Original article

A study of clinical presentation and delays in management of acute myocardial infarction in community

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KEYWORDS

Acute MI
Clinical presentation
Community study

ABSTRACT

To assess the medico social demographics of acute myocardial infarction (AMI) in our community we studied 609 patients presenting between January 2008 to December 2008 with a detailed questionnaire in four centres of UP. Medical attention was sought late (>6 hours) in 316 (51.6%), thrombolysis was obtained in 45.2% (275) and presentation was atypical in 16.3% (99). 36.2% (221) had pre-monitory symptoms of which 68% (150) ignored the same while of 32% (71) who did seek medical attention 47.9% (37) were brushed away as non-cardiac in origin. 20.3% (46/226) of hypertension, 23.2% (43/185) of diabetes and 83.4% (91/109) of hyperlipidaemia was diagnosed post event. We conclude that at least half of patients with AMI do not get definitive therapy, at least one in 10 patients do not have the classical symptoms, reasonable proportion are unaware of their risk factors, and a good majority have pre-monitory symptoms which get overlooked.

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Background

Acute myocardial infarction (AMI) is a major health problem and despite the impressive strides in its diagnosis and management over the past three decades, it is not uncommon to miss the diagnosis or overlook early symptoms, both by the patient himself and the primary physician leading to delayed diagnosis and its resulting morbidity and mortality.

It is well known that presentation of AMI may have many variants. The classic symptom of chest pain is by no means pathognomic and patients with AMI may have atypical presentations like dyspnoea, abdominal or epigastric pain, nausea, vomiting, syncope, etc.^{1–3} Understanding the atypical presentations may help in early identification and treatment of these patients with AMI wherein the earlier the treatment is established, better the outcome.^{4–6}

The importance of early management of acute coronary syndromes (ACS) has been recognised for many years.^{7,8} The delay between onset of chest pain or other symptoms suggestive of AMI and reperfusion therapy (thrombolysis or angioplasty) for restoring infarct related artery patency is comprised of pre-hospital delay and in-hospital delay. The pre-hospital delay (symptom-to-door time) includes the time required to recognise the symptoms, decision to take medical help, arrange transportation and travel to the hospital and may be related to various factors such as level of knowledge, attitude and beliefs of patient and his family, time of symptom occurrence, and distance to the nearest hospital.⁹ Additionally, in-hospital delay including procedural delays also contributes to the delays in institution of early reperfusion therapy in some cases.¹⁰

To understand the demographics of these issues in our society, we proposed a prospective longitudinal observational study identifying the modes of clinical presentation, the treatment strategies adopted, symptom-to-treatment delays and the associated determinants of these in urban and

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semi urban settings using a detailed history questionnaire (Annexure I) and collecting data from three secondary and one tertiary centre actively involved in managing AMI. Data like this could help us identify the grass root realities of our state/country, a fact which is often talked but not well documented in the literature. It could also help the administrators and policy makers take initiative for best utilisation of facilities and best manage the ultimate event of AMI.

Methods

The study was conducted on patients presenting with their first AMI and admitted to Department of Cardiology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, (SGPGI) Lucknow, and three secondary care centres in UP actively involved in management of AMI patients from January, 2008–December, 2008. Patients presenting with their first ST-elevation myocardial infarction (STEMI) within 1 week were included in the study.

Each patient was interviewed and encouraged to relate freely the circumstances surrounding the onset of the infarction event. Details of event were recorded on a pre-designed questionnaire (Annexure I). Old records were analysed in detail for risk factors and for previous medication history.

The following details were noted for each patient:

1. Demographic details.
2. Time of onset of symptoms and time of arrival to the treating hospital.
3. Method of transportation to the hospital.
4. Pre-monitory symptoms, if any, and its diagnosis.
5. Presenting symptom.
6. Door-to-diagnosis time and reasons for delay in diagnosis if any.
7. Known risk factors and medication history.
8. Risk factors diagnosed for the first time after the event.
9. Any past history of known coronary artery disease (CAD).
10. Primary therapy given.
11. Reasons for not getting thrombolytic therapy (TLT), if so.

Results

Completed data forms of 609 patients (436 from SGPGI centre and 173 from other centres) could be analysed. Five hundred and four (82.6%) were male and 105 (17.2%) were female. Mean age was 56.3 years (range 19–98 years).

Presenting symptom analysis

Table 1 shows the distribution of different presenting symptoms at the time of AMI. Chest pain was the most common presenting symptom ($n=510$, 83.7%) and symptoms other than chest pain were present in 99 (16.3%) including epigastric pain alone in 16 (2.6%), dyspnoea alone in 53 (8.7%), arm, wrist, or jaw pain without chest pain in 15 (2.4%), and nausea

or vomiting with out other symptoms in 11 (1.8%), and other symptom including syncope in 4 (0.1%).

Past history

A pre-existing knowledge of a known CAD/Cardiac illness was present in only 92 patients (15.1%) while remaining presented with AMI as the first cardiac event. Of the patients without previous knowledge of cardiac illness, 296 (48.6%) developed the event without pre-monitory symptom episode, while remaining 221 (36.2%) had some pre-monitory, or other odd symptom prior to the MI event, such as one or more episodes of preceding chest pain, or heaviness in recent past that was ignored, or a history of recent onset of angina few days prior. Of these 221 with some pre-monitory symptoms, 150 (68%) ignored the symptoms and did not consult any physician while remaining 71 (32%) did consult a medical practitioner. But in only 34 (52.1%), the symptoms were picked up as relating to CAD and some medical treatment started and the rest 37 (47.9%) were diagnosed as a case of chest discomfort of non-cardiac origin. Table 2 shows detailed past history and pre-monitory symptom analysis.

Risk factor analysis

The most common modifiable risk factor was hypertension which was present in 200 (32.8%) followed by non-insulin dependent diabetes mellitus (NIDDM) in 162 (26.6%) and dyslipidaemia in 109 (17.9%) and smoking was present in 167 (27.4%). Non-modifiable risk factor, like positive family history of premature CAD, was present in only 20 patients (3.3%).

Of the 226 hypertensive patients 46 (20.4%), and of the 185 diabetics 46 (24.9%), and of the 109 dyslipidaemics, 91 (83.5%) were unaware of their presence before the AMI event. Table 3 shows the risk factor details.

Table 1

Presenting symptom of acute myocardial infarction.

Symptom (clinical reading)	
Chest pain with or without other symptoms	510 (84%)
Pain in arm/wrist/jaw only	15 (2.4%)
Nausea/vomiting only	11 (1.8%)
Dyspnoea only	53 (8.7%)
Epigastric pain only	16 (2.6%)
Others	4 (0.10%)

Table 2

Past history and pre-monitory symptom analysis.

Past history	
Known coronary artery disease	92 (15.1%)
First event, no pre-monitory symptoms	296 (48.6%)
1 > 1 Recent episodes of chest pain that was ignored or not diagnosed	187 (30.7%)
Diagnosed recent onset angina (<1 wk)	34 (5.5%)

Pre-hospital delay

We find that only 32 (5.3%) patients attended any hospital within the 1st hour (GOLDEN HOUR) of symptom onset, whereas 316 (51.8%) obtained medical assistance only after 6 hours. Of those presenting >6-hours after chest pain onset, 228 (37.4%) obtained medical assistance within 6–12-hours of symptom onset while 88 (14.5%) could seek medical help only after 12-hours. Table 4 shows the distribution of time delays of symptom onset to first clinical presentation where diagnosis of AMI was made.

We noted that 180 patients (29.6%) used ambulance services for presentation to hospitals, but among these, the majority (96.7%) used the service for being transferred from the secondary to tertiary centre and only a minority of patients (3.3%) were transported to secondary care hospitals in ambulances directly from home.

Door-to-diagnosis time

The patient subgroup from the tertiary centre was mostly already diagnosed as a case of AMI at the time of presentation. Hence, door-to-diagnosis time was not assessed in this subgroup. Among the other 173, presenting to secondary care centres, door-to-diagnosis time was measured from the time patient first presented to the diagnosis of AMI.

Table 5 shows the door-to-diagnosis time in the secondary care centres.

Treatment strategy

Out of the 609 patients, 275 (45.2%) received thrombolysis, 17 patients (2.8%) underwent primary percutaneous transluminal coronary angioplasty (PTCA) and rest 317 patients

Table 3
Risk factors analysis.

Risk factors	Total no. of patients	Aware	Unaware
Hypertension	200 (32.8%)	154 (79.6%)	46 (20.4%)
Diabetes mellitus	162 (26.6%)	116 (73.4%)	46 (24.9%)
Smoking	167 (27.4%)	NA	–
Positive family history	20 (3.3%)	NA	–
Dyslipidaemia	109 (17.9%)	18 (16.5%)	91 (83.5%)
Obesity	36 (5.9%)	NA	–

Table 4
Distribution of time delays to first clinical presentation.

Symptom-to-door time	n (%)
Within 1 hr	32 (5.3)
1–3 hr	128 (21.1)
3–6 hr	133 (21.8)
>6 hr	316 (51.8)
(a) 6–12 hr	228 (37.4)
(b) >12 hr	88 (14.5)

(52.1%) neither received thrombolysis or primary PTCA. The most common cause of not getting thrombolysis was late presentation ($n=304$, 91%).

Table 6 shows the details of reasons for not getting TLT in spite of presenting in the window period.

Discussion

The prognosis of AMI is directly dependent on the rapidity of the initiation of reperfusion therapy, be it TLT, or primary percutaneous coronary intervention (PCI), and the longer the delay, the worse the outcome. In our study, only 5.3% patients could seek medical help within the 1st hour and nearly 50% patients presented more than 6-hours after onset of symptoms, effectively missing the chance to get the reperfusion therapy. Data of similar nature from our country is available through the CREATE registry where in the quoted figures for TLT is 58.5% (10). We, in our study, had a total of only approximately 48% receiving reperfusion therapy with 45% getting TLT and only about 3% primary PCI.

Another important observation of our study is that more than 80% of AMI occurred in patients without knowledge of a pre-existing cardiac illness, so to say, it hit the so-called normal people within the society. However, more important is the fact that at least one third (36.2%) did have a pre-monitory symptoms prior to the AMI but majority of them (nearly two third) either ignored the symptoms themselves and of the remaining one third who went to a primary physician, in over half these the symptoms were not picked up as pre-monitory symptoms of MI by the primary physician too. So, the lacunae lie not only on the part of the patient, but also at least to some extent, on the part of the primary physician also.

Both rationalisation and denial is often present in any illness, and has been well documented in relation to MI. Our study showed that nearly 10–15% patients had atypical symptoms which lead to delayed presentation and consequently delayed management. However, a good proportion of patients (nearly one third) either ignored the symptom

Table 5
Door-to-diagnosis time (secondary care centre).

Door-to-diagnosis time (min)	n = 173 (%)
< 15	37 (21.6)
15–30	53 (30.7)
30–60	55 (31.9)
> 60	28 (15.8)

Table 6
Reasons for non-thrombolysis given.

Reasons for non-thrombolysis	n = 317 (%)
Late presentation	304 (91)
Age > 75 yr	6 (1.8)
History of bleed	4 (1.2)
Recent stroke	2 (0.6)
Taken for primary percutaneous coronary intervention	11 (3.3)
Others	32 (9.6)

rationalising the same to 'wind', 'indigestion', 'muscular pain', etc. or if visited a primary physician, it was overlooked on his part also and not diagnosed as relating to CAD in nearly half. This brings out the importance of awareness and educational programmes for the society at large, imparting knowledge on details of clinical presentation of AMI, and importance of pre-monitory symptoms in early diagnosis and long-term outcomes. Because patients often believe that an AMI is characterised by a sudden onset of severe chest pain alone, they should be informed that symptoms may be milder in character at times, and of different nature too, or intermittent. Our data also suggests that a significant delay is related to the patient's belief that the pre-monitory symptoms were not serious or severe in nature. Patients and their families need assistance in recognising that denial of the seriousness of symptoms contributes to delay and missed treatment opportunities. Another component of the message involves social factors that surround the decision to seek treatment. Most patients consult a senior family member or a close relative about their symptoms. These persons should be included in all education and counselling and they should understand the nature of symptoms of AMI and the importance of quickly contacting emergency medical services.

The other fact that stands out of the study is that ambulance services were available to only a miniscule proportion in transportation from home to first medical help, which needs greater stress, including firstly an availability of such a service with a central helpline number and awareness within the society of this fact, and people encouraged to use the same even at odd hours in the event of suspicious symptoms.

Even after presentation at a secondary level centre, the diagnosis of AMI was delayed by more than 30 minutes in approximately half the patients implying ideal door-treatment time not achieved in at least half of the patients. This may be due to lack of resources like round the clock availability of the physician and diagnostic tests and so on.

In our study, 48% patients received reperfusion therapy with vast majority being thrombolysed. The major reason patients were not thrombolysed was delayed presentation. Only 3% patients underwent primary PTCA, the major reason being non-availability of primary PCI facility and sometimes cost restraint.

Prevalence of risk factors like diabetes, hypertension, and dyslipidaemia in patients suffering AMI was to the tune of one third but the important point brought out was that out of these treatable risk factors, a good proportion of patients were unaware of the same viz., nearly 20% of diabetics and hypertensives and about 85% of dyslipidaemics, as these were then diagnosed for the first time only after the cardiac event

had occurred emphasising the fact that we require more stringent screening programs for the detection of risk factors in the society.

In conclusion, pre-hospital delay is the main reason for not receiving TLT but patient oversight of pre-monitory symptoms and the awareness of risk factor status is also important in the final precipitation of the event of AMI. Physicians and other healthcare providers may play an important role in improving awareness through patient education programmes describing the symptoms during a coronary occlusion, what steps to take if symptoms occur, and the importance of both availability of and need to contact emergency medical services immediately. Patients should also be aware of the treatment options and the rewards of early management.

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Annexure I

CASE REPORT FORM

Title: A multicentric study on differing modes of presentation along with the treatment strategies and determinants of delays involved in managing patients of AMI in the peripheral settings of Uttar Pradesh

Date

Centre code

Case ID No.

A. General Demographic Information

1. Initials

2. Age

3. Sex

M	1
F	0

4. Address
.....

5. Diagnosis

6. Ambulance service used

Y	1
N	0

7. Onset of AMI symptoms

Time

Date

8. Arrival at hospital

Time

Date

9. Symptom to door time (8–7)

10. Prodromal symptoms

Y	1
N	0

If Yes, Duration days / weeks

Symptoms

Chest pain / Dyspnoea / Feeling unwell / Tension / Undue exertion / Others

11. Door to diagnosis time

12. Reasons for delay in diagnosis

☐ Atypical symptoms

☐ Delay in investigations

☐ Specialist NA

☐ Atypical ECG changes

☐ Any other (Specify)

B. Patient Profile

13. Presenting symptoms

☐ Chest pain

☐ Vomiting

☐ Nausea

☐ Dyspnoea

☐ Dizziness

☐ Sweating

☐ Palpitation

☐ Epigastric pain

☐ Pain in arm / wrist / jaw

☐ Any other (Specify)

14. Known risk factors

- ☐ Hypertension ☐ Smoking ☐ DM ☐ FH positive ☐ Hyperlipidaemia
☐ Hyperhomocystenemia ☐ High LpA ☐ Obesity

15. Risk factors diagnosed for first time after the event

- ☐ Hypertension ☐ DM ☐ Hyperlipidaemia ☐ Hyperhomocystenemia ☐ High LpA

16. Previous medication history

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17. Past history

- ☐ First event, not known CAD
☐ 1/> recent episode of chest pain which was ignored / not diagnosed
☐ Recent onset angina (<1 week)
☐ Angina of effort in last 3 months
☐ Known CAD

18. ECG findings

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19. Enzyme levels

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20. Lipid profile

TC TG HDL LDL LpA Homocysteine

21. MI site

- ☐ Anterior ☐ Inferior ☐ Inferioposterior ☐ Anterolateral ☐ Lateral

22. Treatment strategy

- ☐ Lysis ☐ Primary PCI ☐ Neither Lysis>PCI

23. Door to treatment / needle time (If PCI being considered)

24. Reason for no TLT given

- ☐ Late presentation (>3 hr) (>6 hr) (>12 hr)
☐ Age >75 ☐ h/o Bleed ☐ Recent stroke (<6 mo) ☐ Sent for PCI ☐ Others

25. Reason for no PCI

- ☐ Patient not willing ☐ Cannot afford ☐ Physician not willing ☐ Transfer not practical
☐ Presentation late (>12 hr) ☐ Can afford but no finance at odd hr

26. Post MI complications

Y	1
N	0

If Yes, specify

27. Outcome at 1 week

☐ Survived ☐ Not survived

28. FU till discharge

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29. If death, date of patient death: ☐☐☐☐☐☐

30. Cause of death

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31. LVEF

Basal Predischarge

32. Discharge date: ☐☐☐☐☐☐

33. Treatment advice on discharge

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Signature of the investigator

Date ☐☐☐☐☐☐