

Factors Leading to Longer Prehospital Time in Acute Myocardial Infarction

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Objective: To determine pre hospital time (PHT) in our population and factors associated with this phenomenon.

Study Design: Observational study

Place and duration: This study was conducted at the Cardiology Department, Allied Hospital Punjab Medical College Faisalabad from June 2008 to June 2009.

Subjects and Methods: This study was conducted at the Cardiology Department, Allied Hospital Punjab Medical College Faisalabad. One hundred and eighty five consecutive patients of acute ST segment elevation MI were recruited in this study. Both male and female patients of any age were included. Time from onset of symptoms till arrival at the hospital was noted for every patient and in case of delay the factors leading to this delay were inquired from every patient. Factors taken into consideration were, financial, long distance, lack of awareness, local general practitioners (GPs), no attendant at home, and others i.e. conveyance etc.

Results: Mean age of the study population was 55±12 years, 130(70.30%) were male and 55(29.7%) were female. Among associated risk factors, smoking topped the list 102(55.1%) followed by hypertension 81(43.8%) and diabetes 52(28.1%). The distribution of delay of presentation was as follows: 43.8% patients within 4 hours, 23.2% in 4-8 hours, 11.4% in 8-12 hours, 9.2% in 12-16 hours, 3.8% in 16-20 hours and 8.6% of patients presented to cardiac emergency more than 20 hours of the onset of symptoms. Anterior wall myocardial infarction was most frequent 111(60%) in our study whereas inferior wall MI was second in frequency 46(24.9%). Delayed presentation was observed more frequently in female population (72.72%). When clinical factors were taken into account, 58.02% hypertensives, 56.52% obese and 53.8% diabetics presented late. Local general practitioners were most frequent factor in 28% patients, followed by lack of awareness (10.8%). Long distance from emergency coronary care was a factor in 7.6% of the study population.

Conclusion: The results of this population based study showed majority of the study population exhibited prolonged delay (>4 Hrs). Moreover local general practitioners and lack of awareness of ischemic symptoms were most common factors for pre-hospital delay. Pre hospital delay was much more frequent among female study population.

Key Words: Acute myocardial infarction; pre-hospital delay; Ischemic heart disease; Diabetes mellitus; Hypertension.

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Introduction

Coronary artery disease is the leading cause of death in the world.¹ Even in this galactic age when man has developed state of the art interventions to cope this potentially fatal condition, time is still a big constraint. This is because in a setting of acute myocardial infarction, lifesaving benefits of thrombolytic agents are time dependent.²

Even before the clinical use of thrombolytic agents, factors associated with time to hospital presentation, and components of delay, were begin to be studied.³ Having life saving interventions in hand, the analysis of the temporal window between the onset of symptoms and reperfusion therapy as a determinant of treatment outcome is a key area of interest.⁴ Technical delay in intervention is, though involved, but the greatest part of the pre hospital time (PHT) – as much

as 75% of it – consists of the patient's own decision time.⁵

International studies have revealed that a very wide range of pre hospital delay times (a few minutes to several days) is a ubiquitous phenomenon.⁶⁻⁹ The PHT in the United States, the United Kingdom, and Germany is much high, but it is even higher in Asian countries.¹⁰ The median PHT is 3.5 hours (1.2 to 15.2 hours) in the United States and 2.5 hours (1.5 to 8.7 hours) in the United Kingdom, but 4.4 hours (1.8 to 13.3 hours) in South Korea and 4.5 hours (2.0 to 16.3 hours) in Japan. The mean PHT in Germany is now 3.2 hours.⁹ This study is conducted with an objective to determine PHT in our population and factors associated with this phenomenon.

Materials and Methods

This study was conducted at the Cardiology Department, Allied Hospital Punjab Medical College Faisalabad. One hundred and eighty five consecutive patients of acute ST elevation MI were recruited in this study. Both male and female patients of any age were included. Patients were included if they met two of the following clinical criteria:

1. Typical symptoms of acute MI(Chest discomfort, arm or shoulder pain)
2. ECG findings compatible with acute MI
3. Elevated CPK and CK-MB levels that were above the upper limit of normal.

Patients with the history of MI during the last two weeks before this admission and patients who were dead at the time of arrival were not included in this study.

Demographic and socioeconomic variable of interest were age, sex, living arrangement (alone or not alone), location of residence (urban or rural), employment status. Clinical characteristics noted at the time of admission included a history of hypertension, diabetes mellitus, hyperlipidemia. Angina, previous MI, family history of IHD and any history of revascularization (PCI, CABG).

Time from onset of symptoms till arrival at the hospital was noted for every patient and in case of delay the factors leading to this delay were inquired from every patient. Factors taking into consideration were, financial, long distance, lack of awareness, local general practitioners (GPs), no attendant at home, and others i.e. conveyance etc. Relevant clinical examination of all the patients included in the study was done with emphasis on pulse, blood pressure, precordial examination and signs of congestive cardiac failure. ECG was done once daily in all patients. X-ray chest was done only in those patients having signs of left ventricular failure. Site of myocardial infarction was noted for all patients.

Statistical Analysis: Data were entered into SPSS (Statistical package for Social Sciences) Version 13.0 for Windows. Categorical variables were expressed as frequencies and percentages while continuous variables were presented as means±Standard deviations (SD). Frequencies of various predictors of delayed presentation were expressed in percentages.

Results

Mean age of the study population was 55±12 years, 130(70.30%) were male and 55(29.7%) were female. Among associated risk factors, smoking topped the list 102(55.1%) followed by hypertension 81(43.8%), diabetes 52(28.1%), obesity 46(24.9%), dyslipidemia 31(16.8%) and family history 23(12.4%). (Table-I)

Table I: Demographic Criteria of Patients

Demographic Characteristics	Numbers (Percentages) N=185
Age mean years	55 ± 12 Years
Gender	
Male	130 (70.30%)
Female	55(29.7%)
Major Risk Factor of MI	
Hypertension	81(43.8%)
Diabetes Mellitus	52(28.1%)
Smoking	102(55.1%)
Family History	23(12.4%)
Obesity	46(24.9%)
Dyslipidemia	31(16.8%)
Time of presentation	
Within 4 hrs	81(43.8%)
4-8 hrs	43(23.2%)
8-12 hrs	21(11.4%)
12-16 Hrs	17(9.2%)
16-20 Hrs	7(3.8%)
> 20 hrs	16(8.6%)
Type of MI	
Anterior Wall MI	111 (60.0%)
Inferior Wall MI	46(24.9%)
Inferior wall + RV MI	2(1.1%)
Inferior wall + Post Wall MI	9(4.9%)
Lateral Wall MI	12(6.5%)
Global MI	5(2.1%)

The distribution of delay of presentation was as follows: 43.8% patients within 4 hours, 23.2% in 4-8 hours, 11.4% in 8-12 hours, 9.2% in 12-16 hours, 3.8% 16-20 hours and 8.6% of patients presented to cardiac emergency >20 hours of the onset of symptoms. Anterior wall myocardial infarction was most frequent 111(60%) in our study whereas inferior wall MI was second in frequency 46(24.9%). Twelve (6.5%) patients

had lateral wall MI, 9(4.9%) had inferior and posterior wall MI and 5(2.1%) had global MI. The frequency of inferior wall MI along with RV infarct was 2(1.1%). (Table I)

Delayed presentation was observed more frequently in female population (72.72%). When clinical factors were taken into account, 58.02% hypertensives, 56.52% obese and 53.8% diabetics presented late. Advanced age was also associated with delayed presentation as 52.7% patients with age more than 60 years presented late. (Table II)

Table II. Risk factors of ischemic heart disease in patients presenting late

Risk factor	Numbers (Percentages) n=104
Female	72.7%
Hypertensive	58.02%
Obesity	56.52%
Diabetics	53.8%
Age >60 years	52.7%

When factors associated with delay were analyzed, local general practitioners were found to be most frequent factor in 28% of 104 patients, followed by lack of awareness (10.8%). Long distance from emergency coronary care was a factor in 7.6% of the study population. Other factors like conveyance, hesitation in seeking medical advice etc were found in 7.6% of population. Financial constraints were a delay factor in 1.1% and lack of attendant at home in 1.1%. Eighty one patients were not able to give proper history regarding exact time of onset of symptoms; therefore, they were excluded from the analysis. (Table III)

Table III: Factors leading to Late Presentation

FACTORS	Numbers (Percentages) n=104
Local Clinics (GPs, Hakims, Quacks etc)	52(28.1%)
Lack of awareness	20(10.8%)
Long distance	14(7.6%)
Others (Conveyance etc.)	14(7.6%)
Financial	2(1.1%)
No attendant at home	2(1.1%)

Discussion

The results of our study showed a grim picture as a major proportion is "late comers" for the so called "golden hour" after the onset of symptoms. This is in consonance with studies conducted in other countries. According to ARIC study in the USA, with data on 18928 patients, revealed that the PHT did not shorten over the period of thirteen years (from 1987- 2000), although the percentage of patients who called the emergency medical services increased significantly.⁸ Similarly, MITRAplus registry in Germany,⁹ The American NRMI-2 myocardial infarction registry¹¹ and Worcester Heart Attack Study¹² at Massachusetts showed no improvement in the time from symptom onset to treatment. This PHT is a product of multitude of factors as investigated in different studies so far. Meischke et al studied a possible effect of patient sex and symptoms on the PHT: although sex differences existed in the frequency of three different symptoms (women had cold sweats less frequently, but nausea and dyspnea more frequently), interestingly, it was only the more frequent sweating among men that led to a shortening of the pre-hospital delay.¹³ Nonetheless, most studies conclude that the PHT is significantly longer among women than among men⁵⁻⁷ Most studies have found hypertension and diabetes as factors for pre-hospital delay due to less sensitivity to pain as proposed explanation.^{6-8,14} According to different studies, the greatest part of the pre-hospital time (PHT) – as much as 75% of it – comprised of the patient's own decision time,^{6,15} in our study however, it was local general practitioners (GP clinics, Hakims, Quacks etc) who were responsible for keeping the patient from ideal coronary care to the major extent. The reasons for that could be incompetence to analyze symptoms, financial motives as GPs and quacks are fond of "admitting" the patients and treating them whatsoever IV infusion they have. Different studies showed patients subjective reasons responsible for pre-hospital delay:

- The patient does not feel ill enough to call the emergency medical services.¹⁶
- The patient believes the family physician is "on his or her side"¹⁷
- The patient desires the family physician's permission to call the emergency medical services.¹⁷
- The patient believes calling the family physician first is the right thing to do, so that the family physician can then notify the emergency medical services.¹⁷

Most people do not know much about heart attacks. Many however, do know that chest pain is an important symptom, but only a few can correctly name more than two further symptoms.¹⁸ Thus, a number of studies have conducted to answer the question whether pre-hospital delays might be shortened by public education in the

print and electronic media, public events, and in special training courses. According to a review of ten studies on the influence of such efforts on the PHT,¹⁹ few studies showed significantly shorter pre-hospital times than before the intervention,^{20,21} while others revealed no change.²²⁻²⁵ However, there is a dire need for continued medical education of general practitioners so that they can better evaluate cardiac symptoms and make early referral possible. Moreover, concerted efforts are needed at both the government and community levels to stamp out the curse of quakes.

Conclusion

The results of this population based study showed majority of the study population exhibited prolonged delay (>4 Hrs). Moreover local general practitioners and lack of awareness of ischemic symptoms were most common factors for pre-hospital delay. Pre hospital delay was much more frequent among female study population.

Suggestions / Recommendations: Initial minutes and hours are golden time in patients with acute ST elevation myocardial infarction. We can save many lives by giving thrombolytics in time to these patients and we can do this only if we will shorten the time of hospital presentation in these patients and by decreasing the door to needle time. For this suggestions are

- 1) Public awareness through electronic and paper media.
- 2) By the refresher courses for local G.Ps
- 3) By providing and improving ambulance services in towns and at least at Tehsil level.

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