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Research Article

Pattern of Cardiovascular Risk Factors and Outcomes of Patients Older Than 80 Years and Presenting with Acute Coronary Syndromes

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ABSTRACT

Objective: Elderly patients presenting with acute coronary syndrome (ACS) are at higher risk for morbidity, complications and early mortality than younger patients. Elderly are frequently underrepresented in clinical trials.

Methods: A descriptive multi-center study including 760 patients admitted with ACS aiming to determine the most frequently encountered cardiovascular risk factors, as well as the in-hospital complications.

Results: Of the 760 patients, 42.1% were males with a mean age of 85 years. Non-ST-elevation ACS was encountered in 496 patients (65.3%; NSTEMI 50% and unstable angina 15.3%) while STEMI was encountered in 264 patients (34.7%). Regarding risk factors, 61.1% of patients were hypertensive, 60% were diabetics, 44.7% were smokers, 28.9% had dyslipidemia, 16.8% had a family history of coronary artery disease, and 20% had chronic renal impairment at presentation. 252 patients (33.2%) underwent primary PCI, 440 patients (57.9%) underwent elective PCI, 36 patients (4.7%) underwent coronary artery bypass graft (CABG) surgery while 32 patients (4.2%) were maintained on conservative medical therapy and no patients received fibrinolytic therapy. In-hospital mortality was only 3.7% (28 patients), Cerebrovascular stroke occurred in 16 patients (2.1%) and recurrent infarction occurred only in 8 patients (1.1%).

Conclusion: In patients over 80 years presenting with ACS, female sex, hypertension and diabetes were the most frequently encountered cardiovascular risk factors, with more frequent presentation of NSTEMI than STEMI and in-hospital mortality of 3.7%.

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Introduction

Elderly patients presenting with acute coronary syndrome (ACS) are at a higher risk for morbidity, complications and early mortality than younger groups of patients; still, they are underrepresented in clinical trials and observational studies [1, 2]. Coronary artery disease is the most common cause of death worldwide. Old age is an important risk factor for coronary artery disease and an independent predictor for worse outcomes after an acute coronary syndrome. Implementation of guidelines for management of ACS has significantly decreased mortality and morbidities of ACS. However, recent updates for ACS management

have not equally improved outcomes for older adults. Elderly patients are at high risk of poor outcomes, less likely to receive evidence-based treatment, and have higher mortality rates [1-4].

The prevalence and incidence rates of ACS among older patients is not exactly known. More than 50% of ACS hospital admissions are for patients older than 60 years of age, and most of ACS related deaths are very high in this age group. Some registries showed that 30% to 40% of NSTEMI-ACS, and about 20% to 30% of STEMI admissions were for patients aged 70 years or more. Elderly ACS patients were underrepresented in clinical trials in which patients older than 75 years of age represent less than 10%, and more than 85 years represent less than 2%

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of all NSTEMI subjects. In both STEMI and NSTEMI, old age is independently associated with increased mortality. Mortality is at least three times higher in patients more than 80 years compared to patients younger than 65 years of age group. Each 10-year increase in age resulted in a 75% increase in hospital mortality in ACS patients [4-7]. Elderly patients are more likely to present as NSTEMI instead of STEMI, and are more likely to be white, women, and have lower body weight, higher prevalence of comorbidities as anemia, hypertension, atrial fibrillation, heart failure, cerebrovascular events, and renal insufficiency [5-7]. In older adults, there are more extensive calcifications of coronary arteries with more prevalence of multi-vessel and left main disease. These adverse changes increase the risk for myocardial injury [8, 9].

Methods

A descriptive multi-center study conducted on 760 patients in 10 tertiary care hospitals on elderly patients (80 years or more) admitted with ACS between January 2011 and December 2019 in order to determine the most frequently encountered cardiovascular risk factors, the initial laboratory data as well as the in-hospital complications. The study was approved by the corresponding ethics of research committee. Baseline clinical data were collected and stored electronically. Stored information included conventional cardiovascular risk factors, past and present cardiovascular history, clinical examinations findings, electrocardiographic findings, and details of in-hospital treatments and outcomes.

STEMI was diagnosed by acute onset of prolonged [≥ 20 min] ischaemic chest pain with ST-segment elevation (measured of J-point) of at 1 mm or more in two or more contiguous leads, or new onset left bundle branch block, or recent development of pathological Q waves. NSTEMI was defined by the detection of elevated markers of myocardial necrosis (troponins or CK-MB) associated with at least one of the following evidences of ischaemia: i) typical symptoms of angina; ii) ST-segment depression ≥ 0.5 mm in ≥ 2 contiguous leads or T-wave inversions iii) imaging evidence of new loss of viable myocardium or new RWMA.

Statistical Analysis

Values are presented as mean + standard deviation and percentage for categorical variables. Comparisons between groups were made either by Student's t-test for continuous or by χ^2 test for categorical variables, as appropriate. Data were analysed using the Statistical Package for Social Sciences (SPSS ver. 25 Chicago, IL, USA). In all statistical tests, level of significance of 0.05 used, below which the results considered to be statistically significant.

Results

Of the 760 patients included in this study, 320 patients (42.1%) were males with a mean age of 85 years. Non-ST-elevation acute coronary syndrome (NSTEMI) was encountered in 496 patients (65.3%; 50% NSTEMI, 15.3% unstable angina) while ST-elevation myocardial infarction (STEMI) was encountered in 264 patients (34.7%). Regarding risk factors (Table 1), 464 patients (61.1%) were hypertensive, 456 patients (60%) were diabetics, 340 patients (44.7%) were smokers, 220 patients (28.9%) had dyslipidemia, 128 patients (16.8%) had a family history of coronary artery disease, 152 patients (20%) had chronic renal

impairment at presentation, and 76 patients were alcoholic (10%). Regarding laboratory findings (Table 1), the mean haemoglobin level of the studied cases was 11.9 g/dl, mean creatinine level was 1.12 mg/dl, mean total cholesterol level was 149.5 mg/dl, mean low-density lipoprotein (LDL) level was 87.1 mg/dl, mean triglycerides level was 144.4 mg/dl and mean haemoglobin A1C (HbA1C) level was 6.71%. As regards ACS management, 252 patients (33.2%) underwent primary percutaneous coronary intervention (PPCI), 440 patients (57.9%) underwent elective PCI, 36 patients (4.7%) underwent coronary artery bypass graft (CABG) surgery while 32 patients (4.2%) were maintained on conservative medical therapy and no patients received fibrinolytic therapy (Table 1). The in-hospital mortality was only 3.7% (28 patients), cerebrovascular stroke occurred in 16 patients (2.1%) and recurrent infarction occurred only in 8 patients (1.1%) (Table 1).

Table 1: Demographic data, risk factors, laboratory findings and fate (N = 760).

Demographics and History	
Age (years)	85.16 (± 3.6)
Sex (males)	320 (42.1%)
ACS type	
STEMI	264 (34.7%)
NSTEMI-ACS	496 (65.3%)
Risk Factors	
Hypertension	464 (61.1%)
Diabetes	456 (60%)
Smoking	340 (44.7%)
Dyslipidemia	220 (28.9%)
Family History	128 (16.8%)
Renal Impairment	152 (20%)
Alcoholic	76 (10%)
Laboratory Data	
Hemoglobin (g/dl)	11.9 (± 2.9)
Creatinine (mg/dl)	1.12 (± 0.3)
Total cholesterol (mg/dl)	149.5 (± 42.6)
Low Density Lipoprotein (LDL) (mg/dl)	87.1 (± 21.1)
Triglycerides (mg/dl)	144.4 (± 29.3)
Hemoglobin A1C (%)	6.71 (± 0.9)
Management & Outcome	
Fibrinolytic	0 (0%)
Primary PCI	252 (33.2%)
Elective PCI	440 (57.9%)
CABG	36 (4.7%)
Conservative Medical Treatment	32 (4.2%)
In Hospital mortality	28 (3.7%)
Recurrent Infarction	8 (1.1%)
Cerebrovascular stroke	16 (2.1%)

All data are represented in mean (\pm SD) or Number (Percentage).

When comparing those presenting with STEMI and patients presenting with NSTEMI-ACS (Table 2), patients with NSTEMI-ACS tend to be significantly older ($p=0.002$) without any other significant difference in other risk factors. In-hospital mortality was found to be more in the NSTEMI-ACS group but non-significant statistically. None of the patients admitted with NSTEMI-ACS had reinfarction.

Table 2: Comparing STEMI and NSTEMI-ACS patients.

	STEMI (n=264)	P-Value	NSTEMI-ACS (n=496)
Age (years)	84.4 (± 3.6)	0.002*	86.1 (± 3.5)
Sex (males)	108 (40.9%)	0.81	212 (42.74%)
Risk Factors			
Hypertension	160 (60.6%)	0.93	304 (61.3%)
Diabetes	156 (59.1%)	0.85	300 (60.5%)
Smoking	116 (43.94%)	0.87	224 (45.16 %)
Dyslipidemia	80 (30.3%)	1	140 (30.3%)
Family History	44 (16.67%)	0.08	84 (28.23 %)
Renal Impairment	52 (19.7%)	0.94	100 (20.16%)
Alcohol intake	28 (10.6%)	0.84	48 (9.68%)
Laboratory Data			
Hemoglobin (g/dl)	11.9 (± 2.9)	0.81	11.8 (± 2.7)
Creatinine (mg/dl)	1.12 (± 0.3)	0.68	1.1 (± 0.33)
Total cholesterol (mg/dl)	149.5 (± 42.6)	0.82	151 (± 44.2)
Low Density Lipoprotein (LDL) (mg/dl)	87.1 (± 21.1)	0.65	88.5 (± 20.1)
Triglycerides (mg/dl)	144.4 (± 29.3)	0.79	145.6 (± 30.1)
Hemoglobin A1C (%)	6.71 (± 0.9)	0.78	6.75 (± 0.95)
Outcomes			
In Hospital Death	12 (4.54%)	0.65	16 (3.23%)
Recurrent Infarction	8 (3.03%)	0.052	0 (0%)
Cerebrovascular stroke	8 (3.03%)	0.52	8 (1.61%)

All data are represented in mean (\pm SD) or Number (Percentage).

Discussion

Coronary artery disease is common in population aged 80 years or more and is a main cause of morbidity and mortality in this age group. As this group of patients grows, with an increase in life expectancy, the prevalence of cardiovascular diseases is expected to increase [10]. Elderly patients are a heterogeneous group in which there are marked differences between biological and chronological age, which may be due to comorbidities, cognitive and social status or biological conditions as frailty. Elderly population hospitalized for acute cardiac illness often present with concurrent clinical conditions, and geriatric syndromes such as frailty, cognitive impairment, and depression. This may have an impact on patient's recovery [11, 12]. The most commonly encountered risk factors in the octogenarian patients we studied, were hypertension and diabetes which are both independently related to cerebrovascular and cardiovascular illness.

While physicians focus mainly on clinical outcomes, patients are also willing to recover an independent life and return back to their usual lives. However, the presence of geriatric syndromes is not only associated with worse clinical outcomes but with a greater risk of functional decline [11]. This has an important impact on the patient's quality of life. Therefore, one of the real challenges in the management of ACS in elderly patients is the prevention of dependence. Frailty reflects biological more than chronological age that manifests mainly in stressful conditions and, consequently, it may contribute to the heterogeneity in clinical fate within the elderly population [12, 13]. According to current guidelines, medical stabilization followed by an invasive strategy, including revascularisation with percutaneous coronary intervention or coronary artery bypass grafting, is recommended for patients with acute coronary syndromes [1, 2]. However, these recommendations are not age-specific and have been based on registries, underpowered studies, or randomized trials including patients with mean age of about 65 years [14].

As regards ACS management in our study population, 33.2% underwent primary PCI, which means that primary PCI was the standard care of most of the elderly STEMI patients included in our study, 57.9% of the patients underwent elective PCI, and 4.7% underwent coronary artery bypass graft (CABG) surgery while 4.2% were maintained on conservative medical therapy. No patients received fibrinolytic therapy owing to the increased hazards in this age group. Elderly patients may be less eligible for revascularisation or at higher risk of procedural complications. This might explain why patients aged 80 years or older are usually under-represented in clinical revascularisation trials. There is also considerable doubt about how to treat these patients, due to uncertainty about risk versus benefit in different treatment strategies. Regarding the presentation, we found that elderly patients more commonly present with NSTEMI-ACS than STEMI. We also found that the in-hospital mortality rate in this age group was about 3.7% which is more or less similar to that published in other series [15].

Conclusion

In patients over 80 years; female sex, hypertension and diabetes were the main frequently encountered cardiovascular risk factors, with more frequent presentation of NSTEMI-ACS than STEMI, and in-hospital mortality of 3.7%.

Conflicts of Interest

None.

Abbreviations

ACS: Acute Coronary Syndromes

CABG: Coronary Artery Bypass Grafting

NSTEMI-ACS: Non-ST Elevation Acute Coronary Syndromes

NSTEMI: Non-ST-Elevation Myocardial Infarction

PCI: Percutaneous Coronary Intervention

PPCI: Primary Percutaneous Coronary Intervention

RWMA: Regional Wall Motion Abnormality

STEMI: ST Elevation Myocardial Infarction

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