ELSEVIER

EUROPEAN GERIATRIC MEDICINE

Organ specialists coping with geriatric patients

Acute coronary syndrome in elderly – What is the place for invasive strategy?

CrossMark

S.A. Aguiar Rosa [a,1,*], A.T. Timóteo [a,1], M.A. Nogueira [a,1], A. Belo [b],
R.C. Ferreira [a,1], On behalf of the ProACS Registry Investigators

[a] Santa Marta Hospital, Lisbon, Portugal
[b] National Center of Data Collection in Cardiology, Portuguese Society of Cardiology, Coimbra, Portugal

A B S T R A C T

Background: The elderly are less likely to undergo an invasive strategy for acute coronary syndrome (ACS). The aim is to determine the predictors for an invasive strategy and to evaluate the revascularization effect on outcome.

Methods: Retrospective analysis of ACS patients (P) with $\geq$80 years, admitted between 2010 and 2014, in a national ACS registry. P were divided in intervened (G1) and non-intervened (G2) groups. We determined predictors for an invasive approach – percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) – and compared the one year outcome between groups.

Results: From 11,113P admitted with ACS, 2014 had $\geq$80 years. 1025P were included in G1. Predictors for an invasive strategy were STEMI (OR 4.97; $P < 0.001$), previous PCI (OR 2.02; $P < 0.001$), sinus rhythm (OR 1.56; $P = 0.002$), haemoglobin at admission (OR 1.10; $P = 0.003$). Predictors of no intervention were female gender (OR 0.68; $P = 0.002$), previous ACS (OR 0.67; $P = 0.013$), previous CABG (OR 0.60; $P = 0.035$), heart failure (OR 0.48; $P < 0.001$), stroke (OR 0.58; $P = 0.002$), dementia (OR 0.28; $P < 0.001$), heart rate (OR 0.99; $P < 0.003$) and ejection fraction $< 50\%$ (OR 0.68; $P = 0.001$). Hospital mortality was inferior in G1 (8.3% vs. 13.6%; $P < 0.001$), being conservative strategy (HR 2.63; $P < 0.001$), STEMI (HR 2.11; $P = 0.001$), dementia (HR 2.08; $P = 0.021$), inotropics (HR 9.82; $P < 0.001$) and ejection fraction $<50\%$ (HR 2.65; $P < 0.001$) predictors of mortality. In propensity score analysis, at one year follow up G1 had a better survival (88.9% vs. 79.6%; $P < 0.001$).

Conclusion: In elderly patients with ACS, an invasive strategy was associated with short and long-term survival advantage. The predictors for invasive intervention are STEMI, previous PCI, sinus rhythm and haemoglobin at admission.

© 2016 Elsevier Masson SAS and European Union Geriatric Medicine Society. All rights reserved.

1. Introduction

Older patients represent an important group of patients admitted with acute coronary syndrome (ACS), which rises with increasing life expectancy. Among patients enrolled in the Euroheart ACS survey 25% were $\geq$75 years old [1].

The risk of adverse cardiovascular events and poor outcome after ACS increases with age [2], having the elderly potentially more gain from appropriate therapies [3,4]. Despite this, older patients often receive less active treatment. The concern with comorbidities, including anaemia, cerebrovascular disease or dementia, and higher risk of side effects from treatment, such as bleeding, stroke, hypotension, bradycardia or renal failure, causes a decrease in invasive strategy use with age [5–7]. Furthermore, in an acute setting the impact of ageing on an individual may be difficult to assess. Atypical presentation is also frequent in older patients which could delay diagnosis and treatment.

Even though older patients have an higher prevalence of ACS, elderly are underrepresented in ACS trials, being questionable the applicability of data to real clinical practice, where patients have often more comorbidities comparing to those included in studies, particularly in studies involving interventional strategies [5].

* Corresponding author at: Avenida Oscar Monteiro Torres, No. 51, 3esquerdo, 1000-217 Lisbon, Portugal; Rua de Santa Marta, No. 50, 1169-024 Lisbon, Portugal. Tel.: +351 968524759; fax: +351 213158253.
E-mail address: silviaguiarosa@gmail.com (S.A. Aguiar Rosa).
[1] These authors take responsibility for all aspects of the reliability and freedom from bias of the data presented and their discussed interpretation.

The aim of the present study is to characterize elderly population admitted with an ACS, determine the predictors for an invasive strategy and evaluate if there is a revascularization benefit in outcome.

2. Methods

Retrospective analysis of ACS patients with ≥80 years, admitted between 2010 and 2014 and included in the National Portuguese ACS registry in each 33 cardiology department. At admission patients presented symptoms thought to be due to acute coronary artery disease and electrocardiographic changes consistent with and/or elevated biomarkers of myocardial necrosis. This study includes patients with ST-elevation myocardial infarction (STEMI), non-ST-elevation myocardial infarction (NSTEMI) and unstable angina (UA). STEMI was defined as a ST elevation for more than 30 min and the remaining cases were considered NST-ACS, NSTEMI if troponin raised upper reference limit and UA if there were no changes in biomarkers.

In the present study, only patients with an age ≥80 years were selected. Patients were divided into two groups according to therapeutic approach: intervened patients, who underwent revascularization during index hospitalization by percutaneous coronary intervention (PCI), coronary artery bypass grafting (CABG) or both, and non-intervened patients.

In each patient, baseline clinical characteristics including demographic characteristics, coronary risk factors, previous heart disease, and comorbidities were collected. Laboratory data at admission, electrocardiographic and echocardiographic parameters, in-hospital treatment and complications were also analyzed.

Follow-up data were provided to ProACS registry by each Cardiology department.

Predictors for an invasive approach, PCI or CABG, were determined as well as predictors of in-hospital mortality. At one year follow up survival was compared between groups.

The study protocol is according to the Declaration of Helsinki.

2.1. Statistical analysis

Statistical analysis was performed using dedicated software SPSS Statistics (v.22; IBM SPSS, Chicago, IL). Continuous variables were expressed as mean ± standard deviation and categorical variable were expressed as percentage. Study groups were compared using Student's t test or Wilcoxon–Mann–Whitney's test for continuous variable, and Pearson's chi-square or Fischer's exact test for categorical measures, as appropriate.

A multivariate regression model was built to identify the predictors of an invasive strategy, including gender, age, STEMI, previous ACS, previous PCI, previous CABG, diabetes, smoking, heart failure, previous stroke, dementia, systolic blood pressure, heart rate, Killip class > I, sinus rhythm, haemoglobin and creatinine at admission and LVEF < 50%.

Propensity score analysis was used to compare both groups adjusting for confounding factors and Kaplan–Meier curves were estimated for both study groups and tested using the log-rank test. 95% confidence intervals (CI) was used and a P-value < 0.05 was considered statistically significant.

3. Results

Among the patients included in the registry, 18.1% (N = 2014) had ≥80 years (median age 84 years, interquartile range 81–87 years, minimum 80 years, maximum 101 years). Invasive coronary angiography was performed in 1184 patients (67.9%). The intervened group included 1025 patients (51%) and PCI was performed in majority of cases. The remaining patients received only medical treatment and were included in the non-intervened group; 3 patients were excluded due to insufficient data (Fig. 1).

Baseline characteristics of the two groups are presented in Table 1. Intervened patients were younger (P < 0.001) and more often males, contrasting with women predominance in the non-intervened group. No significant differences were observed between groups regarding risk factors for cardiovascular disease. However, revascularized individuals had less comorbidities, particularly previous stroke (P = 0.001), peripheral arterial disease (P = 0.004), chronic kidney disease (P < 0.001), dementia (P < 0.001), previous haemorrhage (P = 0.008). The intervened group had also lower prevalence of previous coronary artery disease, including previous angina, myocardial infarction and CABG, and also fewer cases of valvular heart disease and heart failure. In the intervened group, 49.3% of patients presented with STEMI, 40.5% with NSTEMI, 5.0% with UA and 5.4% with undetermined myocardial infarction. In contrast, the majority of patients in non-intervened group (64.4%) had NSTEMI and only 19.2% STEMI. The remaining 4.9% presented UA and 11.6% undetermined myocardial infarction.

Among all population, invasive coronary angiography was performed in 79.1% of STEMI patients and in 60.5% of NSTEMI patients (P < 0.001). The reaming patients were not submitted to invasive strategy due to late presentation, comorbidities, baseline functional status and frailty. The majority of STEMI patients underwent invasive coronariography (79.1%) and PCI (72.5%), in contrast with NSTEMI patients in whom invasive coronariography was performed in 60.5% of cases and PCI only in 35.9% (P < 0.001). CABG was made in 0.7% of STEMI and in 3.6% of NSTEMI patients (P < 0.001).

In the subgroup of STEMI patients with more than 90 years, invasive coronariography was performed in 51.1% of cases and PCI in 48.9%. On the other hand, in the subgroup of NSTEMI patients older than 90 years, invasive coronariography was performed in
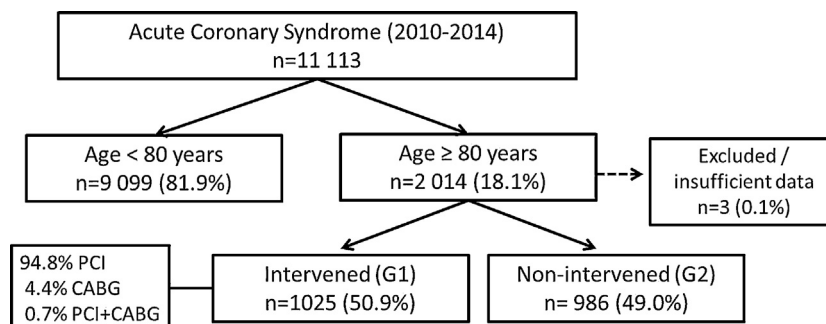

Fig. 1. Study flowchart.