Short Term Outcome of Patients with Acute Myocardial Infarction Preceded by Angina

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Key words: *AMI, Angina, Ischaemic heart disease*

Abstract:

Background: *It has been reported that acute myocardial infarction preceded by angina has favorable short term outcome. To validate this in our setting, this study was undertaken in National Institute of Cardiovascular Diseases.*

Method: *This is a prospective and observational study. 100 patients were evaluated for the short term outcomes of patients of AMI preceded by angina.*

Result : *Observation showed that patients of AMI preceded by angina has less damage of the myocardium as evident by lower CK-MB values and better preservation of left ventricular function. It has also been shown that early complications like death, VT & VF, asystole, CHB, acute LVF, cardiogenic shock were significantly lower in patients of AMI preceded by angina than those without angina.*

Conclusion: *It is observed that incidence of previous angina is an important independent predictor of outcome of the patients with myocardial infarction.*

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Introduction

Coronary heart disease (CAD) is the most common form of heart disease and the single most important cause of premature death in the developed countries.[1] Approximately 800,000 people in the united states experience acute myocardial infarction annually, of which about 213,000 die.[4] The incidence of coronary artery disease in Bangladesh has increased from 3.3 per thousand to 14 per thousand from the year 1975 to 1985.[2] In the discussion of the role of preinfarction angina in the preservation of myocardium, Murry et al, stated that repeated episodes of ischemia before AMI may contribute to the myocardial integrity through two different mechanism.[3] First, the collateral circulation developed by a repeated stimuli may lead to the attenuation of ischemic insults on coronary occlusion. The drop in post stenotic pressure caused by flow limiting stenoses stimulates the development of collateral circulation from other coronary artery beds. The supply of collateral blood flow increases poststenotic pressure, thus improving coronary flow reserve and ischaemic threshold. Preexisting anastomoses progressively transform in mature collaterals over a period of 3 to 6 months by initial widening and remodeling. Subsequent proliferation of endothelial and smooth muscle cells and development of a smooth muscle coat leading to vessel with a final diameter of 20 to 200 micro meter.[5] Secondly, ischaemic preconditioning, being defined as the ability of short periods of ischaemic to limit infarct size after subsequent prolonged coronary occlusion.[6] Repeated ischaemic may contribute to the smaller infarct size during subsequent coronary occlusion as a result of decreased metabolic activity of the compromised myocardium.[3]

An early preconditioning after an ischaemic episode was reported during the initial 2 hours (early preconditioning), but a later protection was also reported beginning 24 hours after the preconditioning stimulus and extending up to 48 hours (delayed preconditioning).[7] Findings compatible with early ischemic preconditioning were reported following balloon occlusion during PTCA, in preinfarct angina, in CABG and exercise induced ischaemia.[8] Finally, there are some controversies in some studies but majority of the studies have shown that AMI preceded by angina had a better outcome.

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Since there is no such study in our country regarding this subject, in the context of our country the results of such study may help in assessment of the short term outcome and prognosis of AMI patients depending on the presence or absence of previous angina which may help in the management strategy as well as in the risk stratification. The patients of AMI preceded by angina possess better prognosis than that of the patients of AMI not preceded by angina.

Materials & Methods

Patients and selection procedure

This prospective, case control study was done in 100 patients. At National Institute of Cardiovascular Diseases (NICVD) from 1st July 2002-31st June 2003.

Study population: Eligible subjects were those who fulfilled following inclusion criteria. Total 100 cases were studied. Among them 50 were case, Group I, and 50 were control, Group II.

Inclusion criteria:

Following subject were included in the study

i) The patient admitted in CCU of NICVD with acute myocardial infarction with preceding angina, Group I and without preceding angina, Group II.

Exclusion criteria:

Following subject were excluded from the study

i) Patient having previous myocardial infarction.

ii) Associated conditions that after the prognosis of the patients i.e. CRF, CLD or malignancy etc.

iii) Patients suffering from valvular heart diseases, congenital heart diseases and cardiomyopathies.

Sample size: 100 patients were included in this study.

Data collection procedure:

An informed written consent was taken from all patients prior to inclusion in the study Group. History and relevant physical findings and others risk factors to coronary artery disease were recorded in pre-designed structured data collection form. Data were collected from primary source starting from demography of patient, clinical history, physical examination and ECG and echo findings. Patients were followed up on daily basis upto 7 days to detect complications.

Data Analysis

All the relevant collected data were compiled in a master chart first and then organized by scientific calculator of computer and standard appropriate formulae.

Further statistical analysis of the results were done by using computer software, devised with statistical package for social science (SPSS). The results were presented in tabulated form as well as figures and drawings. Data were expressed in frequency, percentage, mean and standard deviation as applicable. Comparison between two groups was done by Chi-square test Probability <0.05 were considered as significant.

Observations and Results

This study included total 100 patients of acute myocardial infarction admitted in coronary care unit. The patients were divided in to groups-cases: Group I and control: Group II, according to the presence and absence of preceding angina before admission. After obtaining required data, analysis was done and following results were observed. In this study 14(28%) were diabetes in Group I and 15(30%) were diabetic in Group II, which was not statistically significant.

Study population, shows only 9% patients presented with positive family history of coronary artery disease, which was statistically not significant. Hypertension, diabetes and smoking were the most frequently distributed risk factor, while dyslipidaemia and positive family history of coronary artery disease were less frequently distributed. Distribution of risk factors in the study population was not significant statistically. Aspirin, nitrates and beta-blockers were the most commonly used drugs before the coronary events, and their use is statistically significant also (P value <0.05). Whereas calcium channel blockers were used less and its use was not statistically significant (P value >0.05).

Aspirin was the most commonly used drugs before the coronary events, followed by beta-blockers and nitrates. Calcium channel blocker was least used drugs in both the groups.

In Group-I, 31 patients with pain presented within 12 hours of onset of pain and 14 patients in Group II presented within 12 hours of onset of pain. But 19 patients in group I presented 12 hours after onset of pain and 36 patients presented after 12 hours,

which was statistically significant (P value in Chi-square 0.001).

Angina was severe in 23 cases of group I and 38 cases of group II. But mild to moderate angina was present in 27 cases of group I and 12 cases of group II, which was also statistically significant (P value <0.05). Radiation of pain, sweating, vomiting and shortness of breath was not statistically significant.

There was no difference statistically regarding location of myocardial infarction.

Maximum value of CK-MB was 130U/L in the group II and minimum, value was 46 U/L in Group I. Mean CK-MB value was 82.81 and SD 26.41. Most of the CK-MB values were found to be lower in Group I than in Group II. Better ejection fraction was noted in the case group who had preceding angina before the coronary events, probably due to development of collaterals resulting from repeated ischaemic events.

Study shows preserved left ventricular function in the group I patients than group II patients. The p value is just below the level of significance.

This study shows that complications like left ventricular failure, insertion of temporary pace maker, DC shock, VT & VF, complete heart block, asystole and death was higher in Group II. All the P values was statistically significant (<0.05).

Population during short term (7 days hospital) follow-up, shows that the short term complications were significantly higher in Group II patients than Group I patients. P value was statistically significant (<0.05).

Table-I

Distribution of presenting symptoms in the study population.

Symptoms		Group I	Group II	Total	P value (chi-square)
Severe angina		23(46%)	38(76%)	61	
Mild to moderate angina		27(54%)	12(24%)	39	0.002
Radiation	yes	30(60%)	28(56%)	58	0.113
	no	20(40%)	22(44%)	42	
Sweating	yes	30(60%)	29(58%)	59	0.12
	no	20(40%)	21(4%)	41	
SOB	yes	27(54%	24(48%)	51	0.125
	no	23(46%)	26(54%)	46	
Syncope	yes	3(06%)	5(10%)	8	0.128
	no	47(94%)	45(90%)	92	

Table-II

Ejection fraction in the study population.

Ejection fraction	Group I	Group II	Total	P value (chi-square)
<35%	3(6%)	0	3	
36-45%	20(40%)	29(58)	49	0.049
46-55%	24(48%)	21(42%)	45	
>55%	3(6%)	0	3	

Table -III

Showing frequency of myocardial infarction in different location.

Location of MI	Group I (n=50)	Group II (N=50)	Total	P value (chi-square)
Antero-septal	16(32%)	19(38%)	35	
Antero-lateral	9(18%)	10(20%)	19	0.39
Inferior	12(24%)	9(18%)	21	
Inf+RV infarction	5(10%)	5(10%)	10	
Non-Q MI	8(16%)	7(14%)	15	

Table-IV

Showing immediate complications of the study population in coronary care unit.

Complications	Group I	Group II	P value (chi-square)
Left ventricular failure	2(4%)	8(16%)	0.046
Temporary pacemaker	4(8%)	10(20%)	0.021
DC shock	3(6%)	9(18%)	0.037
VT & VF	2(4%)	8(16%)	0.046
Complete heart block	2(4%)	8(16%)	0.046
Asystole	1(2%)	6(12%)	0.027
Death	3(6%)	9(18%)	0.037

Table-V

Showing short term complication in the study population.

Complications	Group I	Group II	P value (chi-square)
Reinfarction	3(6%)	9(18%)	0.041
Complete heat block	3(6%)	9(18%)	0.041
Atrial fibrillations	2(4%)	8(16%)	0.038
VT & VF	3(6%)	9(18%)	0.041
Cardiogenic shock	2(4%)	10(20%)	0.012
Post MI angina	3(6%)	10(20%)	0.027
Death	2(4%)	12(24%)	0.015

Discussion

This study was a prospective observational study and conducted in the department of Cardiology, National Institute of Cardiovascular Diseases (NICVD). Total of 100 patients of AMI were evaluated of which 50 were taken as the case (Group I) and 50 as control (Group II). Among the base line characteristics, 92% patients were male and 8% were female. Age ranges were 30 to 80 years. (mean age 54.43±11.11). There was no significant difference statistically regarding age and sex of the study population. According to Filippo Ottani et al., there was no statistically significant difference between the two sets of patients regarding age, sex and risk factors for developing myocardial infarction. Though males are affected more than the females in the early age groups.[9]

Among the risk factors, smoking was most frequent in Group I 58% Vs 46% in Group II. Hypertension was present 30% in Group I and 34% in Group II. Diabetes mellitus was present in 28% in Group I and 30% in Group II, followed by family history of coronary artery disease in Group I 10%, in Group II 8% dislipidemia 4% in Group I and 8% in Group II, none of the risk factors was statistically significant (P value >0.05).

The most common presenting symptom in the study population was chest pain. Followed by sweating 60% in cases Vs 58% in controls, shortness of breath 54% in cases and 48% in controls, radiation of pain 60% Vs 58%. Lastly syncope was presenting complaints in 06% in cases of the study population. However, there was no statistical difference in the presenting symptoms. However, when chest pain alone has been analyzed in Chi-square test, there was significant difference in arriving patients within 12 hours and after 12 hours which was statistically significant (P value=0.0001), and the severity of chest pain also was statistically significant (P value 0.002).

Among the study subject 35% had anteroseptal myocardial infarction, anterolateral myocardial infarction 19%, inferior myocardial infarction 21%, inferior with right ventricular infarction 10% and non-Q wave infarction in 15% patients. There was no significant difference statistically (P value 0.39) in terms of diagnosis. Though there is no statistically significant difference in the location of MI but this study has shown that the incidence of inferior MI with right ventricular infarction was lower and this result was similar to the study done by Hiroto Shiraki et al., which stated that preinfarction angina was an independent predictor of the absence of right ventricular infarction in patients with acute inferior myocardial infarction and the patients with preinfarction angina also had better short term outcomes than those without preinfarction angina.[10]

Hemodynamic parameters matched between the study groups. There was no significant difference statistically in terms of pulse, systolic blood pressure and diastolic blood pressure, JVP, lung bases and edema in the study population (P>0.05). Regarding the use of anti-anginal drugs aspirin was the most commonly used anti-platelets and its use was statistically significant (P value 0.00001). Beta-blocker was the second common drug followed by nitrates and their use also not statistically significant. But the use of calcium channel blocker was not statistically significant (P value 0.163) as anti-anginal drugs. As the biochemical marker of cardiac damage CK-MB was used for all the patients as diagnostic tools and to assess the extent of myocardial damage.[11] Forty-nine percent patients in Group I had CK-MB valve between 40-80 U/L while 45% patients in Group II had CK-MB value above 80U/L, which was statistically highly significant (P value 0.001). In a study conducted by Felicita Andreotti, MD et al., have demonstrated that the level of CK-MB value and time to peak tended to be shorter in patients with preinfarction angina than in those without preifarction angina.

All the patients received standard treatment of myocardial infarction which included anti-platelets, anti-anginal and thrombolytics where indicated. And they were closely followed-up both in coronary care unit and in the ward. From this observation it was noted that all the acute and short term complications of acute myocardial infarction were lower in patients of AMI preceded by angina and the p values were found to be statistically significant (P value <0.05). The observation and results of this study is more or less similar to the study conducted abroad in milticenter basis.[12]

Conclusion

It has been observed that incidence of previous angina is an important independent predictor of prognosis of outcome of the patients. Recognition of

angina thus can help in the risk stratification of patients presenting with acute myocardial infarction.

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