ORIGINAL ARTICLE

REASONS FOR DELAYED PRESENTATION OF PATIENTS WITH ST SEGMENT ELEVATION MYOCARDIAL INFARCTION TO THROMBOLYTIC THERAPY IN CARDIOLOGY DEPARTMENT OF AYUB TEACHING HOSPITAL ABBOTTABAD

Ariz Samin[1], Mahwish Toqueer[2], Mahnoor Javaid[2], Zoya Fayaz[2], Noor ul Huda[2], Nayha Nadeem[2], Rida Fatima Saeed[3], Ayesha Laraib[2]

[1]Pak International Medical College Peshawar-Pakistan, [2]Ayub Medical College Abbottabad-Pakistan, [3]NUMS Pakistan

Background: ST elevation myocardial infarction (STEMI) is one of the leading causes of morbidity and mortality. Any delay in reperfusion therapy is associated with poor outcomes. This study was done to know the major reasons for delayed presentation to thrombolytic therapy. **Methods:** This cross-sectional study was conducted at the Coronary Care Unit (CCU) of Ayub Teaching Hospital, Abbottabad from March 2019 till June 2020. A total of 120 diagnosed STEMI patients late for thrombolysis therapy and admitted in the CCU were included in this study. Non-probability convenience sampling technique was used. Data was analysed using SPSS version 16.0. **Results:** The mean age of the patients was 61.6±1.07 years. Most of them were married (111), unemployed (85) and lived in urban areas (69). The most important reasons for delayed presentation of STEMI patients to thrombolytic therapy were due to the attribution of symptoms by patients to other conditions/diseases (57.5% CI:48.53-66.47), attempted self-treatment (50.8% CI: 41.76-59.91), misdiagnosis of symptoms (50%, CI:40.92-59.08), living in an area far away from any hospital (45%, CI:35.48-53.60) and problems of transportation (37%, CI:28.17-45.78). **Conclusion:** The early arrival of patients to health care facility in time is critical in diseases like STEMI. There can be many reasons for delayed presentation of patients to thrombolytic therapy but the most important ones were attribution of symptoms by patients to other diseases, attempted self-treatment, misdiagnosis of symptoms, and problems of transportation.

Keywords: STEMI; Reasons; Delayed presentation; Thrombolytic therapy.

Citation: Samin A, Toqueer M, Javaid M, Fayaz Z, Huda N, Nadeem N, *et al*. Reasons for delayed presentation of patients with ST segment elevation myocardial infarction to thrombolytic therapy in cardiology Department of Ayub Teaching Hospital Abbottabad. J Ayub Med Coll Abbottabad 2021;33(Suppl. 1):773–7.

INTRODUCTION

ST elevation myocardial infarction (STEMI) is a common and major cardiovascular event in our population. It is one of the leading causes of morbidity and mortality.[1] STEMI is one of the lethal presentations of Coronary Artery disease (CAD). ST-segment elevation myocardial infarction (STEMI) is the most acute manifestation of coronary artery disease and is associated with great morbidity and mortality. [2] STEMI is defined as presence of chest pain for at least 20 minutes not responding to nitrates, with one of the following: ST-segment elevation ≥2 mm in two or more electrocardiographic precordial leads or ST-elevation ≥1 mm in two or more frontal leads.[3] STEMI results from myocardial ischemia aggravated by thrombosis at a site of already formed atheromatous plaque.[2] Myocardial infarction caused by complete coronary artery occlusion begins to develop after 15–30 minutes of severe ischemia with no collateral flow.[4] Rapid reperfusion of a blocked coronary artery can reduce myocardial necrosis and reduce mortality. Reperfusion techniques include either thrombolytic therapy or primary percutaneous coronary intervention.[2]

With the advancement of health care facilities, Primary percutaneous coronary intervention (PCI) has replaced thrombolytic therapy as a treatment option in STEMI. There is still the challenge of providing primary PCI within the specified time due to a huge variation in health care facilities in different areas of different countries.[5] For this reason thrombolysis still is the most common reperfusion method used to treat myocardial infarction. The greatest benefit is obtained when thrombolytic agents are administered within the first hour after myocardial infarction (MI).[1] According to American Heart Association/ American College of Cardiology, door to needle time for thrombolytic therapy should be 30 minutes or less.[6] A 50% reduction in mortality can be achieved if thrombolytic therapy is initiated within 3 hours of onset of symptoms.[6] This is beneficial up to 12 hours especially if Q waves have not been formed.[6] According to a study delaying thrombolytic therapy by an hour increases the death ratio by 20%, and 30

minutes delay can reduce the average life expectancy by one year.[7]

Delayed presentation to thrombolytic therapy has worst outcomes of the disease. Commonly, there is Patient delay, Delay between First Medical Contact (FMC) and diagnosis, System delay, i.e., Delay between FMC and reperfusion therapy.[8] According to a study, the delay is mostly at patients' end (59%) and 25% of the times it is due to transport delay. Referral delay and misdiagnosis of symptoms at Emergency department also constitute quite a number.[9,10] In a study conducted at a tertiary care hospital of our province, the main reasons for delay in starting thrombolysis were logistic reasons, subtle ECG changes, misinterpretation of symptoms, complete heart block needing pacemaker, raised blood pressure, and arrival in odd timing.[11] The delay between onset of symptoms and provision of reperfusion therapy is the most important. It should be reduced as much as possible.[8]

Missed thrombolytic therapy is common and constitutes a group of high-risk patients for subsequent cardiac events including death, heart failure and life-threatening arrhythmia.[10] In under developed countries like Pakistan the data in scientific literature is very limited about the different aspects of treatment delay. We undertook this study to know the major reasons for delayed presentation to thrombolytic therapy and find frequency of these factors in patients with acute STEMI. The present study was conducted with an aim to determine the demographic and clinical characteristics of the patients related to these delays.

MATERIAL AND METHODS

This cross-sectional study was conducted at the Coronary Care Unit (CCU) of Ayub Teaching Hospital, Abbottabad. This study was completed in a time span of sixteen months (March 2019 to June 2020). Approval was obtained from hospitals ethical committee before starting the study. The study population included only those patients who were diagnosed as STEMI, were late for thrombolysis therapy and were admitted in the All the Non STEMI patients, critical patients and those who were not willing to give the interview were excluded from this study. Non-probability convenience sampling technique was used for a sample of 120. A structured checklist was developed by investigators after reviewing literature. This questionnaire/check-list was tested and final data collection form was designed. Demographic, clinical information and reasons for their delay to thrombolysis therapy was obtained and recorded. Questions were asked in the local language of the patients after obtaining informed consent by ensuring confidentiality of their information. Data was coded, entered in computer and analysed using statistical package for social sciences (SPSS) version 16.0. Frequencies and percentages were used for categorical variable whereas mean and standard deviation was used for continuous variables. Data was presented in the form of frequency tables and bar charts. For associations between categorical variables Chi square test was used and $p \leq 0.05$ was considered statistically significant.

RESULTS

In this study a total of 120 patients were included. The mean age of the patients was 61.6±1.07 years. Out of the total 120, 61.7% (74) were males with mean age of 60.5±1.07 years and 38.3% (46) were females with mean age 63.61±0.06 years. Most of them were married 92.5% (111), unemployed were 70.8% (85) and 57.5% (69) lived in urban areas. Table-1 shows the baseline characteristics of the patients. Hypertension was the most important risk factor followed by diabetes mellitus.

The most important reason for delayed presentation of STEMI patients to thrombolytic therapy was due to the attribution of symptoms by patients to other conditions/diseases in 57.5% (69) as depicted in figure -1.

There was association between people living in rural areas and misdiagnosis of symptoms (p=0.006). Significant association was also found between inappropriate reason that the symptoms would be self-limiting and attempted self-treatment by the patient (p=0.001), Association was also found between patients who were unemployed and attempted self-treatment by the patient (p=0.013).

Table-1: Baseline characteristics of patients

Characteristics	Percentages n=120	Confidence interval
Diabetes	48.3% (58)	39.26–57.40
Hyperlipidaemia	18.3% (22)	11.31–25.36
Hypertension	51.7% (62)	42.60–60.74
Smoking	28.3% (34)	20.15–36.51
Previous history of coronary artery disease	25.8% (31)	17.89–33.78

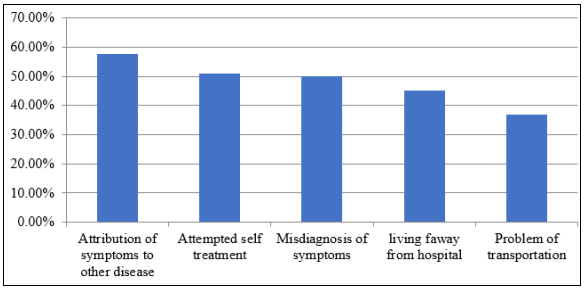

Figure-1: Reasons for delay in thrombolytic therapy in STEMI patients.

DISCUSSION

Acute MI is among the leading causes of death throughout the world which needs prompt diagnosis and treatment. About one third of the patients die after onset of symptoms and arrival at hospital hence timely intervention is of utmost importance.[12] Recognition of treatment delay factors and timely management and treatment, can finally reduce the enormous mortality and morbidity associated with STEMI.[13]

Results of our study showed that hypertension was a dominant risk factor followed by diabetes, smoking, premature coronary artery disease, and hyperlipidaemia. Some studies show a similar trend of risk factors like ours but a few showed smoking to be the dominant risk factor (61%) followed by hypertension(19.5%), diabetes type 2 (5.2%) and diabetes type 1 (1.3%).[14] A study by Challacan *et al* also showed comparable results.[15] One of the most important causes of artherogenesis is arterial hypertension which in turn results in the development of vulnerable plaques whose instability or rupture (causing thrombosis and occlusion of the vessel) ultimately leads to the development of acute coronary syndromes (ACS).[16] In a study done by Rodigues JA *et al* in Brazil the diagnosis of DM was an independent predictor of delayed presentation in patients with STEMI. DM due to presence of diabetic neuropathy and a higher pain threshold masks signs and symptoms of MI.[17]

Attribution of the symptoms to other diseases (57.5%) was the most frequent reason for delayed presentation seen in our study. Our findings are similar to a study in Chittagong by Das Pk *et al* where 82.1% of patients who presented late were due to attribution of chest pain to peptic ulcer disease.[18] This finding is quite comprehensible as presentation of MI can easily be confused with GERD, costochondritis, pulmonary embolism etc. Most patients in our study considered symptoms to be trivial and self-limiting. Study conducted in Iran by Tagadosi M *et al* showed that waiting for the symptoms to improve spontaneously as the most important cause of delay present in 42% of the study population.[19] Developing country like Pakistan where large number of populations lives in rural areas and have limited access to social websites and forums, they fail to understand the importance of prompt medical intervention. Patients who have family history of CAD usually present on time because of better understanding of disease[12]

Attempted self-treatment was second common cause of delayed presentation to thrombolytic therapy which was present in 50.8% of the STEMI patients. Studies show that 4% of patients taking self-medication.[20] and 8% of patients waited for the symptoms to subside by attempted self treatment.[21] This trend of increasing self-medication in our region of study could be attributed to low socioeconomic status of individuals who fear heavy medical expenditure. By the time patients realizes the failure of home remedies and rush to hospital, it is too late for thrombolysis.

Our study showed misdiagnosis of symptoms present in 50% of the patients with STEMI. This is in agreement with another study conducted in Pakistan at Rawalpindi in 2006-07 where 49% of the patients showed delayed presentation due to misdiagnosis of symptoms considering pain being muscular in origin and thought they had some indigestion or bloating.[21] Similar findings were highlighted in studies in hospitals of Wales and England where 1/3rd of the patients with MI are misdiagnosed on hospital admission.[22] One of the reasons for misdiagnosis is misinterpretation of ECG which in our study was 9.2%. Patients' first approach on appearance of symptoms is local healthcare unit where lack of ECG facility and competent staff often leads to misdiagnosis. It is only when the course of symptoms become severe enough that they are referred to a tertiary care hospital. Even if ECG is done on arrival at healthcare unit it is sometimes misinterpreted by junior doctors on duty as a senior consultant is not available around the clock.

Our study result indicated that living in an area far away from any hospital (45%) and problems of transportation (37%) were also major reasons of delayed presentation. Most patients that presented to our institute were from far off areas for which arrangement of a vehicle for an emergency is difficult. The rural areas of Pakistan lack effective transport services. Ambulance service is also usually not available. These results were almost consistent with the study done by Khanam F *et al* in Dhaka in 2017-18 where about one-third (36.7%) of the patients were living at long distances from hospitals, about 48% lacked suitable transport by living in farther distance form hospital [23]and lack of suitable transportation (11.4%) were also factors mentioned in a study.[12]

Denial of acute MI (31.7%), reluctant to trouble others (24.2%) and fear of embarrassment should the symptoms turn out to be false alarm were also some of the reasons for delayed presentation given by some patients. Khraim and Carey also reported that belief of the patients may also be linked with some psychological factors, such as denial of MI, fear of the consequences and fear of troubling others.[24]

When comparing different categorical variables, we came across some significant associations.

Association of male gender with smoking was evident in our study while no association was found between other risk factor based on gender. This could be due to the fact that patient population presented in our hospital was primarily from backward areas of the country where smoking is considered taboo for women in contrast with many western countries. Data from another study also show higher incidence of MI in young smoker males.[25] some previous studies have shown significant association between diabetes and female gender but these results are not consistent with our data. This could be due to lesser number of women in our study population.[26]

A statistically significant association was seen between patient living in rural areas and misdiagnosis of symptoms consistent with research in urban tertiary care in Mumbai. These findings are easily understandable as the primary healthcare centers in rural areas of Pakistan are not well equipped for effective diagnosis and management of patient. The low literacy rate and ignorance of the patients in these areas acts as an additional factor for misdiagnosis. Previous studies in Pakistan are consistent with this fact.[12]

Limitations of our study include a small sample and convenience sampling. Nonetheless important information is gathered and presented.

CONCLUSION

As reiterated in our study early intervention in STEMI patients can be lifesaving and can significantly reduce mortality and morbidity. Attribution of symptoms by patients to other diseases, attempted self-treatment, misdiagnosis of symptoms, living far away and problems of transportation were the most important reasons for delayed presentation of patients to thrombolytic therapy. Such preventable factors should be looked upon and rectified to significantly reduce mortality from this disease.

RECOMMENDATIONS:

Many of the factors for delayed presentation mentioned in our study are avoidable. The government should improve the quality of primary healthcare units in rural areas. Any patient who presents with symptoms of chest pain is in race against time. ECG should be carried out immediately with proper interpretation from a cardiologist. An effective communication system between primary healthcare unit and tertiary care to make necessary arrangements prior to the arrival of referred patient. Public campaigns and social media platforms should be used to raise awareness among people about the symptoms of MI and importance of early management. Efforts for effective ambulance service to help people reach hospitals in time can reduce the fatal outcomes.

REFERENCES

1. Chadwick Jayaraj J, Davatyan K, Subramanian SS, Priya J. Epidemiology of Myocardial Infarction. In: Pamukçu B, editor. Myocardial Infarction [Internet]. IntechOpen; 2019 [cited 2020 Sep]. Available from: https://www.intechopen.com/books/myocardial-infarction/epidemiology-of-myocardial-infarction
2. Vogel B, Claessen BE, Arnold SV, Chan D, Cohen DJ, Giannitsis E, *et al.* ST-segment elevation myocardial infarction. Nat Rev Dis Primers 2019;5(1):1–20.
3. Bueno H, Betriu A, Heras M, Alonso JJ, Cequier A, García EJ, *et al*. Primary angioplasty vs. fibrinolysis in very old patients with acute myocardial infarction: TRIANA (TRatamiento del Infarto Agudo de miocardio eN Ancianos) randomized trial and pooled analysis with previous studies. Eur Heart J 2011;32(1):51–60.
4. Van de Werf F, Ardissino D, Betriu A, Cokkinos DV, Falk E, Fox KA, *et al.* Management of acute myocardial infarction in patients presenting with ST-segment elevation. The Task Force on the Management of Acute Myocardial Infarction of the European Society of Cardiology. Eur Heart J 2003;24(1):28–66.
5. Gershlick AH, Banning AP, Myat A, Verheugt FW, Gersh BJ. Reperfusion therapy for STEMI: is there still a role for thrombolysis in the era of primary percutaneous coronary intervention? Lancet 2013;382(9892):624–32.
6. Yusuf S, Reddy S, Ounpuu S, Anand S. Global burden of cardiovascular diseases: Part 1: General considerations, the epidemiological transition, risk factors and impact of urbanization. Circulation 2001;104(22):2746–53.
7. Usman M. Door to Needle Time in Acute Myocardial Infarction Patients. J Rawal Med Coll 2017;21(2):127–30.
8. Terkelsen CJ, Sørensen JT, Maeng M, Jensen LO, Tilsted HH, Trautner S, *et al*. System delay and mortality among patients with STEMI treated with primary percutaneous coronary intervention. JAMA 2010;304(7):763–71.
9. Beig JR, Tramboo NA, Kumar K, Yaqoob I, Hafeez I, Rather FA, *et al*. Components and determinants of therapeutic delay in patients with acute ST-elevation myocardial infarction: A tertiary care hospital-based study. J Saudi Heart Assoc 2017;29(1):7–14.
10. Taha R, Oraby M, Nasr G, El-Hawary A. Prevalence and causes of failure of receiving thrombolytic therapy in patients with acute ST-segment elevation myocardial infarction. Egypt Heart J 2013;65(2):51–5.
11. Ali J, Ahmad I, Faheem M, Irfan M, Gul AM, Hafizullah M. Factors associated with delaying of fibrinolytic therapy administration in patients with acute myocardial infarction. Khyber Med Univ J 2012;4(3):129–32.
12. Farshidi H, Rahimi S, Abdi A, Salehi S, Madani A. Factors associated with pre-hospital delay in patients with acute myocardial infarction. Iran Red Crescent Med J 2013;15(4):312–6.
13. Alishahi Tabriz A, Sohrabi MR, Kiapour N, Yazdani S. Factors Associated with Delay in Thrombolytic Therapy in Patients with ST-Elevation Myocardial Infarction. J Tehran Heart Cent 2012;7(2):65–71.
14. Callachan EL, Alsheikh-Ali AA, Wallis LA. Analysis of risk factors, presentation, and in-hospital events of very young patients presenting with ST-elevation myocardial infarction. J Saudi Heart Assoc 2017;29(4):270–5.
15. Juárez-Herrera Ú, Jerjes-Sánchez C. Risk Factors, Therapeutic Approaches, and In-Hospital Outcomes in Mexicans with ST -Elevation Acute Myocardial Infarction: The RENASICA II Multicenter Registry. Clin Cardiol 2013;36(5):241–8.

16. Picariello C, Lazzeri C, Attanà P, Chiostri M, Gensini GF, Valente S. The impact of admission procalcitonin on prognosis in acute coronary syndromes: a pilot study. Biomarkers 2012;17(1):56–61.
17. Rodrigues JA, Melleu K, Schmidt MM, Gottschall CAM, Moraes MAP, Quadros AS. Independent predictors of late presentation in patients with st-segment elevation myocardial infarction. Arq Bras Cardiol 2018;111(4):587–93.
18. Das P, Ghafur S, Mollah A, Siddique S, Hossain A, Murshed A. Delayed Presentation of Patients with Acute Myocardial Infarction in Chittagong Medical College Hospital. Cadiovasc J 2016;9(1):3–8.
19. Taghaddosi M, Dianati M, Fath Gharib Bidgoli J, Bahonaran J. Delay and its related factors in seeking treatment in patients with acute myocardial infarction. ARYA Atheroscler 2010;6(1):35–41.
20. Meel R, Gonçalves R. Time to fibrinolytics for acute myocardial infarction: Reasons for delays at Steve Biko Academic Hospital, Pretoria, South Africa. S Afr Med J 2015;106(1):92–6.
21. Khan J. Factors Causing delayed presentation of patients with acute myocardial infarction to the hospital. Pak Armed Forces Med J 2011;61(4):511–5.
22. Mayor S. Acute MI is initially misdiagnosed in nearly a third of patients, study finds. BMJ 2016;354:i4713.
23. Khanam F, Shariful Islam M, Akter J, Lee WH. Factors Related to Delay in Seeking Medical Care Among Patients with Acute Myocardial Infarction in Dhaka. Jentashapir J Heal Res 2019;10(1):e92475.
24. Khraim FM, Carey MG. Predictors of pre-hospital delay among patients with acute myocardial infarction. Patient Educ Couns 2009;75(2):155–61.
25. Yunyun W, Tong L, Yingwu L, Bojiang L, Yu W, Xiaomin H, *et al*. Analysis of risk factors of ST-segment elevation myocardial infarction in young patients. BMC Cardiovasc Disord 2014;14(1):179–83.
26. Khan A, Phadke M, Lokhandwala YY, Nathani PJ. A study of prehospital delay patterns in acute myocardial infarction in an urban tertiary care institute in Mumbai. J Assoc Physicians India 2017;65(5):24–7.

Submitted: August 2, 2021	*Revised: September 15, 2021*	*Accepted: November 2, 2021*

Address for Correspondence:

Ariz Samin, Pak International Medical College Peshawar Pakistan
Email: dr_ariz@yahoo.com