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A study on risk factors of acute myocardial infarction at a tertiary care hospital

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Abstract
Introduction: Most common cause of MI is atherosclerosis with superadded coronary thrombosis. Slowly progressive high grade stenosis of coronary arteries can progress to complete occlusion but do not usually precipitate ST elevation MI, probably because of development of a rich collateral network. However during the natural evolution of the atherosclerotic plaque which is rich in lipid core and thin fibrous cap, an abrupt and catastrophic transition can occur, characterized by plaque rupture.
Methodology: In this study 100 cases of acute myocardial infarction patients admitted in ICCU of above hospital studied during the period of 2013 to 2015.The cases are followed up to the hospital stay 100 cases are divided into 2 groups.
Results: Hypertension (36% Vs 48%), DM (38% Vs12%) were the common risk factors among elderly while smoking (52% Vs 24%), obesity (40% Vs 22%) and family h/o CAD (20% Vs 4%) were the common risk factors among younger patients. 28% of elderly patients found no risk factors.
Conclusion: There was no difference between the two age groups with regard to presence of hypertension, Dyslipidemia.

Keywords: Risk factors, acute myocardial infarction, hypertension

Introduction

Ischemic heart disease (IHD) is a condition in which there is an inadequate supply of blood and oxygen to a portion of the myocardium. It typically occurs when there is imbalance between myocardial oxygen supply and demand.

The most common cause of myocardial ischemia is atherosclerotic disease of an epicardia coronary artery (or arteries) sufficient to cause a regional reduction in myocardial blood flow and inadequate perfusion of the myocardium supplied by the involved coronary artery [1].

Most common cause of MI is atherosclerosis with superadded coronary thrombosis. Slowly progressive high grade stenosis of coronary arteries can progress to complete occlusion but do not usually precipitate ST elevation MI, probably because of development of a rich collateral network. However during the natural evolution of the atherosclerotic plaque which is rich in lipid core and thin fibrous cap, an abrupt and catastrophic transition can occur, characterized by plaque rupture. Some patients have a systemic predisposition to plaque rupture that is independent of traditional risk factors. After plaque disruption, there is exposure of substances that promote platelet activation and aggregation, thrombotic generation and ultimately thrombus formation. The resultant thrombus that forms interrupts the blood flow and causes an imbalance between oxygen supply and demand, and if this imbalance is severe and persistent leads to myocardial necrosis.

Diabetes mellitus is a major risk factor for coronary artery disease and is associated with a higher incidence of myocardial infarction (MI) and sudden death. Morbidity, mortality and re-infarction rate are higher following MI in diabetic than non-diabetic subjects, with one-year mortality in this population as high as 50%. Increased platelet activation, increased expression of coagulation factors and reduced intrinsic thrombolytic activity, contribute to a prothrombotic and procoagulant state [2]. Diabetic subjects are more likely to experience a myocardial infarction and have worse outcomes compared to non-diabetic subjects. The underlying pathophysiology of the atherosclerotic process is not significantly different in diabetic subjects, but the prothrombotic and procoagulant state with which diabetes is associated is thought to contribute to the higher incidence of and worse prognosis after myocardial infarction [3, 4, 5].

Cigarette smoking acutely increases the rate-pressure product and myocardial blood flow at rest, decreases myocardial flow reserve, impairs endothelium-dependent vasodilation and impedes endogenous fibrinolysis. It is associated with endothelial dysfunction in healthy young adults, suggesting that it contributes to the early development of coronary atherosclerosis. It is conceivable that this association might not be a result of the effects of smoking per se, but instead of behaviors that are prevalent among smokers, such as other forms of substance abuse. However, passive exposure to environmental tobacco smoke causes endothelial dysfunction in healthy young adults with no history of active smoking, and it increases coronary atherosclerosis in animal models. Thus, there is little doubt that exposure to cigarette smoke promotes the development of coronary disease.

The role of smoking in coronary atherosclerosis extends far beyond the early onset of endothelial dysfunction. Smoking increases the risk of incident CHD, especially in the context of other major risk factors such as diabetes [6]. It accelerates the angiographic progression of existing coronary atherosclerosis and promotes the formation of new atherosclerotic lesions. It can trigger transient myocardial ischemia in patients with

established coronary disease, and it is a potent risk factor for acute myocardial infarction (MI) and for sudden cardiac death. The risks are higher in women than men, especially in younger cohorts.

Methodology

In this study 100 cases of acute myocardial infarction patients admitted in ICCU of above hospital studied during the period of 2013 to 2015.

The cases are followed up to the hospital stay 100 cases are divided into 2 groups

Group – I Elderly (≥60 years of age) →50 patients.

Group – II Younger patients – (< 60 years of age) →50 pts

Inclusion criteria

a. Age more than 18 yrs. of either sex
b. Acute Myocardial Infarction proved by typical symptoms of acute myocardial infarction, typical ECG pattern (ST segment elevation of >0.1 mV in at least 2 consecutive limb leads or >0.2mV in at least 2 chest leads for ST elevation MI) and Elevated cardiac enzyme levels (CKMB or Troponin T/I)

Exclusion criteria

1. Age less than 18 yrs. of either sex
2. Patients with stable angina
3. Patients with unstable angina
4. Sudden unexplained death

Results

Table 1: Risk factors

Risk Factors	Gr1>60 yrs.	Gr2<60yrs.	P value
Hypertension	18 (36%)	24 (48%)	<0.05
Diabetes	19 (38%)	6 (12%)	<0.05
Smoking	12 (24%)	27 (52%)	<0.001
Obesity	11 (22%)	20 (40%)	<0.05
Past h/o IHD	7 (14%)	9 (18%)	>0.05
Family h/o CAD	2 (4%)	10 (20%)	<0.01
No risk factors	14 (28%)	8(16%)	<0.05

Hypertension (36% Vs 48%), DM (38% Vs12%) were the common risk factors among elderly while smoking (52% Vs 24%), obesity (40% Vs 22%) and family h/o CAD (20% Vs 4%) were the common risk factors among younger patients.28% of elderly patients found no risk factors.

Table 2: Lipid profile

Lipid Profile	Gr1>60yrs.	Gr2<60yrs.	P value
TC>200	13 (26%)	15 (30%)	>0.05
TG>150	12(24%)	22(44%)	<0.01
HDL<40M&<45F	13 (26%)	17 (34%)	>0.05

Younger age group had High TG (44% V/s 24%) when compared to elderly patients.

Table 3: Cardiac enzymes

Cardiac enzymes	Gr1>60yrs	Gr2<60yrs	P value
CKMB	41 (82%)	36(62%)	>0.05
TROPI +VE	30 (60%)	28 (52%)	>0.05

CKMB was elevated in 82% of the elderly patients when compared 62% to younger patients. Tropi was positive in 60% V/s 52% in younger patients

Table 4: Left ventricular dysfunction

LV Dysfunction	Gr1>60YRS	Gr2<60YRS	P value
Normal	21 (42%)	17 (34%)	>0.05
Mild	20 (40%)	29 (58%)	<0.05
Moderate	7 (14%)	5 (10%)	>0.05
Severe	1 (2%)	0 (0%)	
ECHO not done	1	0	

Among elderly patients 56% were having LV dysfunction where as only 68% of younger patients had LV dysfunction.

Discussion

In our study, among the risk factors, in elderly age group diabetes was present in (38%), compared to 12% in the young. In M.P Holay *et al*. study [7] diabetes was seen in 9.3% of elderly patients and 14.3% in younger patients and in VC Woon etal[8] study diabetes was seen in 46.5% of elderly patients and 34.8% younger patients and in Teruo shiraki *et al*. [9] study diabetes was seen in 17% elderly patients and 24% of younger patient.

In our study, hypertension was noticed in 36% of elderly patients compared to 48% in younger patients. In MP Holay *et al*. study Hypertension was seen in 39% of elderly patients and 30.4% of younger patients and in VC Woon *et al.* study hypertension was seen in 57.4% of elderly patients and 45.5% of younger patients and in Teruo shiraki *et al.* study hypertension was seen in 37% of elderly patients and 39% of younger patients and hence Hypertension was the second most common risk factor for Acute MI in both young and older patients.

In our study 24% of the elderly patients were smokers and 52% of the younger patients were smokers. In MP Holay *et al.* study 17.1% of the elderly patients were smokers and 46.5% of the younger patients were smokers and in VC Woon *et al.* study 31.7% of the elderly patients were smokers and 68.8% of the younger patients were smokers and in Teruo shiraki *et al.* study 35% of the elderly patients were smokers and 60% of the younger patients were smokers.

In our study obesity was seen in 22% in elderly patients and 40% of younger patients. In MP Holay *et al.* study obesity was seen in 4.6% in elderly patients and 12.5% of younger patients and in VC Woon *et al.* study obesity was seen in 7% in elderly patients and 13% of younger patients. This further strengthens the known fact that Obesity an important risk factor for Acute MI in Young patients.

Young patients were having high TG levels compared to elderly pts.TG was raised in 24% Vs 14% in younger patients compared to elderly. In Teruo shiraki *et al.* study hypercholesterolemia was seen in 11% in elderly patients and 18% of younger patients, Hyper LDL cholesterolemia was seen in 11% of elderly patients and 13% of younger patients, Hypo HDL cholesterolemia was seen in 41% of elderly patients and 43% of younger patients, Hyper triglyceridemia was seen in 8% of elderly patients and 20% of younger patients. In VC woon *et al.* 44% of the elderly group had

dyslipidemia and 85% in the young group which was statistically significant. In contrast in study done by VC Woon *et al.* 85 % of the patients in young group had Dyslipidemia when compared to 44% of the patients in elderly group.

In our study significant obesity was found in young group (40%) compared to elderly group (22%) and similar observations were made in study done by MP holay *et al.*

In our study family h/o CAD was seen in 20% of younger Vs 4% in elderly. similar observation was made in a study done by MP Holay *et al.* where family history of IHD was seen significantly higher in young – 21.3%(p=0.001).

There was no difference between the two age groups with regard to presence of hypertension, Dyslipidemia. This was unlike the previous studies in which hypertension was most common risk factor in the elderly population. In study done by MP Holay, hypertension was commonly seen in elderly patients (39%).

A study done by Holay MP which compared elderly and young MI patients observed that the young MI patients were more likely to be smokers (68.8% vs. 31.7%) and have hyperlipidemia (75.9%). However, there was no difference between the two age groups with regard to the presence of hypertension and diabetes mellitus.

Cardiac enzymes CKMB values elevated in 82% Vs 62% in elderly compared to younger and trop I was positive in 60% of elderly compared to 52% in young patients. Similar observation was made in a study done by Hoit BH *et al.* 90 where majority of elderly patients had elevated enzymes.

Among elderly patients 16% was having mod to severe LV dysfunction compared to only 10% in younger. Similar observation was made in study by MP Holay where 63.2% patients in elderly group had poor LVEF.

Conclusion

High proportion of elderly patients had elevated CKMB level and Troponin level compared to younger patients.

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