

## Original Articles

# Atypical Presentation of Acute Myocardial Infarction

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### Abstract

**Introduction:** Chest pain has been reported as the cardinal clinical feature of Acute Myocardial Infarction (AMI). However, a substantial number of patients may have atypical or no symptoms on initial evaluation. The absence of typical chest pain and the vagueness of symptoms might result in a delay in seeking medical care. In this study atypical presentations of AMI and in-hospital mortality and outcome were evaluated.

**Material and Methods:** A hospital based cross sectional study was performed among 110 patients of AMI admitted in the CCU who fulfilled the inclusion criteria. The Study was done from July, 2013 to January, 2014 in Dhaka Medical College Hospital, Dhaka, and National Institute of Cardiovascular Diseases (NICVD), Dhaka.

**Results:** Among the 110 patients with AMI, 22 (20%) patients presented with atypical presentation. The maximum incidence of AMI with atypical presentations was in the age group of 65-74 years (28.57%). Dyspnoea (36.36%) was the most among the atypical symptom followed by vomiting 22.72% and the least incident with vertigo 4.54%. Inferior MI being the highest 46% among atypical MI where as mortality rate was high among the antero-septal MI (22.86%). The in hospital mortality of myocardial infarction patients who presented with typical and atypical symptoms were 15% and 36.36 %.

**Conclusion:** The patients without chest pain represent a substantial segment of the MI population. Older patients presented with more atypical symptoms with breathlessness being the commonest atypical symptoms. Mortality was high among the patients who presented with atypical symptoms, increasing age, and who presented lately.

**Key words:** Acute Myocardial Infarction (AMI), Chest pain.



**DOI:** <https://doi.org/10.3329/jom.v22i2.56696>

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**Received:** 25 April 2021;

**Accepted:** 15 May 2021

### Introduction:

The presentation of AMI may have many variants. Chest pain has been reported as the cardinal clinical feature among patients who present with MI.<sup>1</sup> World Health Organization (WHO) requires the presence of chest pain as one of the

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cornerstone features in its diagnosis of MI.<sup>2</sup> However, a substantial number of patients may have atypical or no symptoms on initial evaluation.<sup>3,4</sup> Atypical presentation is defined as the absence of chest pain before or during admission, and may have included gastrointestinal or respiratory symptoms such as dyspnoea, nausea, vomiting, abdominal discomfort or any other symptoms like nonproductive cough, fatigue, syncope, or palpitation, back pain, leg pain, neck pain, weakness etc. The prevalence of this presentation was 8.4% in the Global Registry of Acute Coronary Events (GRACE), 33% in the National Registry of Myocardial Infarction 2 (NRMII-2) and the dominant symptoms in these patients were dyspnoea, nausea and syncope.<sup>5</sup> Brieger D, et al studied the atypical symptoms of AMI. John G. Canto et al studied that MI patients without chest pain were significantly less likely to receive a timely

ECG or reperfusion strategies. Patients who experienced MI without chest pain had more than a 2-fold increased risk of in-hospital death than MI patients who presented with chest pain, even after adjusting for differences in clinical presentation characteristics.<sup>6</sup> However, the natural history of atypically presenting MI patients has been poorly studied and the prognosis is not well established. Even mortality figures are difficult to find because such patients are usually excluded from standard mortality data as applied to ischaemic chest pain.<sup>7</sup>

Recent studies have shown that Overall, 43.6% of patients with NSTEMI and 27.1% of patients with STEMI presented without chest pain.<sup>8</sup> Overall, patients experienced a mean of 4.75 symptoms as part of the acute event of acute myocardial infarction (AMI). Of these unrecognized infarctions, approximately half are unable to recover any symptoms whatsoever and therefore had silent myocardial infarctions. The other half of the patients can recall an atypical event characterized by symptoms compatible with acute infarction, when leading questions are posed after the electrocardiographic abnormalities are discovered.<sup>9,10</sup>

Identification of symptom clusters can be a clinically relevant way to detect specific demographic groups that are most likely to experience similar symptoms with readily identifiable characteristics.<sup>11,12</sup> Therefore, this study proposes to examine and compare the factors associated with atypical symptoms without chest pain in patients with the first attack of Acute MI. However, there has been a lack of studies in our population on the extent of atypical presentations in AMI patients.

It appears that IHD is an important problem even in rural population of Bangladesh. Incidence of AMI in our country is on increasing alarmingly with the development of newer life style as well as with progressive industrialization and globalization.

A lot of works were done, are being continued, increasing in number of publication to explore the various presentation of this killer disease throughout the nook and corner of the world. (13,14,15,16) But there is lack of study in our country regarding the entity. We have to study the problem from our own arena and platform to explore something new, which may have therapeutic and preventive implications.

So, to diagnose the patient atypical presentation in the earliest set up in an effective way, more studies are necessary in this country on this killer problem. It can produce awareness among all level of medical practitioners, minimizing

diagnostic dilemma and thereby reducing both mortality and morbidity among the population of this country as well as the world and also there is a message for the health policy makers.

#### Material and Methods:

This hospital based cross sectional study was conducted in CCU Dhaka Medical College Hospital and National Institute of Cardiovascular Diseases (NICVD), Dhaka during the period of July, 2013 to January, 2014. We studied 110 patients of AMI admitted in the CCU who fulfilled the inclusion criteria. All patient underwent complete medical assessment after admission to the hospital including collection of demographic information, history & physical examination with vital signs, documentation of etiology of AMI & presenting clinical symptoms. All were investigated with ECG, complete blood count, CKMB, Trop-I, blood glucose, lipid profile, serum creatinine, chest X-ray and other relevant laboratory tests.

#### Results

Of all the 110 patients diagnosed as having MI, 22 (20%) patients presented with atypical presentation to the hospital (Table-I).

**Table-I.** Presentation of AMI

Presenting symptom	Number	%
Typical	88	80%
Atypical symptom	22	20%

The maximum incidence of AMI with atypical presentations was in the age group of 65-74 years (28.57%) followed by the age group 55-64 years (25%). No patients presented with atypical symptoms below 30 years (Table II).

**Table-II.** Presentation of AMI according to age

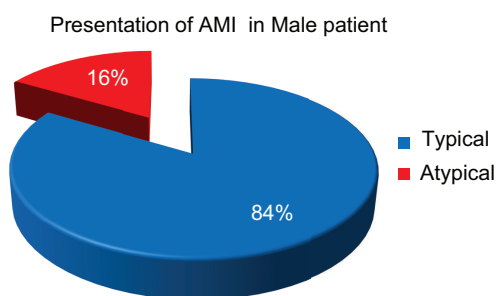
Age	Total no of infarcts	Atypical presentation	%
<30	4	0	0
30-44	17	2	11.76
45-54	30	5	16.66
55-64	36	9	25
65-74	14	4	28.57
>75	9	2	22.22

In the atypical group, 15(68.18%) patients were male and 7(31.82%) patients were female. On the other hand in the typical group 76(86.36%) patients were male and 12(63.15%) patients were female (Table III).

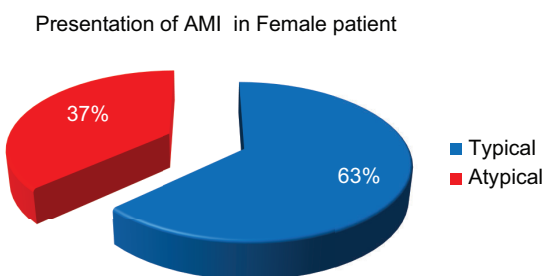
**Table-III. Presentation according to gender**

Gender	Total No. of Pt	Patients with chest pain	Without chest pain
M	91(82.73%)	76(86.36%)	15 (16.48%)
F	19(17.27%)	12(63.15%)	7 (36.85%)

Study showed a total 84% of male presented with typical chest pain and rest of the 16% presented with atypical presentation (Figure 1). On the other hand a total 63% of female presented with typical chest pain and rest of the 37% presented with atypical presentation (Figure 2).



**Figure 1: Presentation of AMI in Male patient**



**Figure 2: Presentation of AMI in Female patient**

Presentation of dyspnoea (36.36%) was the most among the atypical symptom followed by vomiting 22.72%, excessive sweating 22% and the least incident with vertigo 4.54%. Among the other presentations syncope 13.63%, epigastric pain 9.09% and Palpitation 9.09% (Table IV).

**Table-IV. Atypical Symptoms**

Atypical symptom	%
Dyspnoea	8 (36.36%)
Vomiting	5 (22.72%)
Syncope	3 (13.63%)
Sweating	5 (22.72%)
Palpitation	2 (9.09%)
Epigastric pain	2 (9.09%)
Vertigo	1(4.54%)

In this study only 3 patients out of 22 with atypical symptoms had previous history of angina (13.64 %) compared to the 16 patients with typical symptoms, in that 18.18 % of patient gave past history of angina (Table V).

**Table-V. Proportion of AMI preceded by Angina pectoris**

Myocardial infarction type	No.	Infarction preceded by angina	No.	%
Atypical	22	3		13.64%
Typical	88	16		18.18%

A total 52 hypertensive, 50 Diabetic and 42 smoker patients found to sustained the AMI among whom 23.07% hypertensive, 26% Diabetic and 28.58% Smoker presented with atypical symptom respectively (Table VI). 23.07% of hypertensive patients presented with atypical symptoms compared to the non-hypertensive group (17.24%) (Table VII)

**Table-VI. Risk Factors**

Risk factor	Among typical presenting patients	Among atypical presenting patients
Hypertension	40	12
Diabetes mellitus	37	13
Smoking	30	12

**Table-VII. Proportion of atypical MI according to antecedent blood pressure status**

Antecedent blood pressure status	Total myocardial infarction	MI with atypical infarction	
		No.	%
Hypertension	52	12	23.07%
Non hypertension	58	10	17.24%

In this study there was only 50 diabetic patients, out of which 13 patients presented with atypical symptoms (26 %).But in the non-diabetic group, only 16 % presented with atypical symptoms (Table VIII)

**Table VIII.** Proportion of Atypical MI according to antecedent diabetic status

Antecedent Diabetic status	No.	M I with atypical symptoms	
		No.	%
Diabetic	50	13	26%
Non diabetic	60	10	17%

Out of 110 patients, 58 are engaged in sedentary occupation while 14 are active physically.

**Table IX.** Physical activity (comparison)

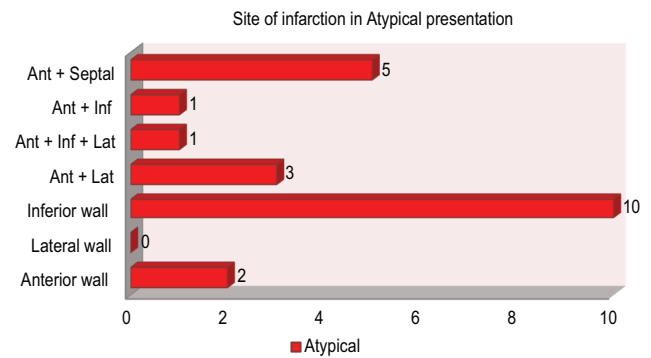
Physical activity	No.	Typical		Atypical	
		n= 88		n= 22	
Sedentary	58	46(52.27%)	12(54.55%)		
Physical	14	10(11.36%)	4(18.18%)		
Mixed	38	32(36.36%)	6(27.27%)		

The inhospital mortality of myocardial infarction patients who presented with typical and atypical symptoms were 15% and 36.36 % (Table X).

**Table-X.** Mortality in patients with typical and atypical presentation of AMI

Type of Myocardial infarction	No.	Mortality	%
Atypical MI	22	8	36.36%
Typical M I	88	13	15%

In this study, Inferior wall MI presented more often with atypical symptoms (43.48 %) and overall mortality highest with Ant + Septal MI (22.86%). Among the other site Ant + Lat MI (16.6%), Ant + Inf MI (12.5%) and Ant + Inf + Lat MI (20%) (Figure 3)



**Figure 3:** Site of infarction in atypical presentation

Out of 110 patients, 31 patients came to the hospital within one hour of onset of symptoms, 41 patients delayed between 1 to 6 hours and 38 took more than 6 hours to reach the hospital. Patients who delayed their arrival to hospital for 1-6 hrs. included patients male vs female (27vs 14) and more than 6 hours included males more than females (21 vs17). Most of the patients with atypical symptoms (22 patients) presented lately more than 6 hours compared to patients with typical symptoms (Table XI)

**Table-XI.** Characteristics according to delay after the onset of acute symptom until hospital arrival

Character	Time			P value
	< 1 hr	1-6 hrs	> 6 hrs	
<60	15	18	18	0.1155
>60	16	23	20	Significant
M	14	27	21	1.3551
F	17	14	17	Significant
IHD	7	5	7	
DM	7	3	8	
HTN	6	6	12	
Atypical symptoms	7	9	6	1.5814 Significant
Mortality	7	8	6	

## Discussion

In this study 110 acute Myocardial infarction patients was undertaken to see the atypical presentation and its association with clinical severity in Dhaka Medical College Hospital from July, 2013 to January, 2014. 110 nonconsecutive patients were enrolled in the study through non probability sampling technique.

Eighty three percent of the patients were male and the rests were female.

About 20% of patients with acute myocardial infarction presented with atypical symptoms (without chest pain) on initial evaluation. So, one fifth of MI patients presented atypical presentation. Patients experiencing M I without chest pain tended to be older (mean age 64 vs 59) and were males 68% vs 32% females. The maximum incidence of acute M I with atypical presentations was in the age group of 65-74 years (28.57%) followed by the age group 55-64 years (25%). No patients presented with atypical symptoms below 30 years.

In the Reykjavik<sup>17</sup> study, about 30% of myocardial infarction presented with atypical symptoms. Results from other population studies have shown that between 20% and 60% of all MI are presented with atypical symptoms. Study by Holay MP<sup>18</sup> and others was consistent with this.

According to study done by John G .Canto and others patients presenting with atypical symptoms were older (mean age 74.2 yrs vs 66.9 yrs) and females were 49% vs 38% males.

In the study Grouped according to age, there is a slight increase in incidence of painless infarction with increasing age. In the age group 55-64 years, 25% of patients and in 65-74% age group 28% presented with atypical symptoms.

This is comparable with William B.Kennel et al<sup>19</sup>, where the values were 27% and 31% respectively. But in contrast to earlier studies in which patients who were 75 years or older were more likely to present without chest pain. In this study only 2 patients above 75yrs presented with atypical symptoms.

We have documented a pronounced gender difference with males far outnumbering female (68% vs 32%) in the incidence of atypical presentation. (Though statistically not significant may be because of small sample size) This is similar to the results found in the study conducted by Muller RT et al<sup>20</sup>.

An increase in proportion of atypical M I with advancing age was not statistically significant although it is uncommonly seen before age 55 yrs. A much larger sample would be required to prove or disprove the possibility. In

this study Most of the patients presenting without pain presented with dyspnoea 36.36%, Vomiting 22.72% the least incident with vertigo 4.54%. Brieger D, et al. showed similar findings in unrecognized MI. The prevalence of this presentation was 8.4% in the Global Registry of Acute Coronary Events (GRACE), 33% in the National Registry of Myocardial Infarction 2 (NRM I-2) and the dominant symptoms in these patients were dyspnea, nausea, syncope.

In this study only 3 patients with previous history of angina presented with atypical symptoms of AMI, showing a lower prevalence of angina among those with unrecognized MI group. This was statistically significant in the present study. This is in comparison with Framingham study<sup>21</sup> and Honolulu heart program study<sup>22</sup> which also showed a low prevalence of angina pectoris among unrecognized MI.

The lower frequency of prior history of angina in the atypical MI group suggested a reduced sensitivity to ischemic pain.

In this study, 23.07 and 26% of patients with atypical presentation were hypertensive and diabetics respectively. This supports the Honolulu Hawaii Heart program study<sup>22</sup> in which the patients with atypical symptoms were more likely to be hypertensive and to have diabetes or impaired glucose tolerance but they were less likely to have angina pectoris.

A greater prevalence of hypertension and diabetes in the atypical MI group was also noted in Framingham study<sup>21</sup> and study by John G Canto.

In this study a higher percentage of inferior wall MI patients presented with atypical symptoms (43.48%) which is statistically significant. Honolulu Hawaii Heart program study<sup>22</sup> also supports the same thing, which demonstrated a pronounced increase in painless infarction with inferior wall MI patients (51%). That is, higher proportion of inferior wall MI tends to cause atypical symptoms, such as epigastric pain or abdominal distress which would fail to be recognized as MI.

But study by William B.Kennel and others showed that there was no difference in the electrocardiographic location of infarct between those with atypical and typical symptoms of MI.

In the Framingham study<sup>21</sup> the proportion of atypical MI did not vary with electrocardiographic location of the infarct.

Patients with atypical MI group showed a higher mortality than did the typical MI group (36.36 % vs 15%) though statistically not significant. When only age at MI, the most important determinant of mortality was adjusted, the atypical MI group had approximately 27% higher mortality from all cases.



In the Framingham study<sup>21</sup> also, age adjusted long term mortality for all cases were slightly worse among unrecognized MI cases than among recognized MI

But this is in contrast to Reykjavik study, where the prognosis for patients with atypical MI is no better than that for patients with recognized

31 patients came to the hospital within one hour of onset of symptoms, 41 patients delayed between 1 to 6 hours and 38 took more than 6 hours to reach the hospital.

Patients who delayed their arrival to hospital for 1-6 hrs included patients male vs female (27 vs 14) and more than 6 hours included males more than females (21 vs 17).

Most of the patients with atypical symptoms (22 patients) presented lately more than 6 hours compared to patients with typical symptoms. Increase in the delay was associated with increase in age (statistically significant), female sex (statistically significant) and with atypical symptoms (statistically significant). The Worcester heart attack study<sup>23</sup> confirms the same findings Case fatality did not differ significantly with delay of arrival at the hospital. In hospital mortality for early arrivers were 26% and that for late arrivers 15%.

A slightly higher mortality for early arrivers may be due to the fact that the early arrivers are less likely to be hemodynamically stable and therefore more likely to be hypotensive or in cardiogenic shock, whereas late arrivers are more stable.

In contrast, according to United Kingdom Heart attack study<sup>24</sup>, case fatality did not differ significantly for delays up to 12 hours, but it was higher for patients who delayed for more than 12 hours.

#### Conclusion:

In this particular study comparatively a small group of individuals had atypical presentation of MI.

A significant observation was that patients with inferior wall MI presented more often with atypical symptoms.

AMI patients with atypical presentation are under-diagnosed and under-treated high risk group. Several clinical risk factors could be helpful in prediction of AMI in this group. But exact recommendations about these facts can be given only after large scale study. Multicenter study with large sample can be done in future to have a consolidated result about these findings.

**Conflict of interest:** None.

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