

## Acute coronary syndrome in elderly – risk factors and in-hospital outcome

Grace M.<sup>1</sup>, Chelakkat M.<sup>2\*</sup>, Asokan A.<sup>3</sup>

DOI: <https://doi.org/10.17511/ijphr.2018.i2.05>


<sup>1</sup> Mary Grace, Associate Professor, Department of Medicine, Medical College Hospital, Thrissur, Kerala, India.

<sup>2\*</sup> Mukundan Chelakkat, Assistant Professor, Department of Cardiology, Medical College Hospital, Thrissur, Kerala, India.

<sup>3</sup> Anjana Asokan, Junior Resident, Department of General Medicine, Medical College Hospital, Thrissur, Kerala, India.

**Background:** Elderly patients constitute a majority subset of population developing acute coronary syndrome. But specific risk factors and in-hospital outcome have not been well-studied. **Objectives:** To study the risk factors and in-hospital outcome of people aged >60 years with acute coronary syndrome. **Materials and Methods:** 220 patients aged >60 years admitted with acute coronary syndrome under Department of General Medicine (during a time period from 1<sup>st</sup> January 2015 to 31<sup>st</sup> December 2015) were studied between admission and death/discharge. All patients who opted for primary PCI and who left treatment before completion were excluded. Patients were grouped into STEMI, NSTEMI and unstable angina. Various factors affecting mortality were studied. **Results:** After exclusion, 212 patients were included in the study. The mean age of men was 68±6 years while that of women was 71±7 years (p=0.01). Modifiable risk factors were present in 84.9% (n=180), most common risk factor observed was past history of systemic hypertension. (52.36%) (n=111). Hypertension was found to have significant association with mortality. (p value=0.05). Chest pain was the most common symptom. Atypical features were found to be higher in those aged above 80 years. (p value = 0.04). Thrombolysis was not done in 15.7% (16) patients with STEMI, reason being they were out of window period for thrombolysis. Women were found to have more pre-hospital delay (p value= 0.026). High Killip class and also hypotension during admission was found to be associated with increased mortality (p value<0.001). **Conclusion:** Hypertension still remains as an important modifiable risk factor for coronary artery disease in the elderly population. Hence regular monitoring of blood pressure and proper management has to be followed in this age group also. The delay to reach the hospital should be avoided, because thrombolytic therapy is very effective in elderly patients.

**Keywords:** Acute Coronary Syndrome, Elderly, Risk factors, In- hospital outcome

Corresponding Author	How to Cite this Article	To Browse
Mukundan Chelakkat, Assistant Professor, Department of Cardiology, Medical College Hospital, Thrissur, Kerala, India. Email: <a href="mailto:mukundanc@gmail.com">mukundanc@gmail.com</a>	Grace M, Chelakkat M, Asokan A. Acute coronary syndrome in elderly – risk factors and in-hospital outcome. Public Health Rev Int J Public Health Res. 2018;5(2):77-81. Available From <a href="https://publichealth.medresearch.in/index.php/ijphr/article/view/86">https://publichealth.medresearch.in/index.php/ijphr/article/view/86</a>	

<b>Manuscript Received</b> 2018-06-05	<b>Review Round 1</b> 2018-06-15	<b>Review Round 2</b> 2018-06-24	<b>Review Round 3</b>	<b>Accepted</b> 2018-06-30
<b>Conflict of Interest</b> No	<b>Funding</b> Nil	<b>Ethical Approval</b> Yes	<b>Plagiarism X-checker</b> 7%	<b>Note</b>



© 2018 by Mary Grace, Mukundan Chelakkat, Anjana Asokan and Published by Siddharth Health Research and Social Welfare Society. This is an Open Access article licensed under a Creative Commons Attribution 4.0 International License <https://creativecommons.org/licenses/by/4.0/> unported [CC BY 4.0].



## Introduction

Age influences coronary artery disease in multiple ways. Besides being an important risk factor for the development of coronary artery disease, it also has a role in predicting the outcome [1].

The number of elderly people with acute coronary syndrome is increasing, due to the increasing number of elderly population and the increasing incidence of comorbidities in this age group. At the same time many of the studies have not included this category of patients.

Hence many of the results of trials conducted in younger people have to be extrapolated to this group. We planned to study the risk factors and in-hospital outcome of elderly patients with acute coronary syndrome.

## Materials and Methods

This study was a prospective observational study which included 212 patients with acute coronary syndrome admitted under General Medicine department of Government Medical College, Thrissur.

Sample was obtained by random selection of patients on randomly selected days. Patient admitted on any one day of the week was chosen.

### Inclusion criteria

01. Patients aged above 60 years
02. History compatible with acute coronary syndrome
03. ECG changes fulfilling diagnosis of acute coronary syndrome

### Exclusion criteria

- Patients opting for percutaneous coronary intervention after diagnosis of acute coronary syndrome.
- Patients who were given thrombolytic therapy from outside hospital

The study was done after getting clearance from the IRB, at Department of Medicine, Thrissur Medical College. Consent was taken from the patient or a legally valid immediate relative in the presence of a witness. Patients were diagnosed with acute coronary syndrome based on ACC/AHA guidelines and they were grouped into 3-STEMI, NSTEMI and unstable angina.

According to age the patients were divided into three groups-61-70 years, 71-80 years and >80 years.

The risk factors which were assessed included diabetes, hypertension, dyslipidemia, tobacco use and chronic kidney disease.

Presence of risk factors and co-morbidities were based on patient's previous medical records and medication history.

Clinical details including symptom onset to arrival time were entered into a detailed proforma. Pulse rate and blood pressure was recorded and Killip class was noted [2]. Pulse rate <60 was considered as bradycardia which was further classified into sinus bradycardia, heart block and junctional rhythm.

Pulse rate >100 was taken as tachycardia and was further grouped into sinus tachycardia, atrial and ventricular tachyarrhythmia. Patients with systolic BP <90mmhg were considered to have hypotension and those with evidence of hypo perfusion was considered to be in carcinogenic shock.

Laboratory investigations done included complete hemogram, fasting blood sugar, fasting lipid profile, biomarkers, (CPK -MB, Troponin T, Troponin I, when available). Biomarkers could not be done for all patients due to financial constraints. Electrocardiograph was taken in all patients as soon as possible after arrival.

After confirming the diagnosis of acute coronary syndrome the patients were placed into one of the three categories-ST elevation myocardial infarction, non-ST segment elevation myocardial infarction, and unstable angina. New onset/presumably new onset LBBB was considered as STEMI.

Echocardiogram was done routinely after 4 weeks, during the time of the first review, in all patients with acute coronary syndrome. Earlier echocardiography was done only in selected patients.

Thrombolysis was done in indicated patients followed by heparin infusion for minimum of 4 days. Streptokinase was used in majority of patients. Urokinase was used in patients previously thrombolysed with streptokinase between 5 days and 6 months prior. Heparin used was unfractionated heparin or low molecular weight heparin based on discretion of treating physician.

Low molecular weight heparin given was Enoxaparin. The door to needle time was noted in patients receiving thrombolytic therapy. Complications which developed during the course of hospital stay, duration of hospitalisation was recorded.

**Statistical analysis:** Statistical analysis was done using SPSS software 19 version.

The continuous data were expressed as mean± deviation; qualitative data were expressed in frequency and percentages. (Proportions).

The qualitative data were analysed using chi-square test. Continuous data were changed into ordinal variables and analysed with chi square test.

The factors which influenced outcome were assessed using multiple logistic regression method.

The demographic characteristics, past history of medical illness, clinical presentation, treatment given, complications, course in the hospital and in hospital outcome were compared between the three age groups. p value of less than 0.05 and 95% confidence interval was taken to determine the statistical significance.

## Results

**Demography:** 62% of patients belonged to age group of 61-70 years, 29% were in the 71-80 years group and only 8% were more than 80 years. The mean age of men was 68±6 years while that of women was 71±7 years (p=0.01). Amongst those aged above 80 years, there was a female predominance (77.8%) (n=14).

**Table- 1 showing age group wise distribution of sex, risk factors and co-morbidities.**

Variable n(%)	Age Groups (years)		
	61-70	71-80	>80
Male	77(57.9%)	28(45.9%)	4(22.2%)
Female	56(42.1%)	33(54.1%)	14(77.8%)
Medical history			
Diabetes	41(30.8%)	17(27.9%)	3(16.7%)
Hypertension	69(51.9%)	29(47.5%)	13(72.2%)
Dyslipidemia	14(10.5%)	6(9.8%)	2(11.1%)
Tobacco use	77(57.9%)	26(42.6%)	6(33.3%)
Prior CAD	46(34.6%)	19(31.1%)	7(38.9%)
Prior stroke	8(6%)	6(9.8%)	1(5.6%)

**Risk factors:** Modifiable risk factors for CAD was present in majority of the patients (84.91%) (n=180) and had male preponderance (96.3%)

(P<0.001) (95% CI 0.034-0.303). Most common risk factor identified was past history of systemic hypertension (52.36%) (n=111) There is higher prevalence of hypertension in NSTEMI-ACS compared to STEMI (p value 0.005).

**Clinical features:** Most common clinical presentation was chest pain (94.8%) (n=201). The predominant atypical symptom was dyspnoea. The other modes of presentation were vomiting and loose stools. Atypical features were found to be higher in those aged above 80 years. (p value=0.04) but no gender association was found. Amongst patients with diabetes mellitus, only 4.9% patients had atypical features. (p=0.910) which was not statistically significant.

**Treatment:** It is also noteworthy that 28.3% (n=60) patients sought medical attention >12 hours after onset of symptoms thus falling out of index period for thrombolysis. There was no significant difference between various age groups regarding the time delay. But women were found to have increased pre-hospital delays (p value = 0.026).

82.1% (n=174) patients belonged to Killip class I and only 2.8 % (n=6) presented with Killip class IV symptoms. Only 13.7% (n=29) had hyperglycaemia during presentation. Fasting blood sugar and lipid profile was studied in 207 patients only as others had expired before they could be obtained. Most common wall localised in ECG was anterior (53.8%).

Thrombolysis was not done in 15.7% (16) patients with STEMI, because they were out of window period for thrombolysis. The eldest patient thrombolysed was 90 years of age and he had good recovery. Door to needle time was achieved in less than 30 minutes in 31(36%) only.

**Outcome:** Systemic hypertension was the only modifiable risk factor which was found to have significant association with mortality (p value-0.05).

**Table-2: Showing factors predicting mortality after multiple logistic regression.**

Variable	B	Odd's ratio	95% confidence interval	p value
Female sex	-3.5	0.029	0.002-0.375	0.007
Killip class	-38	1.362		<0.001
SBP<90mmhg		7.6	6.2-9.3	<0.001

## Discussion

The spectrum of coronary artery disease in the elderly population is thought to be quite different from that seen in younger patients.

**Demography:** In India elderly population account for 15-50% of admissions for acute coronary events [3]. In this study the mean age of the elderly patient with acute coronary syndrome was similar to the data from Shimla, Himachal Pradesh, but unlike in that study there was a marked increase in the number of elderly females with acute coronary syndrome in this study [3]. The prevalence of risk factors like hypertension diabetes and dyslipidemia is more among the elderly.

**Clinical features:** The mode of presentation in this group of patients is more likely to be with atypical features. This may be due to the presence of multiple co morbidities like anaemia, renal impairment, hypertension, diabetes [4]. While chest pain is the most common mode of presentation in the majority of individuals less than 65years, only 40% of elderly patients report typical chest pain. Common presenting symptoms in this age group are breathlessness, fatigue, syncope and sweating [5]. But in this study atypical presentation was seen only in those above 80 years.

Even among those with diabetes atypical presentation was not common. In contrast other Indian authors have encountered more cases of atypical presentation [3] [6]. The interpretation of ECG may be more confusing because of the presence of other abnormalities like ventricular hypertrophy and bundle branch block.

Troponin levels may be elevated due to the coexistence of deranged renal function. Multiple co morbidities is associated with poly-pharmacy and drug interactions. Many of the drugs may have contraindications and may cause more adverse effects in the elderly population.

The dose of the drugs also may have to be adjusted for the renal impairment which is usually seen in this age group [7]. The elderly are less likely to receive evidence based treatment than their younger counterparts. Nearly 10% of elderly patients had absolute contraindications to thrombolysis.

In spite of the presence of multiple co morbidities and possible adverse drug reactions the outcome of elderly patients following ACS is comparable to younger patients. In the CRUSADE trial the main reason for withholding thrombolytic therapy was the increasing age [8]. But the outcome of elderly people treated with thrombolytic therapy was comparable with the younger population [9].

Older age is a factor contributing to increase in hospital mortality.

Cardiac failure and atrial fibrillation are more common among the elderly [5]. The delay in the recognition of the illness is one of the major factors that leads to a worse outcome among the elderly population. Pre hospital delays are more likely among elderly patients with ACS. This will naturally result in poor outcome also.

Compared to data of Sharma A et al the proportion of people with late arrival in this study was much less (47% vs 28%). Similarly the proportion of patients with higher Killip score was also less in this study when compared to Sharma et al (7% vs 2.8%).

**Complications:** The incidence of complications like cardiac failure, conduction disturbances and mechanical complications are more among the elderly especially elderly females [6]. Due to the presence of more extensive atherosclerosis and poor cardiac reserve the elderly are more often likely to present with cardiac failure.

**Outcome:** The mortality rate among elderly patients with NSTEMACS shows an increasing trend, from 13% to nearly 50%. Cumulative incidence of death and rehospitalisation among the elderly in the first year after NSTEMI [10]. The factors leading to poor outcome are delayed presentation, multiple co morbidities, withholding of therapy [11] and adverse reaction to the interventions. Frailty also influences the rehabilitation. More aggressive management has been shown to improve the outcome of elderly patient following ACS [12], [13], [14].

## Conclusion

The management of elderly patients with ACS is more challenging when compared to younger population. More studies are needed for a better understanding of the clinical spectrum and the nuances in the management of acute coronary syndrome in elderly people. The elderly people should also be included in the trials conducted for this clinical entity.

Hypertension still remains as an important modifiable risk factor for coronary artery disease in the elderly population. Hence regular monitoring of blood pressure and proper management has to be followed in this age group also.

The delay to reach the hospital should be avoided, because thrombolytic therapy is very effective in elderly patients. More public awareness should be created so as to bring the affected people to the hospital earlier, so that they can also enjoy the benefits of treatment.

## Reference

01. Engberding N, Wenger NK. Acute Coronary Syndromes in the Elderly.  
doi: 10.12688/f1000research.11064.1. [Crossref]
02. Killip T 3rd, Kimball JT. Treatment of myocardial infarction in a coronary care unit- A two year experience with 250 patients. *Am J Cardiol.* 1967 Oct;20(4)457-64.  
[Crossref]
03. Amin AP , Nathan S, Prodduturi P, et al. Survival benefit from early revascularization in elderly patients with cardiogenic shock after acute-myocardial infarction- a cohort study. *J Invasive Cardiol.* 2009 Jul;21(7)305-12.  
[Crossref]
04. Brieger D, Eagle KA, Goodman SG, et al. Acute coronary syndromes without chest pain, an under-diagnosed and undertreated high-risk group- insights from the Global Registry of Acute Coronary Events. *Chest.* 2004 Aug;126(2)461-9.  
[Crossref]
05. Montilla Padilla I, Martin-Asenjo R, Bueno H. Management of Acute Coronary Syndromes in Geriatric Patients. *Heart Lung and Circulation.* 2017;26(2)107-113.  
[Crossref]
06. Rich MW. Epidemiology, clinical features, and prognosis of acute myocardial infarction in the elderly. *Am J Geriatr Cardiol.* 2006 Jan-Feb;15(1)7-11;quiz 12.  
[Crossref]
07. Subherwal S, Bach RG, Chen AY, et al. Baseline risk of major bleeding in non- ST- segment-elevation myocardial infarction the CRUSADE (Can Rapid risk stratification of Unstable angina patients Suppress ADverse outcomes with Early implementation of the ACC/AHA Guidelines) Bleeding Score.  
doi: 10.1161/CIRCULATIONAHA.108.828541.  
[Crossref]
08. Gharacholou SM , Alexander KP, Chen AY, Wang TY, Melloni C, Gibler WB, Pollack CV Jr, Ohman EM, Peterson ED, Roe MT. Implications and reasons for the lack of use of reperfusion therapy in patients with ST-segment elevation myocardial infarction- findings from the CRUSADE initiative.  
DOI : 10.1016/j.ahj.2010.02.009 [Crossref]
09. Shah P, Najafi AH, Panza JA, Cooper HA. Outcomes and quality of life in patients >or=85 years of age with ST-elevation myocardial infarction.  
doi: 10.1016/j.amjcard.2008.08.051. [Crossref]
10. Lopes RD, Gharacholou SM, Holmes DN, et al. Cumulative incidence of death and rehospitalization among the elderly in the first year after NSTEMI.  
doi: 10.1016/j.amjmed.2014.12.032. [Crossref]
11. Avezum A, Makdisse M, Spencer F, et al. Impact of age on management and outcome of acute coronary syndrome observations from the Global Registry of Acute Coronary Events (GRACE). *Am Heart J.* 2005 Jan;149(1)67-73.  
[Crossref]
12. Puymirat E, Aissaoui N, Cayla G, et al. Changes in One-Year Mortality in Elderly Patients Admitted with Acute Myocardial Infarction in Relation with Early Management.  
DOI: 10.1016/j.amjmed.2016.12.005 [Crossref]
13. Savonitto S , Cavallini C, Petronio AS, et al. Early aggressive versus initially conservative treatment in elderly patients with non-ST-segment elevation acute coronary syndrome- a randomized controlled trial.  
doi: 10.1016/j.jcin.2012.06.008 [Crossref]
14. De Luca L, Marini M, Gonzini L, et al. Contemporary Trends and Age-Specific Sex Differences in Management and Outcome for Patients With ST-Segment Elevation Myocardial Infarction.  
DOI: 10.1161/JAHA.116.004202 [Crossref]