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An Observation of Acute Myocardial Infarction in the Elderly

Routray S.N.[1], Rout S.[2]

[1]Professor, Department of Cardiology, S.C.B Medical College, Cuttack, Odisha, India

[2]Senior Resident, Department of Cardiology, S.C.B Medical College, Cuttack, Odisha, India

Abstract: ***Background: It has been demonstrated in previous studies that elderly with acute myocardial infarction (AMI) undergo more complications than the young with AMI. Objective- The present study was undertaken to analyse the risk factors, clinical features, outcomes and complications of AMI in elderly. The material and methods- We enrolled 180 patients and divided them into 2 groups of 90 each belonging to one group of less than 60 yrs and another group of more than 60 yrs of age. To study the various complications in the above age group of patients with AMI in 30 days follow up. Result: It was seen that the elderly with MI presented with more risk factors and more atypical presentations. Higher morbidity and mortality was observed on 30 days follow up. Conclusion: It was seen that all the complications were more in elderly as compared to young.***

Keywords: AMI, Elderly

1. Introduction

The elderly constitute an increasing proportion of patients presenting with Acute Myocardial Infarction[1]. Elderly is defined as age ≥ 60 yrs as per I.C.M.R. survey on Indian geriatric population[2] and AMI study on elderly Chinese by Shi Wen Wang et. al, 1988 [3]. While age itself is a prominent marker of high risk for adverse events[4] the elderly have usually been under represented in clinical trials of ACS. Global registry of patients with AMI published in 2000 shown over half of the patients were over the age of 65 yrs[5] emphasizing the growing importance of examining outcomes in elderly age group. The role of conventional cardiovascular risk factors in elderly persons is incompletely understood because only fragmentary an inadequate data are available in most instances[1]. Although the typical onset of crushing sub-sternal pain is still fairly common, other modes of presentation such as epigastric pain, atypical chest pain, CCF, vomiting, acute confusion and syncope are frequently encountered in elderly[6]. Since the presentation is variable the diagnosis of myocardial infarction is often overlooked. The elderly also have higher rate of complications and mortality[7]. Apart from diagnostic difficulty, management is also challenging in elderly. They may be more refractory to medical therapy possible because of advance atherosclerotic diseases and ventricular dysfunction particularly diastolic dysfunction. Management decision during 1st 24 hour have the greatest effect on survival in the elderly as is true with all age group[8]. The major goals of treating elderly patients are to improve survival and reduce morbidity. Since elderly patients with AMI differ in clinical presentation compared to young patients with AMI this issue needs perfect understanding as it will have important bearing on reducing the mortality and morbidity.

2. Aims & objective

The present study "Observation on Acute Myocardial Infarction in elderly" was conducted with following Aims & Objectives.

a) To describe the risk factors, clinical features, outcomes in AMI in elderly (age ≥ 60 years) and to compare the same with the young patients with AMI (age < 60 years).
b) To study the various complications in both the above age group of patients with AMI in 30 days follow up.

3. Methods

The present study "Observation on Acute Myocardial Infarction in elderly" consisted of 180 patients diagnosed as AMI and admitted to Department of Cardiology, SCB Medical College during the period of November 2017 – November 2018 out of which 90 cases are of younger (age < 60 years) as group I and 90 cases are of elderly (age ≥60 years).

Hospital based observational cross sectional study was conducted regarding risk factors, outcomes and complications. All these aspects were studied and compared during 1st day and 30th day follow up.

Selection of Cases
Subjects fulfiling any two criteria out of three of the following were included in the study.(a) Typical symptom (Chest discomfort). (b) Typical pattern of ECG Changes (ST segment elevation of ≥ 1 mm in at least two consecutive leads or fresh left BBB). (c) Elevated enzyme levels of serum CPK-MB enzyme (two times the upper limit of normal level) and / or cardiac specific Troponin I (CTnI) and / or cardiac specific Troponin – T (CTnT).

Exclusion Criteria
Subjects of stable and unstable angina were excluded

Statistical analysis
Treatment modality, mortality were compared in both groups using chi-square statistics and unpaired T-test. Datas were presented in percentage and mean SD.Statistical significance was considered as P <0.05.

Ethical Clearance

Study procedure was approved by the Institiutional Ethics Committee of SCB Medical College and Hospital Cuttack Odisha (Regd no ECR/84/Inst/OR/2013 while grant for the study was approved by the institutional Review board vide Ref no 765/15.1.2019. Written consent was sorted prior to participation from respondents by means of an informed consent .

4. Observation

Table 1: Sex distribution of AMI in elderly and young

Sex	Group – 1 (Young, age < 60 yrs.) (n = 90)	Group – 2 (Elderly, Age ≥ 60 yrs) (n = 90)
Male	66 (73.3%)	54(60%)
Female	24 (26.7%)	36(40%)
Total	90 (100%)	90 (100%)

Males were affected more in both elderly and young group, but Male: Female ratio was low in elderly (1.5: 1) compared to young (2.75: 1)

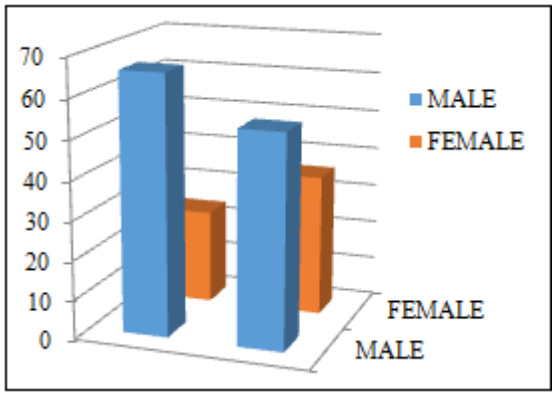

Figure 1: Sex distribution in AMI in elderly and young

Table 2: Previous History of AMI in Young and elderly age group

Sex	Group – 1 (Young, age < 60 yrs.) (n = 90)	Group – 2 (Elderly, Age ≥ 60 yrs) (n = 90)	P value
Male	6 (6.6%)	18 (19.9%)	< 0.05
Female	0 (0%)	12 (13.4%)	< 0.05
Total	6 (6.6%)	30 (33.3%)	< 0.05

P < 0.05 is significant.

Past History of AMI observed more in elderly age group(33.4%) as compared to Young Age Group.(6.6%)

Table 3: Comparision of Risk factors for AMI in young and elderly

Risk factors	Group – 1 (Young, age < 60 yrs.) (n = 90)	Group – 2 (Elderly, Age ≥ 60 yrs) (n = 90)	P value
HTN	21 (23.8%)	36 (40%)	< 0.05
DM-2	12 (13.4%)	9 (10%)	< 0.05
Smoking	48 (53.3%)	15 (16.7%)	< 0.05
Dyslipidemia	12 (13.4%)	9 (9.9%)	> 0.05
F/H of coronary artery disease	18(19.9%)	3 (3.3%)	< 0.05
Obesity	12 (13.4%)	6 (6.6%)	< 0.05
No risk factor	12 (13.4%)	33 (36.4%)	< 0.05

HTN was most common risk factor seen in elderly (40%).Smoking was significantly less in elderly (16.7%) compared to Young (53.5%).No risk seen in 36.4% of elderly compared to 13.4% in Young which is significant.

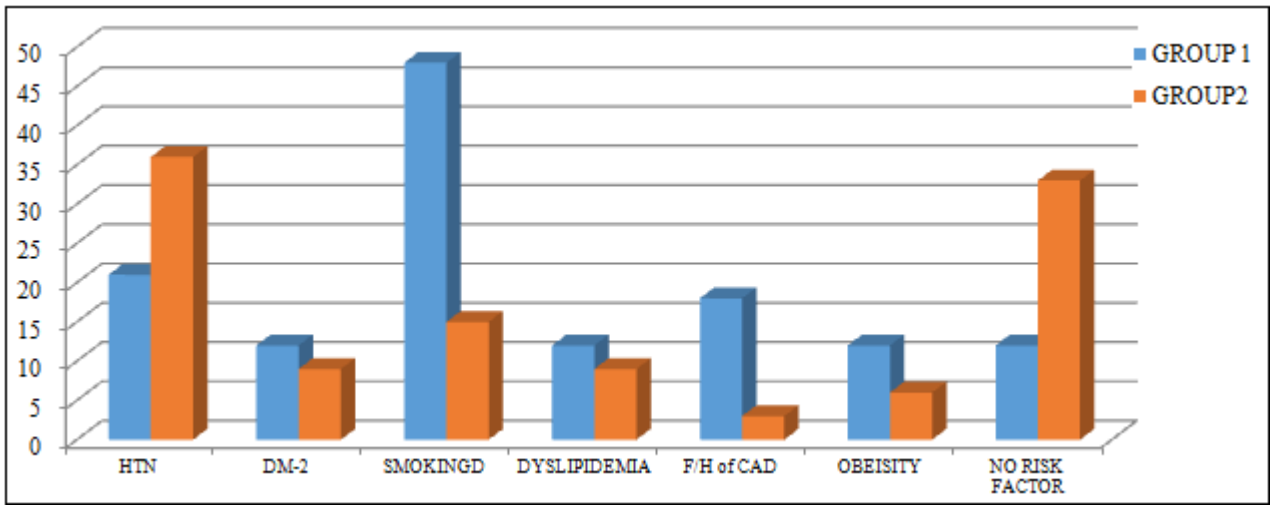

Figure 2: Comparison of risk factors in young and elderly

Table 4: Incidence of frequency of presenting symptoms of AMI. In Young and elderly age group

Presenting symptom and sign	Group – 1 (Young, age < 60 yrs.) (n = 90)	Group – 2 (Elderly, Age ≥ 60 yrs) (n = 90)	P value
Typical chest pain	75 (83.3%)	45(50%)	< 0.05
Atypical chest pain	12(13.3%)	24 (27.7%)	< 0.05
No chest pain	3 (3.3%)	21 (23.3%)	< 0.05
Sweating	52 (46.6%)	45 (50%)	> 0.05
Dyspnoea	15 (16.7%)	36 (40%)	< 0.05
Nausea and vomiting	27(29.7%)	33 (36.4%)	< 0.05
Giddiness	9 (9.9%)	27 (29.7%)	< 0.05
Syncope	3 (3.3%)	12(13.4%)	< 0.05
Palpitation	3 (3.3%)	12(13.4%)	< 0.05
Altered sensorium	0 (0%)	3 (13.4%)	> 0.05
Focal Neurological deficit	3 (3.3%)	0 (0%)	> 0.05

Atypical chest pain, Dyspnoea, Nausea, Vomiting, Giddinees and Syncope were seen significantly more in elderly compared to Young. No chest pain was seen in 23.3% in elderly.

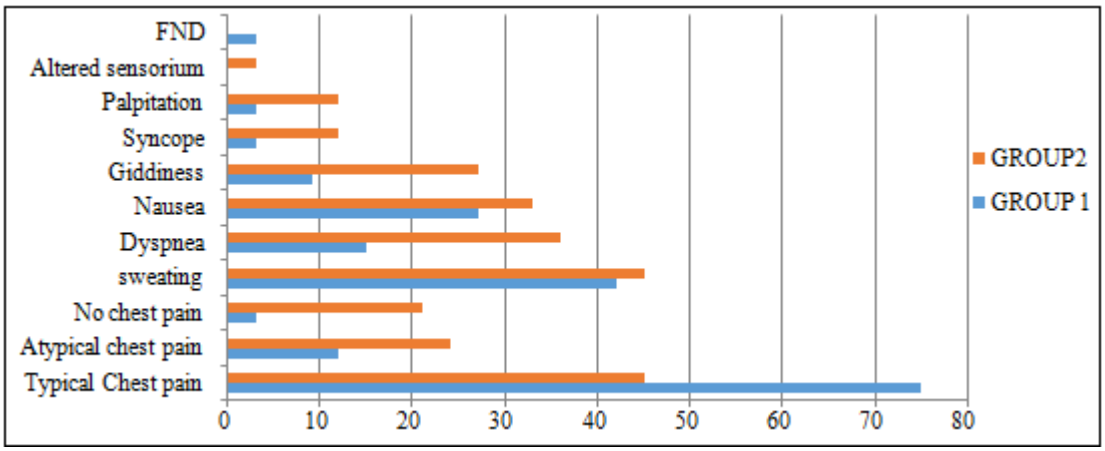

Figure 3: Incidence of Frequency of Presenting Symptoms in AMI in Young and Elderly Age Group.

Table 5: Complications of AMI during 1st.day of presentation in young & elderly age group

Complications	Group – 1 (Young, age < 60 yrs.) (n = 90)	Group – 2 (Elderly, Age ≥ 60 yrs) (n = 90)	P value
CCF	30 (33.3%)	45 (50%)	< 0.05
Cardiogenic shock	3 (3.3%)	12 (13.3%)	< 0.05
Re-infarction	0 (0%)	0 (0%)	-
Arrhythmias	24 (26.7%)	39 (43.3%)	< 0.05
Cardiac arrest	6 (6.6%)	3 (3.3%)	> 0.05
Cerebro-vascular accidents (CVA)	0 (0%)	06 (6.6%)	< 0.05
Bleeding complications	0 (0%)	0 (0%)	-
Death	9 (10%)	21 (23.3%)	< 0.05

Complications like CCF, Cardiogenic shock, Arrhythmia, CVA and Death were observed more frequently in elderly group.

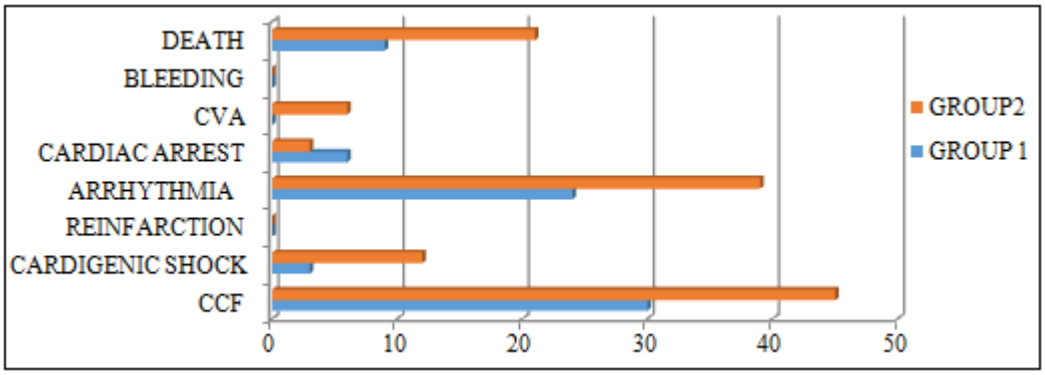

Figure 4: complication of AMI during first day of presentation in young and elderly age group

Table 6: Complications seen on 30th day follow up in Young and elderly Age group

Complications	Group – 1 (Young, age < 60 yrs.) (n = 90)	Group – 2 (Elderly, Age ≥ 60 yrs) (n = 90)	P value
CCF	03 (3.3%)	9 (10%)	<0.05
Cardiogenic shock	0 (0%)	6(6.6%)	>0.05
Re-infarction	0(0%)	3(3.3%)	>0.05
Arrhythmias	12 (13.4%)	18(20%)	<0.05
Cardiac arrest	0(0%)	0(0%)	-
Cerebro-vascular accident	0(0%)	3(3.3%)	> 0.05
Bleeding complications	0(0%)	0(0%)	-
Post MI Angina	3 (3.3%)	9(10%)	< 0.05
Ventricular Aneurysm	0(0%)	3(3.3%)	> 0.05
Death	0(0%)	12(13.4%)	< 0.05

Complications like CCF, Arrhythmia, Post myocardial Infarction Angina and Death observed more commonly in elderly age group

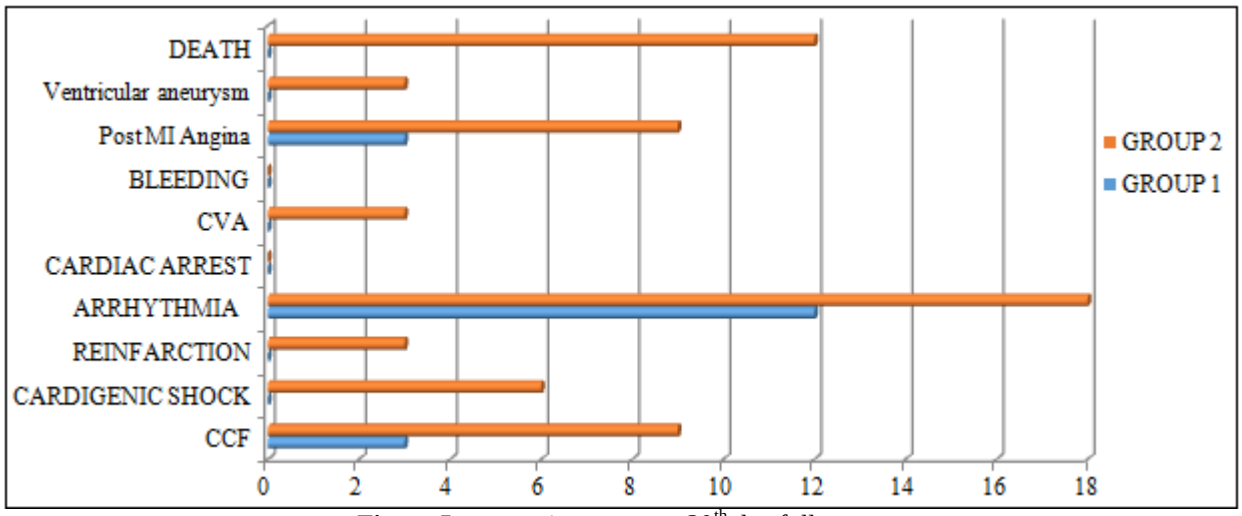

Figure 5: comparison seen on 30th day follow up

5. Discussion

Age and Sex Distribution

The mean age of cases found in young group was around 51.9 ± 3.8yrs and in older group was around 69.5 ± 5.3 yrs. Table – 1 shows the M : F ratio as 2.75 : 1 in younger group & 1.5:1 in Elderly group i.e. though males are affected more in both groups the M : F ratio is gradually becoming smaller in the elderly group. This reflects a higher percentage of females affected in AMI in an elderly population. A study by Shi Wen Wang et. al, 1988[3] on AMI in elderly Chinese had shown similar trend. A study by Garen C. Solomen et. al 1989 showed similar data. If may be due to the loss of protective action of oestrogen in elderly females.

Importance of previous history of AMI

Table – 2 show more no. of cases with previous H/O AMI in elderly group in both male and female. It may be attributed to ageing process which itself is a powerful predictor of adverse events. Structural and functional deterioration which cummulate with each repeat attack of AMI associated with aging process may contribute to increased morbidity and mortality. This fact has been well supported by previous study by Harvuis R et. al and Reichel. W et. al, 1978. The elderly group presented to our hospital relatively late than the younger age group. This delay in presentation in elderly may be due to several factors like atypical presentation and silent myocardial infarction.

Risk Factors of AMI

Among risk factors hypertension was the commonest risk factor in elderly, while smoking was less in elderly as compared to young (Table-3). Similar type of observation were seen by yang XI et al 1987 and by Roman Castello et. al, 1988[9]. The low incidence of smoking in elderly is well explained as most of the elderly quit smoking as age advances and also number of females (post menopausal) increases in elderly age group with AMI who are usually non-smokers. A study by Kannel W.B. et. al, 1976[10] pointed out that cigarette smoking may be less of a risk for cardiovascular disease in old age. The present study observed no risk factor in 36.66% in group – 2. This observation is supported by study by Brain D. Hoit, et al, 1986[11]. This suggest that age itself is a major risk factor for myocardial infarction.

Clinical features of AMI

Atypical chest pain. Non specific symptom like giddiness, syncope and palpitation are more frequently observed in elderly Group compared to younger Group (Table-4) similar observations were seen by previous studies by Shu - Yuan et al, 1988. Such high incidence of Non-specific symptoms in elderly could be because of pre occupied non-cardiac

problems, not able to describe their symptoms accurately (or) have increased pain threshold.

Complications

High incidence of occurrance of heart failure and cardiogenic shock were observed in elderly group compared to younger group (Table-5). Similar observation was also seen during study by William B Applegate et. al, 1984[7] and study by Edurando et. al, 1988. High incidence is probably related to pre-existing heart disease as reflected by more frequent occurrence of Hypertension, cardiomegally (or) a decline in myocardial reserve. Table-5 alsoashows Arrhythmias significantly more common in elderly with similar study report by Harris R. et. al, 1978[12]. This is probably because Atrio-ventricular conducting system is subject to fibrosis and more vulnerable to ischemia and necrosis.

Table-6 shows on 30th day follow up complications like post MI angina, and CCF were more in elderly as compared to young. Complications like cardiogenic shock, re-infarction, cerebro-vascular accidents and ventricular aneurysm were observed only in elderly age group. A study by Gerstenbilition G, et al, 1976[13] showed similar observations. This may be due to the fact that in elderly the adaptations of cardiovascular system to stress is impaired as a consequence of anatomical, functional and metabolic changes in the heart itself and also increase in impedence to ventricular ejection due to anatomical changes in the arterial bed and insufficient vasodilatory capacity of the peripheral vessels. These age related changes hamper normal ventricular functions and its adaptive mechanisms to the hemodynamic burden elicited by myocardial necrosis.

Prognosis

So it was found mortality rate is higher (40%) in elderly compared to young (13.3%). A study conducted by Pedoe H et al, 1994 showed similar observations. Higher rate of mortality in elderly is probably due to structural changes of heart related to the aging process and age related changes in other organs and deterioration of their adaptive mechanisms to ventricular failure.

6. Conclusion

Present study showed with increasing age the preponderence of male among patients with AMI admitted to this Hospital decreased and sex ratio became smaller. Variability in the clinical presentation and more atypical presentation seen in AMI in elderly. Hypertension, diabetes were the common risk factor observed in elderly. High rate of Heart failure and cardiogenic shock noted in elderly. β blocker use, thrombolytic treatment and surgical interventions were less in elderly compared to young. Mortality was significantly more in elderly. Most of the observations were consistent with various Indian and International studies done before.

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