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ORIGINAL ARTICLE

Frequency of in-Hospital complications in patients with acute inferior wall myocardial infarction with and without thrombolysis.

Zaima Firdous[1], Najeeb Ullah[2], Azmat Ehsan Qureshi[3], Farid Ahmad Chaudhary[4], Muhammad Umar Shafique[5] Hina Sultan[6]

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ABSTRACT… Objective: To compare the frequency of in-hospital complications in patients with acute inferior wall myocardial infarction with and without thrombolysis. **Study Design:** Descriptive study. **Setting:** Department of Cardiology, Rehmatul-Lil-Alameen Post Graduate Institute of Cardiology, Lahore. **Period:** 1st August 2024 to 31st January 2025. **Methods:** A total of 100 patients, aged between 35 and 65 years, either gender, presenting with acute inferior wall myocardial infarction (IWMI), were enrolled in the study from the emergency department. Those patients presenting within 12 hours of symptom onset received thrombolytic therapy, while those presenting after 12 hours did not receive thrombolysis. The patients were admitted to cardiology wards and observed for five days. During indoor follow-up, they were examined for complications such as congestive heart failure, cardiogenic shock, stroke, atrial fibrillation, and mortality. **Results:** The average age was found to be 51.28±7.86 years. The most frequent comorbidity was anemia in 61 patients (61%), followed by smoking in 56 patients (56.0%), and dyslipidemia in 54 patients (54.0%). Diabetes affected 52 patients (52%); on the other hand, 48 patients (48%) were hypertensive. Family history of IHD was recorded in 50 patients (50.0%). The incidence of in-hospital complications was highly significant and differed between thrombolysis and non-thrombolysis patients. More cases of congestive heart failure were found among the non-thrombolysis patients, who were 24 (72.7%) as compared to 9 (27.3%) in the thrombolysis group ($p<0.001$). Similarly, cardiogenic shock was observed in 18 (72.0%) non-recipients and 7 (28.0%) recipients ($p<0.001$). Non-recipients had much higher rates of AV blocks at 36 (75.0%) compared to 12 (25.0%) among those receiving thrombolysis ($p<0.001$). Patients who were not treated with thrombolysis more often suffered from mitral regurgitation: 35 (67.3%) vs 17 (32.7%) among thrombolysis patients, $p<0.001$. The right ventricle failure was also associated with a majority of the non-recipients 34 (77.3%) compared to thrombolysis recipients where this occurrence was only present in 10 (22.7%), $p < 0.001$. No difference was reported concerning stroke between both groups 1 (50.0%) vs. 1 (50.0%), $p = 0.794$. Atrial fibrillation was more frequent in non-thrombolysis patients 28 (66.7%) vs. 14 (33.3%), $p<0.001$. **Conclusion:** In conclusion, the results show that of the patients with acute inferior wall myocardial infarction, the majority, 59%, underwent thrombolysis, which is thus very frequently used in the treatment of this kind of patient. Our findings suggest that in-hospital complication rate was significantly reduced in patients who underwent thrombolytic therapy as compared to the ones who did not receive thrombolysis.

Key words: Acute Inferior Wall Myocardial Infarction, In-hospital Complications, Thrombolysis.

INTRODUCTION

Inferior wall myocardial infarction (IWMI) that arises from an occlusion of a coronary artery, it results in the decreased perfusion to that portion of the myocardium unless treated promptly, which leads to myocardial ischemia followed by infarction. Independently, this condition progresses from myocardial ischaemia to infarct. In most cases, the inferior wall of the myocardium receives blood supply via the right coronary artery. However, in 6-10% of the population with left coronary dominance, the left circumflex gives off the posterior descending coronary artery.[1,2]

Infarcted areas in the inferior wall myocardium are almost 40% of all the myocardial infarctions.[3] IWMIs have long been considered to have a more favorable outcome compared to any infarct that occurs at any other site within the heart such as the anterior wall.

1. MBBS, Postgraduate Trainee (FCPS Part-II), Department of Cardiology, Rehmatul-Lil-Alameen Post Graduate Institute of Cardiology, Lahore.
2. MCPS (Medicine), FCPS (Medicine), FCPS (Cardiology), Associate Professor Cardiology, Rehmatul-Lil-Alameen Post Graduate Institute of Cardiology, Lahore.
3. MBBS, FCPS (Medicine), FCPS (Cardiology), Associate Professor Cardiology, Rehmatul-Lil-Alameen Post Graduate Institute of Cardiology, Lahore.
4. MBBS, FCPS, Professor & Consultant, Cardiothoracic Surgery, Rehmatul-Lil-Alameen Post Graduate Institute of Cardiology, Lahore.
5. MBBS, FCPS (Cardiology), Consultant Cardiologist, Rehmatul-Lil-Alameen Post Graduate Institute of Cardiology, Lahore.
6. MBBS, Postgraduate Trainee (FCPS Part-II) Cardiology, Rehmatul-Lil-Alameen Post Graduate Institute of Cardiology, Lahore.

Correspondence Address:
Dr. Zaima Firdous
Department of Cardiology
Rehmatul-Lil-Alameen Post Graduate Institute of Cardiology, Lahore.
zaimaa.firdous@gmail.com

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In cases of IWMI, the mortality rate is less than 10%.[3] Still, there are some complications which increase mortality by many-fold such as RV infarct, hypotension, bradycardia, heart block, and cardiogenic shock.[1,4]

The success and advancement of managing acute myocardial infarction have been depicted by thrombolytic therapy. However, it has quite often been insufficient or applied too late. Thrombolytic therapy works by dissolving thrombi in the infarcted artery and restoring reperfusion, which results in the reduction of the size of the infarct, preservation of left ventricular function, and better survival outcomes.[5-7] A study found that a 38.7% population with acute myocardial infarction received thrombolytic therapy.[8] It was revealed that the hospital-based complications showed similar trends when the patients underwent or were not subjected to thrombolysis; the hospitalization rates in cases of congestive heart failure, cardiogenic shock, atrial fibrillation, stroke, and mortality 21% and 17% vs. 14% and 7%, respectively; 10% vs. 13%; 3% vs. 7% respectively; 11% and 9%).[8]

This study reasoned to find out the incidence of in-hospital complications associated with patients with acute IWMI who underwent thrombolytic therapy compared to those who did not. In routine practice, less than 50% are offered thrombolytic therapy due to presentation only after hours, which results in a poor outcome when compared to those subjected to timely thrombolytic therapy. Research in this area has been very scarce globally, and there were no previous studies on the local population. Moreover, the last study was carried out more than five years ago. Therefore, this research study has attempted to bridge the gap by providing updated magnitudes for local populations and implementing findings to improve clinical practices. This study should enrich knowledge and practice, as well as pave the way for better treatment protocols which help optimize the care of patients with acute IWMI.

METHODS

This is a descriptive study conducted at the Department of Cardiology, Rehmatul-Lil-Alameen Post Graduate Institute of Cardiology, Lahore, from 1st August 2024 to 31st January 2025 after approval from institutional ethical committee (RAIC PESSI/Estt/2025/2401). The sample size of 100 cases was calculated by taking the 95% confidence level, 10% margin of error, and percentage of thrombolysis, i.e., 38.7%.[8] A non-probability consecutive sampling technique was used. There were 100 patients, between 35 and 65 years old, either sex, with acute inferior wall myocardial infarction admitted to the emergency department in this study. The study excluded patients with previous CABG, PCI, recurrent MI, previous stroke, heart failure, chronic renal dysfunction, cardiomyopathy, and atrial fibrillation. Informed consent was taken from the patient. The following details are noted regarding patient demographics: name, age, gender, smoking history (above five packs a year), history of hypertension (BP ≥140/90 mmHg), anemia (hemoglobin <10 g/dL), dyslipidemia (total cholesterol level >200 mg/dL), diabetes (blood sugar level >200 mg/dL), IWMI duration, family history of MI, lifestyle, occupation, and Killip class. The patients were thrombolysed if they were admitted within 12 hours. These patients were admitted to cardiology wards and observed for five days. They were re-examined during follow up for any congestive heart failure, cardiogenic shock, AV blocks, mitral regurgitation, RV failure, stroke, atrial fibrillation and mortality. The collected data was keyed into a computer and analyzed with SPSS software, version 25.

RESULTS

The demographic profile of respondents had more participants between the ages of 51 and 65 years as 52 (52.0%). Next, between the ages of 35 and 50 years, there are 48 (48.0%) respondents. However, it has a mean age of 51.28±7.86 years. Among gender distribution, males were more and contributed to 69 (69.0%), while females constitute 31 (31.0%). Regarding occupational status, more respondents were unemployed 56 (56.0%) than those who were employed 44 (44.0%. The place of residence showed a slightly higher proportion from rural areas 55 (55.0%) than that from urban areas 45 (45.0%). Lifestyle wise, 44 (44.0%) had a sedentary lifestyle, followed by 40 (40.0%)

with an active lifestyle, and only 16 (16.0%) were vigorously active. These demographic data give a broad view of the characteristics of the study population (Table-I).

Age (Year)	Number	Percentage
35-50	48	48.0
51-65	52	52.0
Total	**100**	**100.0**
Mean±SD	51.28±7.86	
Gender		
Male	69	69.0
Female	31	31.0
Total	**100**	**100.0**
Occupation		
Employed	44	44.0
Unemployed	56	56.0
Total	**100**	**100.0**
Location of residence		
Rural	55	55.0
Urban	45	45.0
Total	**100**	**100.0**
Lifestyle		
Active	40	40.0
Sedentary	44	44.0
Vigorously active	16	16.0
Total	**100**	**100.0**

Table-I. Distribution of demographic profile.

Thrombolysis	Number	Percentage
Received	59	59.0
Not received	41	41.0
Total	100	100.0

Table-II. Frequency of patients received thrombolysis after acute inferior wall myocardial infarction (IWMI)

The distribution of the patients who have received the thrombolytic after acute inferior wall myocardial infarction shows 59 (59.0%) have been thrombolysed while 41 patients (41%) found with IWMI without thrombolysis (Table-II).

Comorbidities	Number	Percentage
Diabetes	52	52.0
Hypertension	48	48.0
Dyslipidemia	54	54.0
Anemia	61	61.0
Smoking	56	56.0
Family history of IHD	50	50.0
Total is not 100% as there were multiple responses		

Table-III. Distribution of comorbidities

Among these patients, the most frequent comorbidity was anemia in 61 patients (61.0%), followed by dyslipidemia in 54 patients (54.0%), and smoking in 56 patients (56.0%). Fifty-two (52.0%) were diabetic and 48 (48.0%) were hypertensive. Fifty (50.0%) patients had a family history of IHD in the family (Table-III).

The results showed that the incidence of in-hospital complications was highly significant and varied between thrombolysis and non-thrombolysis patients. More cases of congestive heart failure were found among the non-thrombolysis patients, who were 24 (72.7%) as compared to 9 (27.3%) in the thrombolysis group ($p < 0.001$). Likewise, cardiogenic shock was noted in 18 (72.0%) non-recipients and 7 (28.0%) recipients ($p < 0.001$). Non-recipients had much higher rates of AV blocks at 36 (75.0%) compared to 12 (25.0%) among those receiving thrombolysis ($p < 0.001$). Patients who were not treated with thrombolysis more often suffered from mitral regurgitation: 35 (67.3%) vs 17 (32.7%) among thrombolysis patients, $p < 0.001$. The failure of the right ventricle was also present in a majority of the non-recipients (34 (77.3%), whereas in recipients of thrombolysis this happened only in 10 (22.7%) of cases, $p < 0.001$. No difference was reported in relation to stroke between both groups 1 (50.0%) vs. 1 (50.0%), $p = 0.794$. Atrial fibrillation was more common among non-thrombolysis patients 28 (66.7%) vs. 14 (33.3%), $p < 0.001$ (Table-IV).

DISCUSSION

The treatment with thrombolytic therapy remains an important tool in the management of patients diagnosed with IWMI through the restoration of coronary blood flow and, consequently, improvement in clinical outcomes.[9] In current study, 59% of the patients with IWMI received thrombolytic therapy. Its success in dissolving thrombi and restoring coronary perfusion, with a concomitant decrease in myocardial damage, has been widely appreciated. Efficacy, as determined from clinical trials and longitudinal studies, was always in its favor, showing a lowering of mortality rates and an improvement in cardiac function in the long term. The time course for initiating thrombolytic therapy is of utmost importance, as delays could have a significant impact on outcomes through an increase in complications and adverse events.[10]

In-hospital Complications		Thrombolysis		Total
		Received	Not received	
Congestive heart failure	Yes	9(27.3%)	24(72.7%)	33(100%)
	No	50(74.6%)	17(24.4%)	67(100%)
Total		59(59.0%)	41(41.0%)	100(100%)
χ^2=20.496		p < 0.001		
Cardiogenic shock	Yes	7(28.0%)	18(72.0%)	25(100%)
	No	52(69.3%)	23(30.7%)	75(100%)
Total		59(59.0%)	41(41.0%)	100(100%)
χ^2=13.242		p < 0.001		
AV blocks	Yes	12(25.0%)	36(75.0%)	48(100%)
	No	47(90.4%)	5(9.6%)	52(100%)
Total		59(59.0%)	41(41.0%)	100(100%)
χ^2=44.112		p < 0.001		
Mitral regurgitation	Yes	17(32.7%)	35(67.3%)	52(100%)
	No	42(87.5%)	6(12.5%)	48(100%)
Total		59(59.0%)	41(41.0%)	100(100%)
χ^2=30.995		p < 0.001		
RV failure	Yes	10(22.7%)	34(77.3%)	44(100%)
	No	49(87.5%)	7(12.5%)	56(100%)
Total		59(59.0%)	41(41.0%)	100(100%)
χ^2=42.736		p < 0.001		
Stroke	Yes	1(50.0%)	1(50.0%)	2(100%)
	No	58(52.2%)	40(40.8%)	96(100%)
Total		59(59.0%)	41(41.0%)	100(100%)
χ^2=0.068		p=0.794		
Atrial fibrillation	Yes	14(33.3%)	28(66.7%)	42(100%)
	No	45(77.6%)	13(22.4%)	58(100%)
Total		59(59.0%)	41(41.0%)	100(100%)
χ^2=19.721		p < 0.001		

Table-IV. Comparison of in-hospital complications with or without thrombolysis

It was, thus, found that 59% of the patients received thrombolytic therapy. Treatment of acute myocardial infarction needs early medical attention.[11] Clinical practice recommendations exist, for example, from the American Heart Association. Those recommendations call for the administration of thrombolytic agents to patients presenting with the symptoms of myocardial infarction provided that the patient fulfills qualifications set for the therapy. This only heightens the importance of early diagnosis and treatment to improve survival and reduce cardiac damage in patients, hence the reason for adhering to established clinical protocols.[9]

Decisions regarding thrombolytic therapy must be made after a careful weighing of the differing patient-specific risks and contraindications. Patients with recent surgery, uncontrolled hypertension, or increased risk of bleeding are less likely to be suitable candidates for this treatment; this would account for the great proportion of patients in the current study who did not receive thrombolytic therapy. These considerations demonstrate the requirement for individualized risk assessment in ensuring patient safety while maximizing the benefits of thrombolysis.[12]

In current study, thrombolysis apparently does not affect the events related to the hospital complications, namely, congestive heart failure, cardiogenic shock, AV blocks, mitral regurgitation, right ventricular failure, stroke, atrial fibrillation, and death. These results indicated that the thrombolytic drugs had no considerable and statistically different influences ($p>0.05$) on most in-hospital complications.

The present study revealed a major difference in the hospital complications that prevail among thrombolysis-treated patients compared to those who did not receive thrombolysis. Non-thrombolysis patients reported a higher number of congestive heart failure incidences (72.7% vs. 27.3%, p<0.001), cardiogenic shock incidences (72.0% vs. 28.0%, p < 0.001), AV blocks incidences (75.0% vs. 25.0%, p<0.001), mitral regurgitation incidences (67.3% vs 32.7%, p<0.001) and right ventricle failure incidences (77.3% vs. 22.7%, p<0.001) in comparison to those who received thrombolysis. There was no significant difference on the occurrence of stroke between these two groups: p=0.794. Atrial fibrillation more occurred in thrombolysis-naïve patients, at a percentage of 66.7% versus 33.3%, p<0.001.

The findings in the present study can be compared with the findings from a wide variety of studies carried out on thrombolytic therapy. In one such study, Indian patients with a diagnosis of inferior wall myocardial infarction had in-hospital complications like cardiogenic shock, severe mitral regurgitation, and left ventricular failure significantly less compared to other general end-users.[13] This aligns with the presented study, suggesting a beneficial role of thrombolysis in reducing certain complications.

A study by Kumar et al also asserted that there were benefits of thrombolytic therapy with respect to the prevention of in-hospital complications as compared to patients undergoing no thrombolytic treatment.[13] Our study also shows that prevalence of AV block is relatively high in non-thrombolysed patients. It is pertinent to note here that AV block, may as a secondary effect of the reperfusion secondary to thrombolytic therapy.[14]

The degree of heart failure and cardiogenic shock following an AMI were reduced by thrombolytic therapy. GISSI (Italian group for the study of the survival of myocardial infarction) results showed that administration of thrombolytics was significantly associated with a reduction of mortality and morbidity from an AMI in the early period.[15]

AV blocks are established complications of AMI. Specific incidence comparison data between thrombolytic and non-thrombolytic patients are scant. However, timely reperfusion by thrombolytic therapy reduces the limitation of myocardial damage, therefore potentially reducing the likelihood of conduction system complications.[16]

Acute mitral regurgitation can occur from either papillary muscle dysfunction or rupture following an acute myocardial infarction. Early reperfusion with thrombolytic therapy may salvage myocardial and papillary muscle function and therefore reduce the incidence of mitral regurgitation.[16]

Right ventricular infarction is a well-recognized complication of acute myocardial infarction. Early thrombolytic therapy prevents deterioration in right ventricular function because of the restoration of blood flow and reduces the incidence of right ventricular failure.[16]

CONCLUSION

In conclusion, the results show that of the patients with acute inferior wall myocardial infarction, the majority, 59%, underwent thrombolysis, which is thus very frequently used in the treatment of this kind of patient. Our study also showed a significantly reduced in-hospital complication rate, which included congestive heart failure, cardiogenic shock, AV blocks, mitral regurgitation, right ventricular failure, and atrial fibrillations, among the group of patients who underwent thrombolytic therapy as compared to the ones who did not receive thrombolysis.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Zaima Firdous:** Substantial contribution to data collection, analysis, interpretation, drafting of article
2	**Najeeb Ullah:** Substantial contribution, critical revision of article for more intellectual, content supervision, final approval of article.
3	**Azmat Ehsan Qureshi:** Substantial contribution in design and analysis, critical revision of article.
4	**Farid Ahmad Chaudhary:** Substantial contribution in data analysis, critical revision of article.
5	**Muhammad Umar Shafique:** Substantial contribution in data analysis, drafting of article.
6	**Hina Sultan:** Substantial contribution in patient recruitment and data collection.