Assesment of Myocardial Infarction in Young Patients

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ABSTRACT

Introduction: Paucity of data exists in the literature regarding the clinical features, natural history, and prognosis in young patients with acute myocardial infarction (MI). Literature quotes few studies which have focused on assessment of various epidemiologic features and anatomy of the coronary arterial system in young adults with the evidence of coronary heart diseases. Hence present study evaluated young patients presenting with acute MI on the basis of various demographic details and morbidity and mortality.

Material and methods: The present study was conducted among 600 patients who were admitted with MI within 24 hours of the onset of the clinical symptoms. Patients were divided into young aged, middle aged and the older individuals. All the demographic and clinical details of the patients were recorded and assessed. All the results were analyzed by SPSS software. Multivariate analysis and chi-square test were used for the assessment of level of significance.

Results: Mean age of the young patients, middle-aged patients and elderly patients were 39.5, 60.8 and 78.2 years respectively. 90 percent of the patients in the young age group were males while in the middle aged and elderly group patients, the percentage of males were 77 and 91 respectively. Significant results were obtained while comparing the CHF as complications in patients of different age groups. 78 percent of the young patients were current smokers while only 58 and 27 of the middle aged and elderly patients respectively were current smokers. Significant differences were obtained while comparing the patients on the basis of current smoking status.

Conclusion: Relatively favourable prognosis is associated in young patients with a history of MI in comparison with elderly patients.

Key words: Myocardial infarction, Young patients

INTRODUCTION

Literature has paucity of data regarding the clinical features, natural history, and prognosis in young patients with acute myocardial infarction (MI).[1] In United Sates alone, more than 30,000 women younger than 55 years of age per year are hospitalized with MI. Several national campaigns have been started due to growing public recognition of the importance of heart disease in young women. However, still lacking in the literature is the contemporary data about trends in clinical characteristics, hospitalization, and mortality rates of young patients with MI.[2] Increase in prevalence of risk factors for Coronary heart diseases (CHD) such as obesity, in young patients counters the protection offered by young age. Ignorance of CHD combined with a false sense of security likely prevents younger individuals from seeking medical advice. Early recognition and risk factor modification in this population is of key importance.[3] In young MI patients, the mechanism and course of disease are likely different from those in an older population.[4] Literature quotes few studies which have focused on assessment of various epidemiologic features and anatomy of the coronary arterial system in young adults with the evidence of coronary heart diseases.[5] Hence; we evaluated young patients presenting with acute MI on the basis of various demographic details.

MATERIAL AND METHODS

The present study was conducted in the Department of Cardiology and General Medicine of the medical institution and included assessment of 600 patients who were admitted with MI within 24 hours of the onset of the clinical symptoms from 2015 to 2016. A similarity in the one year survival rate and pattern of the patients after they were admitted to the hospitals is reported in the previous studies conducted by Gilpin EA et al.[6]

Fulfilments of minimum of two out of the following criteria were used for the assessment of the AMI:

- Chest pain characteristic of AMI,
- Electrocardiographic changes with evolution of Q waves,
- Rise in Cardiac Bio-markers levels.

Evolution of Q waves as depicted in Electrocardiographic changes included in diagnostic criteria involved transmural infarction. Diagnosis of non-transmural infarction was done by typical ST segment and T wave changes accompanied by criterion.[7]

Classification of Q wave was classified into following types:

- Anterior infarction (V1-V4),
- Lateral infarction (I, aVL, and/or V5-V6),
- Inferior infarction (II, III, aVF)

Classification of posterior infarctions was done with the inferior infarctions.[7] Young aged persons were defined as subjects with age of less than 45 years of age, middle aged persons were defined as subjects of age between 45 to 70 years while the older individuals were defined as subjects having age more than 70 years. All the demographic and clinical details of the patients were recorded and assessed. History of hypertension was considered as positive when the systolic blood pressure or the diastolic blood pressure was more than 140 mm and 90 mm of mercury respectively. Patient's medical history and results of the diagnostic tests were used for the previous incidence of MI in the study patients. Assessment of previous episodes of angina pectoris, Congestive heart failure, diabetes, lipid profile derangement and lung obstructive disorders were

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assessed. We also assessed ventricular arrhythmias which we defined as frequent ventricular beats (more than 1 beat/min or 30 beats/hr), multiform ventricular premature beats, couplets, early ventricular beats (R-on-T phenomenon), or ventricular tachycardia (more than 3 consecutive ventricular premature beats). Observation of atleast two of the following features confirmed the diagnosis of heart failure in the cardiac care unit:

- S3,
- Rales, or
- Radiographic evidence of pulmonary congestion

Following features were categorized as complications:

- Cardiac arrest,
- Pericarditis,
- Mitral Regurgitation,
- Rupture of the interventricular septum and papillary muscle,
- Papillary muscle dysfunction,
- Persistent chest pain and
- Shock

Analysis of the administration of digitalis, diuretics, procainamide, quinidine, and 13-blocking agents at time of discharge was maintained during the time when the patients appeared for follow-up check up. Records of follow-up of patients at 3, 6 and 12 month's time were maintained. Information of the patients that died was also taken and data was recorded. Those cases were considered as events in which cardiac deaths occurred or new non-fatal MI occurred.

STATISTICAL ANALYSIS

All the results were analyzed by SPSS software. Multivariate analysis and chi-square test were used for the assessment of level of significance.

RESULTS

Clinical and demographic details of the patients are demonstrated in Figure 1 and Table 1. Mean age of the young patients, middle-aged patients and elderly patients were 39.5, 60.8 and 78.2 years respectively. 90 percent of the patients in the young age group were males while in the middle aged and elderly group patients, the percentage of males were 77 and 91 respectively. Previous history of angina pectoris occurred in 24 percent of the young patients while 41 and 49 percent of the patients in the middle aged group and elderly group respectively exhibited history of angina pectoris. Complications of the patients are highlighted in Figure 2 and Table 2. CHF was observed in 42 percent of the young patients while in case of middle-aged and elderly patients, percentage of the patients having CHF as complications were 55 and 56 percent respectively. Significant results were obtained while comparing the CHF as complications in patients of different age groups. Figure 3 shows the smoking characteristic of the patients of the various groups. 78 percent of the young patients were current smokers while only 58 and 27 of the middle aged and elderly patients respectively were current smokers. Table 3 shows the p-value for the smoking history in patients of various groups. Significant differences were obtained while comparing the patients on the basis of current smoking status. Figure 4 depicts the survival rate in young, middle and elderly patients.

DISCUSSION

One of the leading causes of deaths in the adults of the western world is by coronary heart disease (CHD). One of the lethal manifestations of CHD is MI and can results in sudden death.[8] Even though spectrum of MI is mainly involving elder patients, recent data quotes that MI can occur in young patients also. In patients younger than 45 years of age, the incidence of MI is relatively low.[9] When occur in patients of less than 45 years of age, MI carries significant morbidity, psychological effects, and financial constraints for the patient and the family.[10] The protection offered by young age has been slowly taken away by

Parameter	Young patients	Middle-aged patients	Elderly patients	p-value
Mean age (years)	39.5	60.8	78.2	0.28
Males (%)	90	77	91	0.02*
Previous MI history (%)	16	30	29	0.03*
Angina pectoris history (%)	24	41	49	0.01*
CHF history (%)	4	11	22	0.03*
*: Significant				
Table-1: p-value for clinical and demographic details				

Complications (%)	Young patients	Middle-aged patients	Elderly patients	p-value
CHF	42	55	56	0.02*
Chest pain (persistent)	32	34	30	0.52
Shock	3	4	6	0.12
*: Significant				
Table-2: p-value for the complications in patients of various groups				

Parameter	Young patients Vs Middle aged patients	Middle aged patients Vs Elderly patients	Young patients Vs Elderly patients
Non-smoker (% of patients)	0.02*	0.03*	0.01*
Past smoker (% of patients)	0.02*	0.02*	0.02*
Present smoker (% of patients)	0.01*	0.03*	0.01*
*: Significant			
Table-3: p-value for various smoking parameters in patients of different groups			
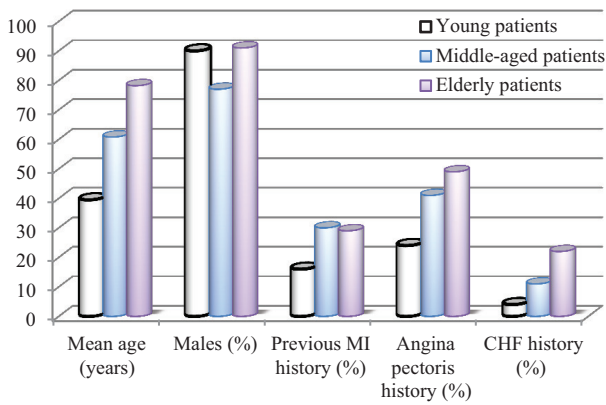
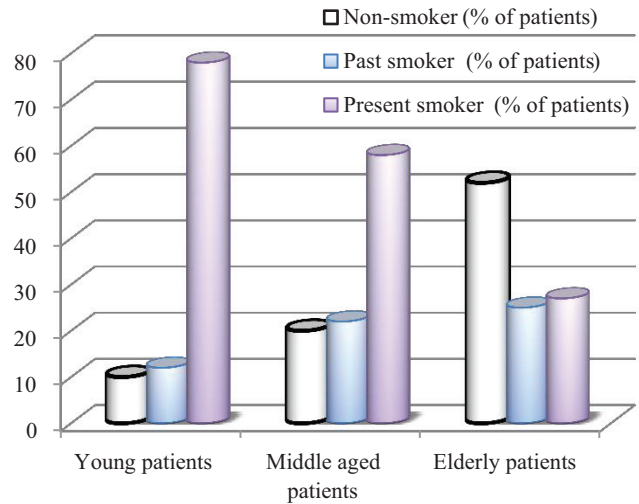**Figure-1:** Clinical and demographic details of the patients

Figure-2: Complications in patients of various groups

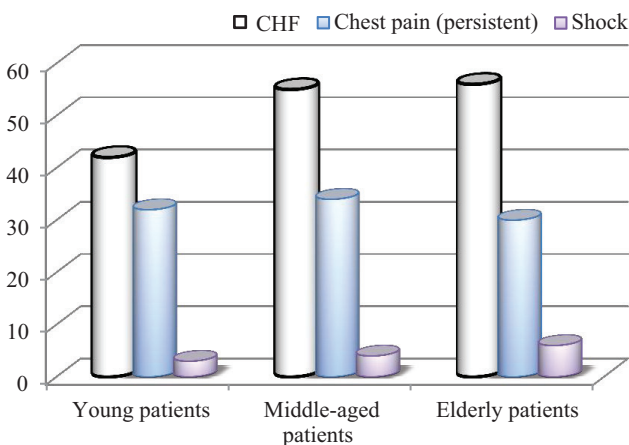**Figure-3:** Smoking characteristic in patients of the various groups
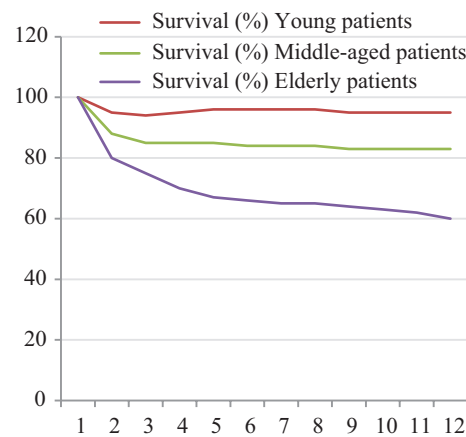

Figure-4: Cumulative 1 year survival rate of patients in various groups

the increased prevalence of risk factors for CHD in adolescents such as smoking, obesity, and lack of physical activity.[11] Hence; we evaluated young patients presenting with acute MI on the basis of various demographic details and morbidity and mortality. In the present study, we observed that a distinct group characterized by low hospital mortality rate and comparatively favourable prognosis at 1 year follow-up is exhibited by MI affected young patients. Significance of family history, smoking history as a risk factor for development of MI in young patients is highlighted in the present study. More extensive infarctions are evident in the present study in young patients as estimated by elevated incidence of ventricular tachycardia in comparison with the elderly patients. However, surprisingly low poor prognostic signs, complication rates and mortality were recorded in the present study. Egred M et al[11] reviewed the data available in the literature regarding the management of MI in young patients. Significant mental, physical and financial burdens are caused by this disease when it affects the persons of younger age. Four main groups are formed when the aetiology of MI is summarized in young patients. These include atheromatous coronary artery disease, non-atheromatous coronary artery disease, hyper-coagulable states, and MI related to substance misuse. All these various etiologic groups considerably overlap with each other. Faisal AW et al[12] analyzed the various risk factors associated with first MI in young patients. They analyzed 100 patients of less than 45 years of age who suffered from first MI and concluded that in young adults of their study, smoking, hypertension, diabetes and dyslipidemia represented modifiable risk factors. Bhardwaj R et al[13] evaluated the risk factors in young patients

presenting with MI and reported that more than 40 percent of the patients exhibited Low High-density lipoprotein (HDL) and concluded that the main presentation of MI in young patients is the ST elevation. Li Z et al[14] assessed the characteristic of HDL and its relation with HDL cholesterol along with severity of the lesion in young patients with MI and found that in young patients who present with MI, HDL cholesterol is the protective factor. Colkesen AY et al[15] assessed the coronary artery lesion characteristic of acute ST elevation MI in young patients and reported that family history, smoking etc are the important risk factors for the occurrence of MI in young adults. Aygul N et al[16] assessed the frequency of occurrence of risk factors for STEMI and observed a statistical significant increase in the prevalence of hypertension and diabetes as a risk factor in patient with STEMI. Zhang WP et al[17] evaluated the risk factors associated with MI by conducting a case-control study involving 53 young patients and over 400 elderly patients and observed that among young patients, smoking and positive family history was found to be significant risk factors whereas HDL cholesterol was found to be lower in young patients in comparison with the elderly patients. Shah N et al and others[18,19] reviewed the differences in the rates, risk factors and prognosis of the MI in elder patients and young patients and revealed that in young patients, short term prognosis of MI is better in comparison with the elder patients.

CONCLUSION

From the present study, the authors conclude that relatively favourable prognosis is associated in young patients with a history of MI in comparison with elderly patients. However, future longitudinal studies are recommended.

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