



Original Article

Factors Leading to Delayed Presentation Among Patients Presenting with ST-Elevation Myocardial Infarction in Emergency Department of a Tertiary Care Hospital

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ABSTRACT

The duration between the onset of myocardial infarction and first intervention plays a pivotal role in saving the life of the patients **Objective:** To determine the frequency of various pre-hospital factors causing delay among patients presenting with STEMI in the emergency department of a teaching hospital **Methods.** This is a descriptive observational study conducted at the Cardiology Department, Rawalpindi Institute of Cardiology (RIC), Rawalpindi from March to August 2019. A total of 142 patients presenting with ST-elevation myocardial infarction (STEMI) to the Emergency Department (ED) of RIC were enrolled. Electrocardiograms (ECGs) were reviewed for confirmation of STEMI and find the type of MI. Echo-cardiography was done to find out the ejection fraction (EF) of the left ventricle. Type of reperfusion therapy either thrombolytic therapy or primary percutaneous coronary intervention (PCI), time of symptom onset, and time of presentation in ED of RIC were noted. Patients were divided into four major groups depending upon the possible factors for delayed presentation: 1) Misinterpretation of symptoms, 2) Ignorance Of reporting urgently or waiting for symptoms to resolve, 3) Transportation problem and 4) First presentational facility where thrombolytic unavailable. Data were analyzed using the Statistical Package for Social Sciences (SPSS) v.23.0 (IBM, Armonk, U.S.). **Results:** The mean age was 53.2(SD=15.5). Out of 142 patients, most of them were males 130(91.5%). In our study, the majority 46.5% had a primary level of education. Transportation problems were the main reason for delayed presentation accounting for 45(34.5%), followed by misinterpretation of symptoms 40(28.2%), patients first presented at a facility where thrombolytic therapy was unavailable 27(19%) and patients were either ignorant of reporting urgently to a hospital or they waited for symptoms to resolve 26(18.3%). There was a significant difference in point of the first consultation, MI type, and time duration of delayed presentation among groups ($P<.05$). **Conclusion:** Transportation problems and misinterpretation of symptoms are the main reasons for the delay in getting reperfusion treatment for ST-elevation MI. Providing better primary care facilities available to rural areas as well as targeted awareness campaigns will greatly help in this regard.

INTRODUCTION

In 2015, globally there were about 422 million cases of cardiovascular diseases and 18 million CVD related deaths [1]. Most of the deaths in acute ST- elevation myocardial infarction (STEMI) occur within the first 24 hours (80%), of which 40-65 % occur in the first hour [2]. The most

important single factor responsible for STEMI related mortality is late presentation and not timely receiving reperfusion therapy. According to a study 30 % of the patients with STEMI presented beyond 06 hours of symptom onset [3]. The prehospital delay was the main

reason for late presentation and the main factors contributing to prehospital delay were old age, diabetes mellitus, poor knowledge of symptoms, atypical presentations, and unavailability of rapid transport facilities in rural areas [4]. In Pakistan a study showed that lack of knowledge, unawareness regarding the symptoms, late referral due to financial issues and lack of resources were the main culprits in late presentation to the hospitals [5]. Nowadays management of STEMI is based on early reperfusion to limit infarct size and improve patient outcome [6]. In trials based on thrombolytic therapy, the maximal benefit was delivered within the first 2 hours of symptom onset [7] and no mortality benefit was seen in patients presenting beyond 12 hours [8]. In ST-elevation myocardial infarction (STEMI), timeframe is the single most important factor that affects mortality. Delayed presentation leads to decreased likelihood of revascularization and increasing mortality [9]. Different studies both national and international exhibited different factors responsible for late presentation in STEMI. Rawalpindi Institute of Cardiology receives STEMI patients from Northern Punjab, AJK, and from some districts of KPK. We aim to find the delaying factors responsible for the late presentation of STEMI patients from these areas, so that we can make strategies to overcome these factors and improve patient's outcome.

METHODS

This is a descriptive observational study conducted at the Cardiology Department, Rawalpindi Institute of Cardiology (RIC), Rawalpindi from March to August 2019. A total of 242 patients presenting with ST-elevation myocardial infarction (STEMI) to the Emergency Department (ED) of RIC were enrolled. Patients who received thrombolytic therapy before arrival at RIC were excluded. History was taken from the patients or immediate family members, whichever was convenient. Data obtained included; age, gender, occupation, level of education, the place where symptoms related to STEMI started, and where the patient first presented for the treatment. Electrocardiograms (ECGs) were reviewed for confirmation of STEMI and find the type of MI. Echo-cardiography was done to find out the

ejection fraction (EF) of the left ventricle. Type of reperfusion therapy either thrombolytic therapy or primary percutaneous coronary intervention (PCI), time of symptom onset, and time of presentation in ED of RIC were noted. Patients were divided into four major groups depending upon the possible factors for delayed presentation: 1) Misinterpretation of symptoms, 2) Ignorance Of reporting urgently or waiting for symptoms to resolve, 3) Transportation problem and 4) First presentational facility where thrombolytic unavailable. The data were analyzed using both descriptive and inferential statistics. The categorical data were presented as frequencies and percentages. The studied parameters were compared with the defined groups using the Chi-square test. In all statistical analyses, P-values less than 0.05 were accepted as statistically significant. Data were analyzed using the Statistical Package for Social Sciences (SPSS)v.23.0 (IBM, Armonk, U.S.).

RESULTS

The mean age was 53.2 (SD=15.5). Out of 242 patients, there were 221 (91.5%) male and 21 (8.5 %) were females. In our study, the majority 113 (46.5%) had a primary level of education while 90 (37.3%), 34 (14.1%), and 5 (2.1%) were illiterates, graduates, and post-graduates respectively. Table no. 1 shows frequencies and percentages of possible reasons for delayed presentation.

Reasons for Delayed Presentation	N	%
Misinterpretation of symptoms	69	28.2%
Ignorance Of reporting urgently or waiting for symptoms to resolve	44	18.3%
Transportation problem	83	34.5%
First presentational facility where thrombolytic unavailable	46	19.0%

Table 1: Frequencies and percentages of possible reasons for delayed presentation (n=242)

A statistically significant difference was found among groups for point of first Consultation (P=.01), MI Type (P=.01) and Time duration of delayed Presentation (P=.01) among groups. Table 2 reports the association of reasons of delayed presentation with studied parameters.

Characteristics		Misinterpretation of symptoms		Ignorance Of reporting urgently or waiting for symptoms to resolve		Transportation problem		First presentation at a facility where thrombolytic unavailable		p-value
		n	%	n	%	n	%	n	%	
First Contact	non-medical	5	7.5	3	7.7	17	20.4	2	3.7	0.01*
	GP-clinic/ RHC	28	40.0	3	7.7	14	16.3	12	25.9	
	Hospital/medical specialist	7	10.0	6	11.5	14	16.3	8	18.5	
	THQ/DHQ	14	20.0	8	19.2	27	32.7	14	33.3	
	Tertiary care Hospital	15	22.5	24	53.8	11	14.3	8	18.5	
MI Type	anterior wall/ anterolateral	47	67.5	29	65.4	32	38.8	31	66.7	0.01*
	inferior wall / inferolateral /infero-posterior	22	32.5	15	34.6	51	61.2	15	33.3	
Reperfusion Therapy Used	Streptokinase	2	2.5	2	3.8	3	4.1	0	0.0	0.56
	Primary PCI	64	92.5	40	92.3	80	95.9	46	100.0	
	NONE	3	5.0	2	3.8	0	0.0	0	0.0	
Ejection Fraction	< 30 %	21	30.0	12	26.9	7	10.2	5	11.1	0.18
	30 - 45 %	36	52.5	22	50.0	49	59.2	30	66.7	
	> 45 %	12	17.5	10	23.1	24	30.6	11	22.2	
Time duration of delayed Presentation	less than 1 hour	7	10.0	0	0.0	3	4.1	0	0.0	0.01*
	between 1 and 3 hours	9	12.5	30	69.2	12	14.3	39	85.2	
	between 3 and 6 hours	26	37.5	10	23.1	43	51.0	5	11.1	
	between 6 and 12 hours	17	25.0	2	3.8	13	16.3	0	0.0	
	between 12 and 24 hours	10	15.0	2	3.8	15	18.4	2	3.7	

Table 2: Association of reasons of delayed presentation with studied parameters

Note: * indicates statistically significant ($p < 0.05$), THQ: Tehsil Headquarters Hospital, DHQ: District Headquarters Hospital, RHC: Rural Health Unit, GP-clinic: General practitioner clinic

DISCUSSION

Delay in receiving appropriate reperfusion therapy in patients suffering from MI can lead to significant morbidity and mortality. Recent studies in the USA have shown that reducing door-to-balloon time does not reduce mortality, [10-12] emphasizing the importance of actions to promote

reductions in prehospital patient delay. Our study showed a clear majority of male patients which corroborates the result of previous literature, such as this study by Khan et.al which reported 83 % male patients and one by Khalid et.al which showed 75.9% male preponderance [13,14]. 37% of

patients in our study were illiterate or under matric and 46 % of patients had education from primary to matric level. This shows that a majority of those presenting late had lower levels of education as well as awareness. This identifies a particular demographic of the population that could be targeted with awareness campaigns with maximal benefit. The benefit of such campaigns has been demonstrated by a study conducted in Sweden [15]. It showed that after just one year of an awareness campaign, the median time delay dropped from 180 minutes to 138 minutes. So, a nation-wide awareness and education campaign specifically targeting undereducated men about the symptoms of myocardial infarction and how the patient and his family members should respond to these symptoms might lead to significant reductions in the presentation delays as well as improve morbidity and mortality. Furthermore, our study identified the misinterpretation of symptoms as one of the reasons which caused a delay of 3 to 6 hours in the majority of the patients in comparison to other reasons. A study by Ali et.al showed similar results [16]. This is in congruence with the results found by Koc, who concluded that Misinterpretation of symptoms and misconceptions about emergency treatment during AMI cause delays in admission and may affect treatment [17]. This further stresses the need for awareness programs in the country to reduce significant but preventable morbidity and mortality due to STEMI. This is supported by a study by Mohan et.al which showed that recognition that the symptoms were cardiac in origin led to shorter delays in presentation [9]. Transportation problem was the second major factor of delay and it caused a majority to present later similar to a study by Miedema et.al [18]. This identifies a problem in the current primary care set-up as it indicates an unmet need for a wider net of primary care facilities in the area. A study by shows Pereira et.al predicted shorter patient delay when emergency transport facilities were used to transport patients [19]. The majority of our patients may not have wasted the initial crucial hours after an MI if appropriate facilities or emergency transportation had been available. After arrival at a tertiary care facility, data shows that the Primary Percutaneous coronary intervention (PPCI) ratio increased has from 15% to 44% and the fibrinolysis ratio has decreased from 41% to 16% [20]. Our results reflect this, showing a decreasing trend for thrombolytic therapy and more than 95 % of patients consenting for PPCI. Thus, primary PCI facilities need to be provided, at least up to every district headquarter hospital level. For a generalization of results, a future study with a larger sample size and involving more possible factors of delayed presentation is required. This will, in turn, help the government to take steps to nullify possible factors leading to late presentation and ultimately death of patients.

CONCLUSIONS

Transportation problems and misinterpretation of symptoms are the main reasons for the delay in getting reperfusion treatment for ST-elevation MI. Providing better primary care facilities available to rural areas as well as targeted awareness campaigns will greatly help in this regard.

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