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Risk factors and co-morbidities associated with acute myocardial infarction: A cross sectional study

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Abstract
Introduction: In India, there were approximately 29.8 million patients with cardiovascular disease by the year 2003, 1.5 million people die every year. Compared with all other countries, India suffers the highest loss in potentially productive years of life, due to deaths from cardiovascular disease in people with age 35-64 years.
Objectives: The present study was undertaken to know the risk factors and co morbidities associated acute myocardial infarction (AMI).
Methodology: This cross sectional study was carried out in Basaveshwar teaching & General Hospital, attached to M.R. Medical college, Kalaburagi. The study sample included all the patients admitted to medicine ward of Basaveshwar Teaching and General Hospital, Kalaburagi with the history of chest pain suggestive of AMI as diagnosed by WHO criteria during the study period. The period of study was from June 2012 to June 2014. SPSS 20 was used for statistical analysis to find the association of risk factors and co morbidities of AMI.
Result: Acute myocardial infarction (AMI) was more common in men than women and the incidence of which was higher in the age group of 5l-60 years in both sexes. The highest risk factor for AMI was smoking followed by hypertension and obesity. Maximum number of AMI cases (80%) were admitted in the ICCU ward within 12 hours of onset of chest pain.
Conclusion: AMI is more commonly seen during the age group of 41-70 years. Males are affected at an earlier age as compared to females. Smoking if the major risk factor significantly associated with AMI. Hypertension is the co morbid condition significantly associated with AMI.

Keywords: risk factors, co morbidities, acute myocardial infarction (AMI), chest pain, ECG

Introduction

At the beginning of the 20th century, cardiovascular diseases (CVD) accounted for less than 10% of all deaths worldwide. At the beginning of the 21st century, they accounted for nearly half of all the deaths in the developed world and 25% in the developing world. By 2020, it is predicted that the diseases will claim 25 million lives annually and that coronary heart disease (CHD) will surpass infectious diseases as the world's number one cause of death. The early mortality rate from acute myocardial infarction (AMI) is 30% with about half of them occurring within 1hour of disability. Although the mortality rate after admission for AMI has declined by 30% over the past decades, approximately 1 of every 25 patients who survive the initial hospitalization die in the first year after AMI [1].

The classic World Health Organization (WHO) criteria for the diagnosis of AMI require that at least two of the following three elements be present: A history of ischemic type of chest discomfort, Evolutionary changes on sersially obtained ECG tracings, and a rise and fall in serum cardiac markers [2] The pathological diagnosis of myocardial infarction (MI) requires evidence of myocyte cell death as a consequence of prolonged ischemia. Epidemiological reports from the WHO and American Heart Association beginning in the late 1950s required the presence of at least two of the following for clinical diagnosis of myocardial infarction: Characteristic symptoms, electrocardiographic changes and a typical rise and fall in biochemical markers [3].

Cardiovascular disease is the number one killer in the western world, it is surprising that the entity we now call myocardial infarction (coronary thrombosis) was widely recognized clinically only about 50 years ago [4]. Despite Dr. Herrick's [5] classic article of 1912, medical students and house staff in 1923 in Chicago, Herrick's home town, had still not heard of the diagnosis of coronary thrombosis (myocardial infarction). The full impact of the ECG was felt only after the introduction of the precardial and augmented limb leads, which led to the documentation of the q-wave and by the late 1940s widespread appreciation of its specificity for myocardial infarction [6]. Diagnostic objectivity was greatly aided by the introduction of plasma enzymes in 1954 [7] and the specificity significantly improved after the introduction of LDH isoenzymes in 1957 [8] and of CK is oenzymes in 1966 [9].

Methodology

This cross sectional study was carried out in Basaveshwar teaching & General Hospital, attached to M.R. Medical college, Kalaburagi The study was conducted on patients admitted with history of chest pain suggestive of AMI as diagnosed by WHO criteria admitted in medicine ward. The study was undertaken with an aim to study risk factors and co-morbidities associated with all types of Acute Myocardial

Infarction**.** The study was carried out from June 2012 to June 2014. The sample size includes 100 patients with history of chest pain suggestive of AMI, selected by simple random method. Of these, 100 patients were diagnosed as having AMI by using WHO criteria after exclusion of patients having acute pericarditis, severe heart failure, acute myocarditis, cardiac trauma, skeletal muscle disease and/or trauma, chronic renal failure.

A detailed history of risk factors, co morbidities and clinical history was obtained from patients or from their relatives after obtaining informed consent. While taking history importance was given regarding risk factors and co-morbidities associated with chest pain; its site, nature, duration, radiation, relation with exertion, sweating and vomiting. Data was analysed using SPSS 20 version. Descriptive and analytical statistics was used to check the association of risk factors and co morbidities associated with AMI. P value less than 0.05 was taken as statistically significant.

Ethical clearance was obtained from ethical committee Basaveshwar teaching & General Hospital, attached to M.R. Medical college, Kalaburagi before the commencement of study.

Results

Our study observations among the proved AMI cases are as follows: In the present study, 72% of the patients were male and 28% females. 9 patients had acute myocardial infarction with age <40 years called young acute myocardial infarction As per table-1, the maximum number of cases of acute myocardial infarction were found in age group 51-60 years in both males (31.94%) and females (46.42%) followed by 41-50 years in males and 61-70 in females only a mere number of 9 cases were in the age group of 21- 40 years. Males were most commonly affected during the age group of 41 to 70 years were as females were more commonly affected during 51 to 70 years.

From Table-2 41 percent of the AMI cases were smokers, 18 percent of cases were obese. Co morbidities in terms of Hypertension, dyslipidemia and diabetes mellitus was seen among 60%, 15% and 34% of AMI cases. It can be observed that hypertension was the major risk factor followed by smoking and least was dyslipidemia. The risk factors associated with AMI was smoking (P=0.016). The co morbidity significantly associated with AMI was Hypertension (P=0.000)

Discussion

Acute myocardial infarction (AMI) is the cause of 25-30% of deaths in most industrialized countries. By 2020 it is predicted that the ischemic heart disease will

4-7% of all Patients with myocardial infarction and nearly four-times this percentage for patients under age 35 years do not have atherosclerotic coronary artery disease [16]. surpass infectious disease as the world's number one cause of death and disability [10]. Decades of observational studies have verified excess MI risk in men compared with women. Kanitz *et al*. [11] study, 81% were male and 19% were females. In the present study 72% of acute myocardial infarction patients were male and 28% were females.

Decades of observational studies have verified excess myocardial infarction risk in men compared with premenopausal women. After menopause, however, coronary risk accelerates in women. In Kanitz *et al*. [12] study 81% were males and 19% were females for myocardial infarction. Lipid

Disorders

In Tanajura *et al*. [13] study the prevalence of hyperlipidemia was 16%. Abnormalities in plasma lipoproteins and derangements in lipid metabolism rank as the most firmly established and best understood risk factors.

Hypertension: A wealth of epidemiologic data support a relationship between hypertension and atherosclerotic heart disease. More recent studies also show a reduction in CHD risk by antihypertensive therapy. In Tanajura *et al*. study the prevalence of hypertension was 22%. [14].

Diabetes Mellitus: Diabetes mellitus is a CHD risk – equivalent, most patients With DM die of atherosclerosis and its complications. In Tanajura *et al*. [13] study, the prevalence of DM was 4%.

Cigarette Smoking: Cigarette smoking accelerates atherosclerosis in both sexes Smoking accelerates atherosclerosis in both sexes and at all ages and increases the risk of thrombosis, plaque instability, myocardial infarction and death. In Tanajura *et a1*. [13] study, the prevalence of smoking was 81%. A wealth of epidemiologic data support a relationship between hypertension and atherosclerotic heart disease, more recent studies also show a reduction in CHD risk by antihypertensive therapy. In Tanajura *et a1*. [13] study, the prevalence of hypertension was 22%.

Abnormalities in plasma lipoprotein and derangements in lipid metabolism rank as the most firmly established and best understood risk factors for AMI. In Tanajura *et a1*. [13] study, the prevalence of dislipidemia was 16%.Diabetes mellitus is a chronic heart disease risk equivalent; most patients with diabetes mellitus dies of atherosclerosis and its complications. In Tanajura *et a1*. [13] study, the prevalence of diabetes mellitus was 4%.

In the present study, the prevalence of smoking was 41%, hypertension 60%, dyslipidemia 15% and diabetes mellitus 34%. According to Mario D'ecosta *et a1*. [15] about 80% of the acute myocardial infarction cases were admitted to the ICCU ward within 12 hours from the onset of chest pain. The present study also shows the same (78%) of acute myocardial infarction cases who were admitted within 12 hours of chest pain. Almost all myocardial infarctions occur due to atherosclerosis of coronary arteries. Non-atherosclerotic etiology of coronary artery disease:

Table 1: Age and sex wise distribution of AMI patients

Age Group	Males		Female	
	Number	Percent	Number	Percent
21-30	1	1.3	--	--
31-40	7	9.7	1	3.57
41-50	18	25.00	2	7.14
51-60	23	31.94	13	46.42
61-70	16	22.2	9	32.14
71-80	7	9.7	3	10.71
Total	72	72.00	28	28.00

Table 2: Risk factors and co morbidities associated with acute myocardial infarction

Risk Factors	AMI positive cases	Percentage	χ^2 P value
Smoking	41	41	5.846 0.016
Hypertension	60	60	22.599 0.000
Dyslipidemia	15	15	0.204 0.930
Obesity	18	18	0.005 0.962
Diabetes Mellitus	34	34	1.623 0.203

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