

PRESENTATION OF ACUTE MYOCARDIAL INFARCTION IN DIABETIC AND NON-DIABETIC PATIENTS : A COMPARATIVE STUDY

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Summary :

A total of 115 cases of acute myocardial infarction (AMI) admitted over one year in 2 hospitals, Sher-E-Bangla Medical College Hospital, Barisal & National Institute of Cardiovascular Diseases, Dhaka, were made in two groups-diabetic (DM-32) and non diabetic (N-DM-83) in order to evaluate differences between initial manifestations of AMI in these two groups. Age incidence showed that 58 cases were above 50 years of which 17 were diabetic (DM) & 41 were non diabetic (N-DM). Remaining 57 cases were below that age and among them 42 were non-diabetic & 15 were diabetic. In the group of above 50 years, 8 out of 17 DM had atypical manifestations, but it was in only 3 out of 41 N-DM ($P < 0.001$) patients. In the subjects 50 years or less, the incidence of atypical symptoms were not significant between DM & N-DM groups. Incidence of Pre-infarction symptoms was similar between the two groups. Arrhythmias, post-infarction angina were higher in diabetic patients. It was seen that 8 out of 32 DM patients had arrhythmia, particularly brady-arrhythmia, whereas it was only in 6 out of 83 N-DM ($P < 0.01$) patients. Out of 32 DM patients 6 had post-infarction angina, but it was in only 4 out of 83 N-DM patients ($P < 0.02$). The relationship between diabetic neuropathies & the symptoms of AMI were inconclusive. Mortality rate was similar between the groups.

(J Dhaka Med. Coll, 1993 : 2 (2) : 34-39)

Introduction :

It is well known that the fatal complications of acute myocardial infarction (AMI) occur during the first few hours or days after the onset of AMI. So, the principle of early detection and treatment of cases in the general population is the corner stone on which the edifice of disease control will be built. It is important to detect the AMI as soon as possible. It was reported that diabetics often complain of atypical symptoms at the onset of AMI¹. This is an important reason for the delayed diagnosis and treatment of AMI. So this study was aimed to find out the differences between initial manifestations of AMI in diabetics (DM) & non diabetics (N-DM) in our country.

Materials and Methods :

The clinical material for this study consisting of a total 115 patients (32 DM & 83 N-DM) with AMI was selected & examined personally in two hospitals, Sher-E-Bangla Medical College Hospital, Barisal & N.I.C.V.D. Dhaka over a period of one year from February 1988 to January 1989. The criteria of diagnosis AMI & of the time of onset of AMI were as follows : patients' complaints, changes in the serial ECG finding &

elevation of AST level. As AST level is not specific for diagnosis of AMI and CK or LDH were not available in SBMCH, Barisal and NICVD Dhaka during the time of study, routine ECG diagnosis of AMI was considered essential.

All diabetic subjects were diagnosed by their clinical manifestation of diabetes mellitus &/or the results of WHO OGTT².

To analyse the manifestations at the onset of AMI, all patients were classified into two groups, 'typical (painful)' and 'atypical' (less painful). Patients with AMI were classified as having typical symptoms if they complained of the following : anterior (retrosternal, precordial, or diffuse) chest pain, moderate to severe in intensity, crushing, compressing or constricting in character with or without radiation to the arm, neck or back, with or without sweating and shortness of breath. Patients who reported the following symptoms were classified as 'atypical' : epigastric pain or discomfort, epigastric compression, slight expansion of anterior chest, nausea, vomiting, loss of appetite, no chest pain but only heaviness over the precordium, faintness, palpitation, hiccough, extreme weakness & sensation of impending

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death. All these information were obtained from histories which were recorded at admission³ (Table-1).

Tables - I
Symptoms of onset of AMI

A. Typical (painful)	
Site	: Anterior (Retrosternal, precordial, diffuse) chest pain
Intensity	: Moderate to severe
Character	: Crushing, compressing or constricting
Radiation (With or without)	: To the arm, neck, or back.
Associated with: or without	: Shortness of breath, sweating.
B. Atypical (less painful)	
	Epigastric pain or discomfort
	Epigastric compression
	Slight expansion of the anterior chest
	No chest pain but only heaviness over the precordium
	Extreme weakness & sensation of impending death
	Others symptoms : nausea, vomiting, faintness, palpitations, hiccough, loss of appetite etc.

Transmural or subendocardial infarction was diagnosed by ECG. Cases of transmural infarction were classified into 3 groups: Anterior, Inferior and Posterior wall infarction.

The presence of 'pre infarction' symptoms preceding the acute infarction attack was studied. In this study 'stable angina' was defined as a state in which symptoms were steady; 'unstable angina' was defined as an increasing frequency and/or intensity of a certain symptom prior to AMI, or post infarction angina, 'none' was defined as the sudden onset of AMI without any previous symptoms and 'unknown' means that satisfactory records were not obtained⁵. Patients were examined over one week after admission to observe early presentation of complicated AMI and rate of mortality of AMI within 1st week. Arrhythmia was classified as tachyarrhythmia and bradyarrhythmia⁵.

Results :

Of 32 diabetics (DM) 27 were male and 5 were female with age ranging from 35 to 78 years (mean 43.7 S.D± 13.2) and from 45 to 80 years (mean 57 S.D. ± 12.5) respectively. The group of non diabetics (N-DM) was composed of 83 patients, 80 males and 3 females ranging 28 to 75 years of age (mean 50.9 S.D ± 11.9) and from 40-55 years of age (mean 50.6 S.D. ± 6.7) respectively. (Table-II)

Of 32 diabetic patients 22 (62.8%) developed typical manifestations and 10 (32.2%) developed atypical manifestations, but among the N-DM patients 74 (89.2%) were typical & only 9 (10.8%) were atypical (P<0.01). (Table-III)

In subjects over the age 50, 8 out of 17 DM (47.1%) had atypical symptoms at the onset of AMI but the same symptoms in only 3 out of 41 (7.3%) N-DM patients (P<0.001). In patients under the age 50 years the incidence of atypical cases was small in both groups and difference was not significant. (Table-IV).

Incidence of preinfarction symptoms among diabetic and non diabetic patient was not statistically significant, though it was not roughly equal. (Table-V)

Type of AMI was observed among diabetic and nondiabetic. There was no significant difference between the groups. But anterior transmural infarction was about 2.3 times more than inferior transmural infarction among diabetic patients. Among non diabetics, anterior and inferior wall infarction was roughly equal. (Table-VI)

In DM cases, relationship between location of infarction and clinical manifestation was studied and showed that 6 out of 21 (28.6%) anterior transmural, 3 out of 9 (33.3%) inferior transmural and 1 out of 2 (50%) subendocardial cases developed atypical symptoms. (Table-VII)

Among subjects with DM, arrhythmia was 19 out of 32 (59.4%) but among N-DM it was 33 out of 83 (39.8%) (P<0.01). Postinfarction angina was 6 out of 32 DM (18.8%), whereas only 4 out of 83 N-DM (4.8%) (P<0.02). (Table-VIII)

These results showed a higher rate of arrhythmia and postinfarction angina in DM than in N DM. Heart failure and cardiogenic shock were not significantly higher among DM than N DM. Other complications like pericarditis, chest infection, hiccough and mortality rate were also not significantly different between the groups. (Table-VIII)

Among arrhythmic patients 11 out of 32 (34.4%) diabetics developed tachyarrhythmia and 8 out of 32 (25%) DM developed bradyarrhythmia. In

non diabetic 27 out of 83 (32.5%) developed tachyarrhythmia but only 6 out 83 (7.3%) developed bradyarrhythmia. These results showed a higher rate of bradyarrhythmia in DM than in N DM ($P < 0.01$). (Table-IX).

Ankle jerk was examined in 12 atypical cases and 11 typical cases. Among them 5 out of 12 (41.7%) atypical cases showed ankle jerk negative and in 3 out of 11 (27.3%) typical cases, ankle jerk was negative and difference was not significant (Table-X)

Table-II*Age and sex distribution of the patients (n=115)*

SEX	Diabetic		No diabetic	
	No of cases	Age in years (Mean \pm S.D.)	No of cases	Age in years (Mean \pm S.D.)
Male	27	35-78 (43.7 \pm 13.2)	80	28-75 (50.9 \pm 11.9)
Female	5	45-80 (57 \pm 12.5)	3	40-55 (50.6 \pm 6.7)

Table-III*Symptoms of onset of AMI (n=115)*

Subjects	Typical presentation	Atypical presentation	P Value
Diabetic(DM)	22/32 (68.8%)	10/32 (31.2%)	P<0.01
Non Diabetic (N-DM)	74/83 (89.2%)	9/83(10.8%)	

Table-IV*Presentation of onset of AMI at different ages. (n=115)*

Age (Years)	Subjects	Typical	Atypical	P Value
<50	Diabetic	13/15 (86.7%)	2/15 (13.3%)	N.S.
	Non Diabetic	37/42 (88.1%)	5/42 (11.9%)	
>50	Diabetic	9/17 (52.9%)	8/17 (47.1%)	P<0.001
	Non Diabetic	38/41 (92.7%)	3.41 (7.3%)	

Table V
Incidence of preinfarction symptoms (n=115)

Symptoms	Diabetic (DM)	Non Diabetic (N-DM)	Total	P Value
Stable angina	2/32 (6.2%)	11/83 (13.3%)	13/115 (11.3%)	N.S.
Unstable angina	10/32 (31.3%)	12/83 (14.4%)	22/115 (19.1%)	N.S.
None	16/32 (50%)	57/83 (68.7)	73/115 (63.5%)	N.S.
Unknown	4/32 (12.5%)	3/83(3.6%)	7/115 (6.1%)	N.S.

Table- VI
Types of AMI (n=115)

Types	DM	N-DM	P Value
Anterior transmural	21/32 (62.6%)	40/83 (48.2%)	N.S.
Inferior transmural	9/32 (28.1%)	35/83 (42.2%)	N.S.
Posterior transmural	1/32 (3.1%)	3/83 (3.6%)	N.S.
Mixed wall	2/32 (6.2%)	4/83 (4.8%)	N.S.
Subendocardial	2/32 (6.2%)	8/83 (9.6%)	N.S.

Table - VII
Diabetic cases : Relationship between location and manifestation (n=32)

Location	Typical	Atypical	Total
Ant. Trans.	15 (7.4%)	6 (28.8%)	21
Inferior trans.	6 (66.7%)	3 (33.3%)	9
Subendocardial	1 (50%)	1 (50%)	2

Table - VIII
Incidence of complications (n=115)

Complication	DM	N-DM	P Value
Arrhythmia	19/32 (59.4%)	33/83 (39.8%)	P<0.01
Postinfarction Angina	6/32 (18.8%)	4/83 (4.8%)	P<0.02
Heart failure	6/32 (18.8%)	8/83 (9.6%)	N.S.
Cardiogenic shock	3/32 (9.4%)	4/83 (4.8%)	N.S.
Others	8/32 (25%)	10/83 (12.1%)	N.S.
Mortality rate	3/32 (9.4%)	7/83 (8.4%)	N.S.

Table-IX
Types of arrhythmia (n=115)

Types	DM	N-DM	P Value
Tachyarrhythmia	11/32 (34.4%)	27/83 (32.5%)	N.S.
Bradyarrhythmia	8/32 (25%)	6/83 (7.3%)	P<0.01

Table-X
Ankle Jerk and symptoms of onset of AMI (n=23)

	Atypical	Typical	P Value
A-J Negative	5/12 (41.7%)	3/11 (27.3%)	N.S.
A-J Positive	7/12 (58.3%)	8/11 (72.7%)	N.S.

Discussion :

Herrick⁵ in 1912 first noted reports of acute myocardial infarction presenting without pain. Bradley⁷ (1962) reported that 42% of DM cases compared with 6% of N-DM cases have no pain.

In this study 31.2% diabetic (DM) had atypical symptoms at the onset of AMI, while 10.8% with N-DM were atypical (Table-III). The elderly patients complained less frequently of chest pain. In this study, it was found that in subjects over the age of 50, 47.1% with DM had atypical symptoms at the onset of AMI, while 7.3% with N-DM were atypical (Table-IV). This results parallels with the finding of Bradley⁷.

Preinfarction symptoms were examined retrospectively with an intention to establish a relationship between preinfarction symptoms and DM. But in this study this difference was insignificant between DM and N-DM.

Types of AMI were studied among diabetics and non diabetics and showed no significant difference; although anterior transmural infarction was 2.3 times more than inferior transmural infarction in diabetics (Table-VI). But Yoshino H et al⁴ stated in his study, diabetic developed more subendocardial infarction than transmural infarction. It was found in his study that 37.5% DM but only 18.5% N-DM developed subendocardial infarction (P<0.05). Difference between the result of this study and Yoshino H et al study might be due to unavailability of serial CPK estimation in our hospital. This study only based on ECG diagnosis and this is

why an appreciable number of subendocardial infarction might be missed.

Yoshino H et al⁴ showed in his study 23% anterior transmural, 36% inferior transmural and 19% subendocardial infarction in diabetics developed atypical symptoms and these results are not significantly different from this study (Table-VII) & indicates that no correlation present between symptoms and the type of infarction.

Complications particularly arrhythmia and post infarction angina were higher among diabetics although mortality rate was roughly equal in DM & N-DM groups (Table-VIII). But why bradyarrhythmia is significantly higher in DM group in this study is not yet clear (Table-IX). From these findings it could be concluded that morbidity of AMI was higher in DM though mortality rate remains equal.

It has been suggested that sensitivity of pain may be diminished in DM because of autonomic neuropathy. But in this study the relationship between diabetic neuropathies and the symptoms of AMI were uncertain because there were not sufficient cases who examined for ankle jerk & nerve conduction study was not available during this study.

Conclusion :

1. Acute myocardial infarction in elderly diabetics is more often manifested by atypical symptoms.

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2. In diabetics with acute myocardial infarction, the morbidity is higher.
3. Mortality rate with AMI in diabetics and non diabetics remains same.
4. In diabetics with atypical symptoms the possibilities of acute myocardial infarction should be kept in mind.

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