Acute Myocardial Infarction in the Young and in The Elderly : A Comparative Study

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ABSTRACT : A clinical study of 345 cases of acute myocardial infarction (AMI) seen in two hospitals, Sher-E-Bangla Medical College Hospital (SBMCH), Barisal and National Institute of Cardiovascular Disease (NICVD), Dhaka, were divided in two groups. Group-I comprised of patients of age equal to or less than 40 years and group-II consisted of patients of age greater than 40 years. Twenty one of 72 (29.2%) patients of group-I were physical workers whereas the figure was only 33 of 273 (12.1%) in group-II (p<0.05). 58.3% patients of group-I were excessive smoker; corresponding figure in group-II was only 23.1% (p<0.001). Incidence of hypertension and diabetes mellitus was significantly higher in group-II compared to group-I (38.1% vs 22.2% ; p<0.05 and 33.3% vs 18.1%, p<0.05 respectively). On the other hand there were more alcoholic and hypercholesterolemic patients in group-I as opposed to group II (13.9% vs 5.1%; p<0.02 and 15.2% vs 7.3%; p<0.05 respectively). Prevalence of preinfarction angina and previous MI was significantly higher in group II compared to group I (49.1% vs 25.5%; p<0.05 and 10.6% vs 1.4%; p<0.02 respectively). Clinical presentation and type of MI did not differ significantly between the two groups but cardiac failure and mortality rate were higher in group II (14.3% and 23.4% respectively) compared to group I (42.2% and 11.1% respectively).

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Key words : (i) Acute myocardial infarction (ii) young MI

INTRODUCTION

Prior to world war II, acute myocardial infarction was considered to be uncommon in patients under 40 years of age. The problem was brought into sharper focus in the post-war years when Enos, Beyer and Holmes[1] published their pathological report on coronary artery disease in young soldiers killed in Korean conflict. During the past two decades acute myocardial infarction in patients under 40 years has been of increasing concern as evidend by large number of publications[2,3]. Hospital admission statistics have limited significance for analysis of age dependent trends of prevalence. This study aimed at investigating differences between the incidence, clinical presentation and complications between young and the elderly population.

MATERIALS AND METHODS

Three hundred and forty-five patients of acute myocardial infarction (AMI) admitted to the Coronary Care Unit (CCU) of NICVD, Dhaka and Sher-e-Bangla Medical College Hospital (SBMCH), Barisal over a 2 year period from 1988 to 1989 were the subjects of this study. The criteria for diagnosis of AMI were as follows : Patients complaints, changes in the serial ECG findings and elevation of AST level. As AST level is nonspecific for the diagnosis of AMI and CK or LDH were not possible in NICVD Dhaka and in SBMCH Barisal during the time of study, ECG diagnosis of AMI was considered essential. To analyse the manifestations at the onset of AMI, all patients were classified into two groups, typical (painful) and atypical. Patients 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 of

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discomfort, epigastric compression, slight expansion of anterior chest, nausea, vomiting, shaking chills, loss of appetite, no chest pain but only heaviness over the precordium, faintness, palpitation, cough with sputum, hiccough, extreme weakness, sensation of impending death[4]. All the information were obtained from histories which were recorded at admission. Transmural and subendocardial infarction were diagnosed by ECG. Cases of transmural infarction were classified into anterior, inferior and posterior wall infarction.

Presence of symptoms preceding the acute infarction were studied. Stable angina was defined as a state in which symptoms were steady. Unstable angina was defined as increasing frequency and/or intensity of certain symptoms prior to AMI or post infarction angina[5]. Routine blood count, ESR, Hb% urine analysis, fasting blood sugar, serum cholesterol, blood urea and routine chest X-ray were done in all the cases except three. Patients were examined over one week after admission to look for complication including mortality. For this study, on the basis of physical activity and nature of job, cases were divided into sedentary and physical. On the basis of total family income from all sources per month, cases were grouped as rich, average and poor. Income of Tk 5000/- or more per month was grouped as rich, taka 1500/- to less than 5000/- per month as average and less than 1500/- taka per month as poor.

RESULTS

Of a total 345 cases of AMI, 72 were of age 40 years or below (Group-I) and 273 cases were over the age of 40 years (Group-II). The male and female ratio was 23:1 in group-I and 12:1 in group-II. The age of group-I ranged from 28 to 40 years (mean 35.7±3.5) in male and 35 to 40 years (mean 38.3±9.1) in female. The age of group-II patients ranged from 41 to 80 years (mean 55.09±9.1) in male and 41 to 78 years (mean 56.3±10.7) in female. About 95% of the cases in the precocious age group were between 30 to 40 years of age and only 5% were below the age of 30 (Table-I).

70.8% cases in group-I had sedentary occupation and 87.9% in the other group had similar occupation and 29.2% of patients of group I were physical workers but it was only 12% of group-II (Table-II). It was observed that patients with excessive smoking significantly predominated in group-I (excessive smoking means smoking cigarettes more than 20 sticks per day for more than 10 years). Family history of ischemic heart disease and socioeconomic condition of the groups did not differ

Table–I : AGE AND SEX DISTRIBUTION

	Group I (≤40yr)		Group II (>40yr)	
	Number of cases	Age (Years) (mean ±SD)	Number of cases	Age (years) (Mean±SD)
Male	69	28-40 (35.7±3.5)	252	41-80 (55.9±9.1)
Female	3	35-40 (38.3±1.7)	21	41—78 (56.3±10.7)

Table–II : INCIDENCE OF OCCUPATION

	Group I No. of cases	%	Group II No of cases	%	P value
Sedentary worker	51/72	(70.8%)	240/273	(87.9%)	ns
Physical workers	21/72	(29.2%)	23/273	(12.1%)	<0.05

significantly. In group-I 22% were hypertensive and 18.11% were diabetic whereas the figures were 38.1% and 33.3% respectively in group-II. 15.2% of patients in group I had hypercholesterolemia but only 7.3% of the cases in group-II had hypercholesterolemia (p<0.05). There were more alcoholics in group-I compared to group-II (13.9% vs 5.1%; p<0.02) (Table-III).

Incidence of preinfarction angina and previous MI were studied. Incidence of angina pectoris was significantly higher in elderly group. Of them unstable angina was significantly higher and stable angina apparently higher in group II. Incidence of previous MI was also higher in elderly group (table IV).

Clinical presentation and types of MI were also studied but no significant difference was found between the groups (table V and VI).

The patients were closely observed for complications. Incidence of cardiac failure was significantly higher in the elderly group (14.3% vs 4.2% P<0.05). There was no significant

Table-III : INCIDENCE OF PRECIPITATING FACTORS

	Group I (n=72)		Group II (n=273)		P value
	No of cases	%	No of cases	%	
Excessive smoking	42 ·	58.3	63	23	<0.001
Family history of IHD	7	9.7	20	7.3	ns
Socioeconomic condition					
A Rich	45	62.7	159	50.2	ns
B. Average	21	29.2	103	37.7	ns
C. Poor	6	8.3	11	4.1	ns
Hypertension	16	22.2	104	38.1	<0.05
Diabetes mellitus	13	18.1	91	33.3	<0.05
Hypercholesterolemia	11	15.2	20	7.3	<0.05
Anaemia	16	22.2	44	16.1	ns
Obesity	7	9.7	37	13.5	ns
Chronic alcoholic	10	13.9	14	5.1	<0.02

Table-IV : INCIDENCE OF PREINFARCTION SYMPTOMS AND PREVIOUS MI

	Group I (n=72)		Group II (n=273)		P value
	No of cases	%	No of cases	%	
Stable angina	12	16.7	80	29.3	ns
Unstable angina	6	8.3	54	19.8	<0.05
Total angina	18	25	144	49.1	<0.05
Previous MI	1	1.4	2.9	10.6	<0.02

Table-V : CLINICAL PRESENTATION OF AMI

	Group I (n=72)		Group II (n=273)		P value
	No of cases	%	No of cases	%	
Typical presentation	63	87.5	225	82.4	ns
Atypical presentation	9	12.5	48	17.6	ns

Table-VI : TYPES OF AMI

	Group I (n=72)		Group II (n=273)		P value
	No of cases	%	No of cases	%	
Anterior transmural	42	58.3	141	51.6	ns
Inferior transmural	24	33.3	108	39.6	ns
Posterior transmural	0	0	12	4.4	ns
Mixed wall	3	4.2	15	5.5	ns
Subendocardial	6	8.3	24	8.8	ns

Table-VII : INCIDENCE OF COMPLICATIONS

	Group I (n=72)		Group II (n=273)		P value
	No of cases	%	No of cases	%	
Arrhythmia	27	37.2	11	40.6	ns
Post infarction angina	3	4.2	27	9.9	ns
Cardiac failure	3	4.2	39	14.3	<0.05
Cardiogenic shock	2	2.8	20	7.3	ns
Others	4	5.6	26	9.5	ns
Mortality rate	8	11.1	64	23.4	<0.05

difference in other complications between the groups. Mortality in group II was however higher compared to group I (23.4% vs 11.1%; P< 0.05) (Table VII).

DISCUSSION

Various epidemiological studies observed that incidence of MI is more common in some preexising condition[2,3,6]. Excessive physical effort like running, lifting heavy weight or exercise sometimes precipitate AMI among young people. This is probably due to the fact that young people are more likely to be engaged in heavy exertion than older people[3]. In the present study there were more physical workers in precocious group. Though the number was less than 1/3rd of total under 40 patients (Table II).

Antoni[6] observed that 77.2% younger patients were excessive smokers compared to 30.6% in his elderly gorup In our study although 58.3% younger patients were excessive smoker the incidence was significanlty higher than elderly group (Table III). Antoni[6] also observed that hypertension, obesity and diabetes play a significant role for development of IHD over the age 40. In his study in group I only 10.2% were hypertensive and 2.7% were diabetic whereas 37.5% were hypertensive and 16.8 were diabetic n group II. In this study although there were more hypertensive and diabetic patients in elderly group as many as 22% were hypertensive and 18.1% diabetics in the younger group. These figures are significanlty higher than that of Antoni. Association of obesity with IHD is nonconclusive in this study. There were more affluent people in both groups. This may be due to their sedantory habits rich diet, competitive life style and personal habits[7].

Higher serum cholesterol levels carry increased risk of coronary artery disease at younger ages. Oliver[8] observed that 10% of his cases with precocious ischemic heart disease had hypercholesterolemia but in the present study only 15.2% of younger patietns had high serum cholesterol.

Simson[3] observed that preinfarction angina pectoris was significantly higher in elderly group. In this study stable angina was apparently higher in elderly group and unstable angina was significantly higher in elderly group. Total angina was 22.5% in younger group and 67.4% in elderly group according to the observation of Simson, but in this study the figures were 25% in the precocious group and 49.1% in the elderly group (table III). Simson3 observed Arrhytlmias in 23.3% of the younger group and in only 6.2% of the elderly group. But in the present series arrhythmias were present in 37.2% of cases under 40 and in 40.6% over 40 group i.e. dysrhythmias were very high in both groups. Simson also reported that cardiac failure was present in 10.2% of precocious group and in 20.5% of the elderly group. Cardiogenic shock was observed in 7.5% and 28.3% cases

respectively and mortality rate 14.2% and 30.8% in the respective group. But in this study, though cardiac failure and mortality rate were significantly higher in the elderly group, all complications except arrhythmias were less than Simson's report (Table VII).

It is concluded that i. Undue physical work may precipitate myocardial infarction in the younger group without preinfarction symptoms; ii) Excessive smoking is the most important risk factor found in the young but hypertension, diabetes, hypercholesterolemia and chronic alcohol intake are also contributing risk factors for them; iii. Hypertension and diabetes mellitus are the two most leading risk factors for the elderly; iv. Presentation and wall involvement in MI do not differ with age; v) Complications like heart failure and mortality rate increase with age.

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