	75
	Type B lesion				
Yes	36	53.73	31	46.26	67
no	14	42.42	19	57.57	33

Table 16: Association between LAD Type A & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
LAD Type A	No	Count	45	42	87
		% within LAD Type A	51.7%	48.3%	100.0%
		% within Thrombolysis	90.0%	84.0%	87.0%
	Yes	Count	5	8	13

		% within LAD Type A	38.5%	61.5%	100.0%
		% within Thrombolysis	10.0%	16.0%	13.0%
LAD Type B	No	Count	25	23	48
		% within LAD Type B	52.1%	47.9%	100.0%
		% within Thrombolysis	50.0%	46.0%	48.0%
	Yes	Count	25	27	52
		% within LAD Type B	48.1%	51.9%	100.0%
		% within Thrombolysis	50.0%	54.0%	52.0%
LAD Type C	No	Count	50	44	94
		% within LAD Type C	53.2%	46.8%	100.0%
		% within Thrombolysis	100.0%	88.0%	94.0%
	Yes	Count	0	6	6
		% within LAD Type C	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	12.0%	6.0%
RCA Type A	No	Count	42	45	87
		% within RCA Type A	48.3%	51.7%	100.0%
		% within Thrombolysis	84.0%	90.0%	87.0%
	Yes	Count	8	5	13
		% within RCA Type A	61.5%	38.5%	100.0%
		% within Thrombolysis	16.0%	10.0%	13.0%
RCA Type B	No	Count	42	43	85
		% within RCA Type B	49.4%	50.6%	100.0%
		% within Thrombolysis	84.0%	86.0%	85.0%
	Yes	Count	8	7	15
		% within RCA Type B	53.3%	46.7%	100.0%
		% within Thrombolysis	16.0%	14.0%	15.0%
RCA Type C	No	Count	49	41	90
		% within RCA Type C	54.4%	45.6%	100.0%
		% within Thrombolysis	98.0%	82.0%	90.0%
	Yes	Count	1	9	10
		% within RCA Type C	10.0%	90.0%	100.0%
		% within Thrombolysis	2.0%	18.0%	10.0%
LCX Type A	No	Count	50	44	94
		% within LCX Type A	53.2%	46.8%	100.0%
		% within Thrombolysis	100.0%	88.0%	94.0%
	Yes	Count	0	6	6
		% within LCX Type A	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	12.0%	6.0%
LCX Type B	No	Count	40	40	80
		% within LCX Type B	50.0%	50.0%	100.0%
		% within Thrombolysis	80.0%	80.0%	80.0%
	Yes	Count	10	10	20
		% within LCX Type B	50.0%	50.0%	100.0%
		% within Thrombolysis	20.0%	20.0%	20.0%
LCX Type C	No	Count	50	47	97
		% within LCX Type C	51.5%	48.5%	100.0%
		% within Thrombolysis	100.0%	94.0%	97.0%
	Yes	Count	0	3	3
		% within LCX Type C	0.0%	100.0%	
		TypeC lesion			
Yes	1	12.5	7	87.5	8
no	49	53.26	43	46.73	92
		TypeC lesion			
Yes	1	12.5	7	87.5	8
no	49	53.26	43	46.73	92
		TypeC lesion			
Yes	1	12.5	7	87.5	8

Table 17: Association between LAD Type A & Thrombolysis

			Thrombolysis		Total	Pearson Chi-Square
			Successful Thrombolysis	Failed Thrombolysis		
LAD Type A	No	Count	45	42	87	Chi-Square=0.796;p=0.37 2
		% within LAD Type A	51.7%	48.3%	100.0 %	
		% within Thrombolysis	90.0%	84.0%	87.0%	
	Ye s	Count	5	8	13	
		% within LAD Type A	38.5%	61.5%	100.0 %	
		% within Thrombolysis	10.0%	16.0%	13.0%	
Total		Count	50	50	100	
		% within LAD Type A	50.0%	50.0%	100.0 %	
		% within Thrombolysis	100.0%	100.0%	100.0 %	

Table 18: Association between LAD Type B & Thrombolysis

			Thrombolysis		Total	
			Successful Thrombolysis	Failed Thrombolysis		
LAD Type B	No	Count	25	23	48	Chi-Square=0.160; p=0.689
		% within LAD Type B	52.1%	47.9%	100.0%	
		% within Thrombolysis	50.0%	46.0%	48.0%	
	Yes	Count	25	27	52	
		% within LAD Type B	48.1%	51.9%	100.0%	
		% within Thrombolysis	50.0%	54.0%	52.0%	
Total		Count	50	50	100	
		% within LAD Type B	50.0%	50.0%	100.0%	
		% within Thrombolysis	100.0%	100.0%	100.0%	

Table 19: Association between LAD Type C & Thrombolysis

			Thrombolysis		Total	Pearson ChiSquare 6.383
			Successful Thrombolysis	Failed Thrombolysis		
LAD Type C	No	Count	50	44	94	Chi-Square=6.383; p=0.012
		% within LAD Type C	53.2%	46.8%	100.0%	
		% within Thrombolysis	100.0%	88.0%	94.0%	
	Yes	Count	0	6	6	
		% within LAD Type C	0.0%	100.0%	100.0%	
		% within Thrombolysis	0.0%	12.0%	6.0%	

Table 20: Association between RCA Type A & Thrombolysis

			Thrombolysis		Total	
			Successful Thrombolysis	Failed Thrombolysis		Pearson ChiSquare
RCA Type A	No	Count	42	45	87	Chi-Square=.796; p=0.372
		% within RCA Type A	48.3%	51.7%	100.0%	
		% within Thrombolysis	84.0%	90.0%	87.0%	
	Yes	Count	8	5	13	
		% within RCA Type A	61.5%	38.5%	100.0%	
		% within Thrombolysis	16.0%	10.0%	13.0%	
Total		Count	50	50	100	
		% within RCA Type A	50.0%	50.0%	100.0%	
		% within Thrombolysis	100.0%	100.0%	100.0%	

Table 21: Association between RCA Type B & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
RCA Type B	No	Count	42	43	85
		% within RCA Type B	49.4%	50.6%	100.0%
		% within Thrombolysis	84.0%	86.0%	85.0%
	Yes	Count	8	7	15
		% within RCA Type B	53.3%	46.7%	100.0%
		% within Thrombolysis	16.0%	14.0%	15.0%
Total		Count	50	50	100
		% within RCA Type B	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Table 22: Association between RCA Type C & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
RCA Type C	No	Count	49	41	90
		% within RCA Type C	54.4%	45.6%	100.0%
		% within Thrombolysis	98.0%	82.0%	90.0%
	Yes	Count	1	9	10
		% within RCA Type C	10.0%	90.0%	100.0%
		% within Thrombolysis	2.0%	18.0%	10.0%
Total		Count	50	50	100
		% within RCA Type C	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Table 23: Association between LCX Type A & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
LCX Type A	No	Count	50	44	94

		% within LCX Type A	53.2%	46.8%	100.0%
		% within Thrombolysis	100.0%	88.0%	94.0%
	Yes	Count	0	6	6
		% within LCX Type A	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	12.0%	6.0%
Total		Count	50	50	100
		% within LCX Type A	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Pearson Chi-Square = 6.383; p = 0.012

Table 24: Association between LCX Type B & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
LCX Type B	No	Count	40	40	80
		% within LCX Type B	50.0%	50.0%	100.0%
		% within Thrombolysis	80.0%	80.0%	80.0%
	Yes	Count	10	10	20
		% within LCX Type B	50.0%	50.0%	100.0%
		% within Thrombolysis	20.0%	20.0%	20.0%
Total		Count	50	50	100
		% within LCX Type B	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Table 25: Association between LCX Type C & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
LCX Type C	No	Count	50	47	97
		% within LCX Type C	51.5%	48.5%	100.0%
		% within Thrombolysis	100.0%	94.0%	97.0%
	Yes	Count	0	3	3
		% within LCX Type C	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	6.0%	3.0%
Total		Count	50	50	100
		% within LCX Type C	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Pearson Chi-Square = 3.093; p = 0.079

Table 26: Association between TIMI Flow 1 & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
TIMI Flow_1	TL0	Count	1	1	2
		% within TIMI Flow_1	50.0%	50.0%	100.0%
		% within Thrombolysis	2.0%	2.0%	2.0%
	TL0 TR1	Count	0	2	2
		% within TIMI Flow_1	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	4.0%	2.0%
	TL0,TR2,TX2	Count	0	4	4
		% within TIMI Flow_1	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	8.0%	4.0%
	TL1	Count	2	6	8
		% within TIMI Flow_1	25.0%	75.0%	100.0%
		% within Thrombolysis	4.0%	12.0%	8.0%
	TL1 TR2	Count	0	4	4
		% within TIMI Flow_1	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	8.0%	4.0%
	TL2	Count	22	14	36
		% within TIMI Flow_1	61.1%	38.9%	100.0%
		% within Thrombolysis	44.0%	28.0%	36.0%
	TL2 ,TR2,TX0	Count	0	2	2
		% within TIMI Flow_1	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	4.0%	2.0%
	TL2 TR2 TX2	Count	0	3	3
		% within TIMI Flow_1	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	6.0%	3.0%
	TL2 TX2	Count	2	5	7
		% within TIMI Flow_1	28.6%	71.4%	100.0%

		% within Thrombolysis	4.0%	10.0%	7.0%
	TL2,TR2	Count	5	6	11
		% within TIMI Flow_1	45.5%	54.5%	100.0%
		% within Thrombolysis	10.0%	12.0%	11.0%
	TR1	Count	0	1	1
		% within TIMI Flow_1	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	2.0%	1.0%
	TR2	Count	12	2	14
		% within TIMI Flow_1	85.7%	14.3%	100.0%
		% within Thrombolysis	24.0%	4.0%	14.0%
	TX2	Count	6	0	6
		% within TIMI Flow_1	100.0%	0.0%	100.0%
		% within Thrombolysis	12.0%	0.0%	6.0%
Total		Count	50	50	100
		% within TIMI Flow_1	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	34.297[a]	12	.001
Likelihood Ratio	43.728	12	.000
N of Valid Cases	100		

a. 20 cells (76.9%) have expected count < 5. The minimum expected count is .50.

Table 27: Association between TL & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
TL	0	Count	1	7	8
		% within TL	12.5%	87.5%	100.0%
		% within Thrombolysis	2.0%	14.0%	8.0%
	1	Count	2	10	12
		% within TL	16.7%	83.3%	100.0%
		% within Thrombolysis	4.0%	20.0%	12.0%
	2	Count	29	30	59
		% within TL	49.2%	50.8%	100.0%
		% within Thrombolysis	58.0%	60.0%	59.0%
	3	Count	18	3	21
		% within TL	85.7%	14.3%	100.0%
		% within Thrombolysis	36.0%	6.0%	21.0%
Total		Count	50	50	100
		% within TL	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Table 28: Association between TR & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
TR	1	Count	0	3	3
		% within TR	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	6.0%	3.0%
	2	Count	17	21	38
		% within TR	44.7%	55.3%	100.0%
		% within Thrombolysis	34.0%	42.0%	38.0%
	3	Count	33	26	59
		% within TR	55.9%	44.1%	100.0%
		% within Thrombolysis	66.0%	52.0%	59.0%
Total		Count	50	50	100
		% within TR	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Pearson Chi-Square = 4.252; p = 0.119

Table 29: Association between TX & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
TX	0	Count	0	2	2
		% within TX	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	4.0%	2.0%
	2	Count	8	12	20
		% within TX	40.0%	60.0%	100.0%
		% within Thrombolysis	16.0%	24.0%	20.0%
	3	Count	42	36	78

		% within TX	53.8%	46.2%	100.0%
		% within Thrombolysis	84.0%	72.0%	78.0%
Total		Count	50	50	100
		% within TX	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Table 30: Association between Stenosis & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
Stenosis	Norm al	Count	47	27	74
		% within normal	63.52	36.48	100%
		% within Thrombolysis	94	54	74.0%
	<50	Count	3	23	26
		% within <50	11.5	88.46	100%
		% within Thrombolysis	6	46	26.0%
Tot	al	Count	50	50	100
		% within group	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Table 31: Association between ANGINA & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
ANGINA	No	Count	48	37	85
		% within ANGINA	56.5%	43.5%	100.0%
		% within Thrombolysis	96.0%	74.0%	85.0%
	Yes	Count	2	13	15
		% within ANGINA	13.3%	86.7%	100.0%
		% within Thrombolysis	4.0%	26.0%	15.0%
Total		Count	50	50	100
		% within ANGINA	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Pearson Chi-Square = 9.490; p = 0.002

Table 32: Association between TIMI Flow & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
TIMI Flow	0	Count	1	7	8
		% within TIMI Flow	12.5%	87.5%	100.0%
		% within Thrombolysis	2.0%	14.0%	8.0%
	1	Count	0	5	5
		% within TIMI Flow	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	10.0%	5.0%
	2	Count	28	36	64
		% within TIMI Flow	43.8%	56.3%	100.0%
		% within Thrombolysis	56.0%	72.0%	64.0%
	3	Count	21	2	23
		% within TIMI Flow	91.3%	8.7%	100.0%
		% within Thrombolysis	42.0%	4.0%	23.0%
Total		Count	50	50	100
		% within TIMI Flow	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Pearson Chi-Square = 26.196; p<0.0001

Table 33: Association between Window Period & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
Window Period	< 3 Hours	Count	8	0	8
		% within Window Period	100.0%	0.0%	100.0%
		% within Thrombolysis	16.0%	0.0%	8.0%
	3-6 Hours	Count	16	17	33
		% within Window Period	48.5%	51.5%	100.0%
		% within Thrombolysis	32.0%	34.0%	33.0%
	>= 6 Hours	Count	26	33	59
		% within Window Period	44.1%	55.9%	100.0%
		% within Thrombolysis	52.0%	66.0%	59.0%
Totall		Count	50	50	100

		% within Window Period	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Table 34: Association between KILLIP Class & Thrombolysis

			Thrombolysis		Total
			Successful Thrombolysis	Failed Thrombolysis	
KILLIP Class	I	Count	11	14	25
		% within KILLIP Class	44.0%	56.0%	100.0%
		% within Thrombolysis	22.0%	28.0%	25.0%
	II	Count	35	22	57
		% within KILLIP Class	61.4%	38.6%	100.0%
		% within Thrombolysis	70.0%	44.0%	57.0%
	III	Count	4	8	12
		% within KILLIP Class	33.3%	66.7%	100.0%
		% within Thrombolysis	8.0%	16.0%	12.0%
	IV	Count	0	6	6
		% within KILLIP Class	0.0%	100.0%	100.0%
		% within Thrombolysis	0.0%	12.0%	6.0%
Total		Count	50	50	100
		% within KILLIP Class	50.0%	50.0%	100.0%
		% within Thrombolysis	100.0%	100.0%	100.0%

Pearson Chi-Square = 10.65; p = 0.014

Table 35: Predictors of Failed Thrombolysis.

Variables	Odds ratio [95% CI]	p value
Diabetes	2.41 [1.35–4.24]	0.0032&
Dyslipidemia	2.65 [1.52–4.82]	0.04&
Hypertension	2.72 [0.91–7.55]	0.21
History of ACS	1.85 [0.95–6.59]	0.32
Family history	0.51 [0.09–2.45]	0.26
Smoking	1.12 [0.72–1.85]	0.79
Alcohol	0.89 [0.44–2.25]	0.9539
Timi	1.12 [0.98–1.55]	0.012
Window period	1.55 [1.25–1.98]	0.0002
Systolic blood pressure	1.05 [0.95- 1.15]	0.02

DISCUSSION

All patients in the study received Tenecteplase thrombolysis, with 50 patients in the successful thrombolysis group & 50 in the failed thrombolysis group.

Tenecteplase was administered to a total of 100 STEMI patients, & the two groups were compared based on demographics, underlying risk factors, hemodynamic characteristics, angiographic variables, & outcomes.

We observed that 50% of patients failed thrombolysis, which is consistent with Western findings.

All patients in the study group were grouped based on the age, sex, the region of MI, the time to lysis, the presence of diabetes mellitus, hypertension, whether the patient had a risk factor suchsmoking, Alcohol consumption, hypercholesterolemia, ejection fraction by echocardiography.

Angiographically, the factors considered in the study were the number of coronary arteries involved, the percentage of stenosis in the artery, the lesion characterization of the coronary artery, & whether the lesion was type A, B, or C.

All of the patients had a coronary angiography within a week of being admitted to the hospital for an AMI.

According to our findings, 50% of thrombolysis attempts were failed. In a study, statistical data on patients with failed lysis revealed that 40% had failed thrombolysis.[8]Richardson et al[9] study found that 44% of thrombolysis attempts failed. This variance was most likely caused by the baseline criteria used to diagnose failed thrombolysis, as well as the thrombolytic medication utilized.

Age: Patients presenting with MI were more likely to be older than 60 years old (51%). There was a significant difference in age-wise presentation variables between the failed & successful thrombolysis groups (p = 0.001).

Sex: 65% of the overall cases were male, whereas 35% were female. There were 37 male & 13 female patients in the successful thrombolysis group, as well as 28 male & 22 female participants in the failed thrombolysis group. There was no statistically significant difference between successful & failure thrombolysis based on sex variable (p=0.059).

Anterior wall & inferior wall distribution: An AWMI was present in 68% of the cases. Among the patients with A.W.M.I., 34 (68%) had successful thrombolysis, while 34 (68%) failed thrombolysis without statistical significance. Hence, A.W.M.I. did not predict whether thrombolysis would be successful or failed.[10]

Patients with inferior wall MI had 50% effective thrombolysis & 50% failure thrombolysis, with no statistically significant difference. I.W.M.I. showed no preference for successful or failure thrombolysis.

A study found that anterior wall MI was associated with less effective thrombolysis. The GISSI-2

experiment revealed that the higher the Killip class, the more failed thrombolysis.[11] Schomig et al study found that patients in cardiogenic shock (Killip class IV) had entire thrombotic blockage of the infarct-related artery as well as loss of 40% or more of the left ventricular myocardium, which is similar to our findings. This suggests that patients in cardiogenic shock make better candidates for PCI.

According to the presentation ECG, anterior wall MI was the most prevalent location of infarction, & the left anterior descending artery was the most common infarct-related artery.

Time to thrombolysis: In our study, 58.8% of patients who presented to the ICU within 3 hours after the onset of symptoms had successful thrombolysis, but only 26.7% of patients who presented after 12 hours of chest pain had successful thrombolysis.

Various series of STEMI in India have shown that more than 90% of patients present with characteristic chest pain, which is consistent with the current study.

The overall ischemia time (from symptom start to reperfusion therapy) is the most critical element in achieving optimal STEMI results.

The total time taken for patient lysis upon entrance to the ICU was separated into three sub-divisions: <3 hr, 3-12 hr, &>12 hrs. Patients who attended within 3 hours of experiencing chest pain, those who arrived between 3 & 12 hr, and those who arrived after 12 hr. Among 17 patients who arrived at the hospital within <3 hours after chest pain, 58.8% (n=10) had a successful thrombolysis, while 41.2% (n=7) had a failed one.

In the group of patients who came more than 12 hours after the onset of chest discomfort, roughly 73.3% (n=11) had failed thrombolysis, compared to 26.7% (n=4) who had successfully completed thrombolysis.

Patients presenting after 3 hr of symptom start were more typically seen with failed thrombolysis. When comparing patients who came between 3 & 12 hours after the onset of chest discomfort, 47.1% (n=32) had failed thrombolysis against 52.9% (n=36) who had effective thrombolysis.

In India, multiple registries have revealed tendencies toward late presentation (4-10.8h) for a variety of causes.[1] In a study by Saleem et al, 71.08% of patients received thrombolysis within 12 hrs of the beginning of chest discomfort, while 28.92% received thrombolytics after 12 hrs with only 72.88% experiencing complete clearance of ST elevation on ECG.

Window period: According to the study by Parvathareddy et al., 12 all 12 cases (100%) achieved effective thrombolysis within a window of < 3 hr. In 41 patients with a window duration of 3 - 6 hrs, 32 (78.04%) had successful thrombolysis & 9 cases (21.9%) had failed thrombolysis. Thrombolysis was successful in 6 (12.7%) of the 47 cases with a window time of > 6 hours, while 41 (87.2%) were failed. Cases with a shorter window duration had very high chances of effective thrombolysis (P - value < 0.001, statistically significant).

Relief of chest pain: The relief of chest discomfort after two hours of thrombolysis was investigated. 79.6% (n=39) of patients in the successful group reported relief of chest pain within 2 hours of thrombolysis, while 20.4% (n=10) of patients in the failed thrombolysis group reported relief of chest pain < 2 hours. The difference is statistically significant (p<0.0001).

The time to thrombolysis can also contribute to thrombolysis failure. Another group of patients who were thrombolyzed after 6 hrs of experiencing chest discomfort had a 70% failure rate with thrombolytics. It was also noted that for every 60 sec delay in the thrombolysis period from symptom onset, the failure to thrombolysis increased by 10%.

Comorbid conditions: Among 37 diabetic patients, 11 (29.7%) had successful thrombolysis, whereas 26 70.3%) had failed it. The failure rate of thrombolysis in diabetics was statistically significant as compared to non-diabetics (p=0.002). Diabetes is a more significant risk factor for failed thrombolysis than the hypertension risk factor.

In our study, 50 individuals had hypertension, of which 22 (44%) had successful thrombolysis & 28 (56%) had failed thrombolysis. The difference between two groups does not shows statistically significant (p=0.23).

Another prevalent link in heart disease is hypertension; Subindrawd et al found that 20% of patients in the failed thrombolysis group had hypertension, but 16% in the successful group, which was not statistically significant (38). In their study, 11 individuals in the failed lysis group had hypertension, accounting for approximately 39.3% of the failed lysis group, as opposed to 12.9% in the successful group. Thrombolysis was successful in 9 (56.3%) of the 16 alcoholic cases, while it failed in 7 (43.8%) (p=0.58).

2DECHO evaluation: All patients underwent ECHO evaluations & were classified as having normal LV function, mild, moderate, or severe LV dysfunction. There were 31 participants in the trial with normal LV function. In the successful thrombolysis group, 30 patients (96.8%) had good LV function, whereas only one patient (3.2%) in the failed thrombolysis group did so. One patient (3.3%) in the successful thrombolysis group exhibited moderate left ventricular dysfunction, compared to 29 patients (96.7%) in the failed thrombolysis group. None of the patients who received successful thrombolysis exhibited substantial LV dysfunction, but two patients (4%) in the failed thrombolysis group did.

In successful thrombolysis, 19 patients (51.4%) had mild LV dysfunction; in failed thrombolysis, 18 patients (48.6%) had mild LV dysfunction. Patients with failed thrombolysis had higher rates of LV dysfunction compared to those with successful thrombolysis (p<0.0001).

According to Parvathareddy et al,[12] 32% of patients in the successful thrombolysis group had good LV function, compared to only 8% in the failed thrombolysis group. Only 8% of patients in the successful thrombolysis group showed moderate LV dysfunction, compared to 40% of the failed thrombolysis group. No patients in the successful thrombolysis group had substantial LV dysfunction, but one patient in the failed thrombolysis group did. Mild left ventricular dysfunction was present in 60% of successful thrombolysis patients and 50% of failed thrombolysis patients. Patients who failed thrombolysis had a higher level of LV dysfunction than patients who were successful.

However, our study did not find a significant association between the two groups in terms of left ventricular ejection fraction.

Vessel involvement: Patients were classified as having single, double, or triple vessel disease based on the number of coronary arteries affected. The stenosis was considered substantial if the diameter stenosis was more than 50% in the study population. 67 patients had a single vascular disease, with 48.0% (n=24) failing thrombolysis & 86% (n=43) succeeding (p<0.0001). 48% of the patients in the failed thrombolysis group had SVD. The study described 24 cases of DVD, of which 70.8% (n=17) failed thrombolysis & 29.2% (n=7) succeeded. 34% of the patients in the failed thrombolysis group had DVD.

In our study, all nine patients (100%) with triple vessel disease were in the failed lysis group; none of the patients in the successful group had triple vascular disease. In the failed thrombolysis group, 18% of the patients experienced TVD. A total of 67 cases had single vessel illnesses, with 35.8% in the successful & 64.2% in the failure thrombolysis groups. Approximately 33 patients with multivessel disorders underwent thrombolysis, with 78.78% failing & 21.22% succeeding (p<0.0001).

According to a study by Parvathareddy et al, statistical data was interpreted as patients with multivessel diseases such as TVD and DVD and as those with single-vessel disease. A total of 50 patients had single-vessel disease, with 58% in the successful thrombolysis group and 42% in the failed group. 50% of patients had multivessel disease, with 42% in the successful thrombolysis group & 58% in the failed thrombolysis group (P = 0.1615).

Type of Lesions: Out of 25 patients with Type A lesions, 13 (52%) had effective thrombolysis & 12 (48%) did not, indicating a significant difference (P < 0.001). Out of 67 patients with Type B lesions, 36 (53.73%) underwent effective thrombolysis & 31 (46.26%) failed, indicating a statistically significant difference (P < 0.01). Out of 8 patients with Type C lesions, only one (12.5%) had effective thrombolysis, while 7 (87.5%) failed. This difference was statistically significant (P < 0.01).

A research by Parvathareddy et al [12] found that 44 patients with Type A lesions had 75.9% effective thrombolysis & 24% failed, with a statistically significant difference (P < 0.001).

Window period: All patients (n=8,100%) with window period < 3 hrs had successful thrombolysis & the majority patients with window period > 6 hrs had failed thrombolysis (n=33, 66.0%)
(P=0.012).

Hypercholesterolemia: Patients with successful thrombolysis had a mean total cholesterol of 149.44±31.468 mg/dl, while those with failed thrombolysis had a mean of 155.76±33.91 mg/dl. Hypercholesterolemia is a risk factor for coronary artery disease (CAD). Patients with successful thrombolysis had a mean HDL cholesterol level of 39.80±14.064mg/dl, while those with failed thrombolysis had a mean of 39.62±12.804mg/dl. Patients with successful thrombolysis had a mean TGL cholesterol level of 146.98±61.581mg/dl, while those with failed thrombolysis had a mean of 143.54±57.327mg/dl.

TIMI flow grading: 77 patients had TIMI flow values ranging from 0 to 2, with 48 patients (62.33%) failing thrombolysis & 29 (37.66%) succeeding.

64 patients had TIMI 2 flow, with 36 (56.3%) in the failed thrombolysis group & 28 (43.8%) in the successful thrombolysis group (P < 0.0001). Out of 23 patients with TIMI flow 3, 21 (91.3%) received effective thrombolysis & 2 patients (8.7%) had failed thrombolysis with a statistically significant p value < 0.0001.

The TIMI flow grading in each coronary artery is compared in successful and failed thrombolysis groups, as TIMI 3 flow vs. TIMI <3. In the study population for TIMI flow evaluation in the LAD region, a total of 23 patients had a TIMI 3 flow in the coronary artery, with 91.3% in the successful thrombolysis group compared to 8.7% in the failure group.

The TIMI flow grading in each coronary artery was compared in both successful and failed thrombolysis groups, with factors such as TIMI 3 flow and TIMI < 3 flow.

In our research population of TIMI flow evaluation in the LAD region, a total of 12 patients had TIMI 3 flow in the coronary artery, with 10 (83.83%) in the successful thrombolysis group compared to 2 (16.67%) in the failure group. There were 56 patients with <3 TIMI flow, with 36 patients having failed thrombolysis and 20 patients having successfully completed thrombolysis. Only 35.72% of successful patients had TIMI flow < 3 compared to 64.28% of failed thrombolysis patients, with a statistically significant correlation (p<0.0001).

While the TIMI flow in the right coronary artery was examined, there were 8 patients with a TIMI flow of 3 in the right coronary artery, with 100% (n=8) of them having successful lysis & 0% in the failed lysis group.

Among the 29 patients in the successful thrombolysis group, 8 (27.59%) had TIMI <3 flow,

while 21 (72.42%) in the failed lysis group had TIMI <3 flow, indicating a
statistically significant correlation.
TIMI 3 Flow following effective thrombolysis was statistically more significant in the left anterior descending artery than in the right coronary artery.

TIMI score: The calculated TIMI score of Failed Thrombolysis was high when compare to successful Thrombolysis group (4.88±1.710 vs 3.42±0.499, p<0.0001).

Killip class: There were 100% (n=6) patients with Killip class >IV, & 66.7% (n=8) of Killip class >III were predictors for failed thrombolysis (p=0.014).

Percentage stenosis: The study group was separated into patients with CAD (>50%) & without CAD (<50%). Of the total number of patients, 74 had normal coronary arteries. Among patients with CA <50% stenosis, 6% (3/50) had successful thrombolysis, while 46% (23/50) had failed thrombolysis. In the group with CA > 50% stenosis, 88.46% of patients failed thrombolysis, whereas 11.5% were successful, with a statistically significant correlation (p<0.0001).

Lesion characteristics: Among all patients in the successful lysis group, it was determined whether successful thrombolysis was more likely in the LAD, RCA, or LCX. Only 18% of the 15 LAD patients underwent effective thrombolysis. Failed thrombolysis of the left coronary artery was more common, affecting 74% of patients.

No reflow phenomenon: Among the total study population, no reflow phenomenon noted only in the failed thrombolysis group. Six of the fifty patients showed no reflow phenomena. These patients hada normal epicardial coronary artery, but their ST segment remained elevated. In 6% of the cases, no reflow occurred. Both of these individuals had an anterior wall MI & hypertension was a shared risk factor.

In our investigation, there was no statistically significant difference between effective & failed thrombolysis based on gender.

S.S Iyengar et al,[13] made a similar observation. There was no significant difference in the age-wise variable of presentation between the failed thrombolysis & the successful thrombolysis groups (P = 0.27). Patients aged 70 yr & older had a much decreased success rate. In our investigation, the presence of single or multivessel disease did not predict effective or failed thrombolysis.

In contrast, based on the lesion characteristics of the infarct-related artery, it was observed that Type A lesions had a significant propensity for successful thrombolysis, but Type B & C lesions had a high predilection for failed thrombolysis.

Logistic regression analysis: On multivariate analysis, the predictors of failed thrombolysis were prolonged ischemic time (delayed presentation), delayed presentation (>6 h), dyspnea at presentation, higher Killip class (III & IV), TIMI score, blood pressure, particularly cardiogenic shock, & risk factors such as diabetes mellitus, dyslipidemia, and obesity (BMI>23.5 kg/m2). It was determined that utilizing the Window time and lesion type, thrombolysis success with Tenecteplase could be predicted with excellent accuracy.

Limitations of the study includes:

- Study population was small,
- Not a randomized study,
- ST segments is dynamic, so faults may occur in diagnosis of thrombolysis.

CONCLUSION

Failed thrombolysis was more common in patients who had diabetes as a risk factor. The study underlines the importance of early thrombolysis for successful reperfusion and improved clinical outcomes. On multivariate analysis, the predictors of failed thrombolysis were prolonged ischemic time (delayed presentation), delayed presentation (>6 hr), dyspnea at presentation, higher Killip class (III & IV), TIMI score, hypertension, as well as risk factors like diabetes mellitus, &dyslipidemia. In patients who failed thrombolysis, Type B & Type C lesions in the infarct-related artery were more prevalent. Patients with prolonged window times & failed thrombolysis were shown to have more complexed coronary lesion morphology. This study reemphasizes the importance of early thrombolysis for successful reperfusion and improved clinical outcomes.

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