Hellenic Journal of Cardiology (2016) 57, 109–115

Available online at www.sciencedirect.com

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ORIGINAL ARTICLE

# Gender differences in the prognostic impact of chronic kidney disease in patients with left ventricular systolic dysfunction following ST elevation myocardial infarction treated with primary percutaneous coronary intervention

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Received 14 May 2015; accepted 4 December 2015
Available online 6 April 2016

**KEYWORDS**
Gender;
Chronic kidney disease;
ST-elevation myocardial infarction

**Abstract** *Background/Aim:* Renal function potentially has different prognostic impact in men and women with acute myocardial infarction. The aim of this study was to evaluate the prognostic impact of chronic kidney disease (CKD) on five-year all-cause mortality in men and women with left ventricular systolic dysfunction (LVSD) following ST elevation myocardial infarction (STEMI).
*Method:* We included 348 consecutive STEMI patients who were treated with primary percutaneous coronary intervention (pPCI) and had a left ventricular ejection fraction < 40%. CKD was defined as baseline creatinine clearance (CrCl) < 60 ml/min. Patients with cardiogenic shock at admission were excluded.
*Results:* Among analyzed patients, 104 patients (29.8%) were women, and 244 patients (70.1%) were men. Compared with male patients, female patients were older. Females were more likely to have previous angina and hypertension. CKD was more common in women compared with men (54.8% *vs.* 22.5%, p<0.001). Female gender and older age were independent

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Peer review under responsibility of Hellenic Cardiological Society.

http://dx.doi.org/10.1016/j.hjc.2015.11.001
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predictors of CKD. No significant difference in five-year all-cause mortality was between men and women (27.8% *vs.* 23.3%, p=0.370). In a Cox regression model (adjustments were made for age, Killip class at admission, post-procedural flow TIMI<3, left main stenosis and women with diabetes), CKD remained an independent predictor of five-year all-cause mortality in men (HR 2.2; 95% CI 1.22–3.3, p=0.007).

*Conclusions:* Although pre-terminal CKD was more frequently noted in women, it was an independent predictor of five-year mortality exclusively in men. Different prognostic significance of CKD between sexes indicates that renal function must be considered in the prognosis of men and women following acute myocardial infarction.

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## 1. Introduction

Even in mild forms, chronic kidney disease (CKD) is a well-known risk factor for adverse cardiovascular outcomes in patients with ST elevation myocardial infarction (STEMI) and left ventricular systolic dysfunction (LVSD).[1–3] Over the past several decades, increasing knowledge regarding sex differences in coronary heart disease has emerged.[4] Several studies suggest that the prevalence of risk factors, pathophysiology, clinical manifestation and prognosis of coronary heart disease vary between men and women.[4–8] CKD is more prevalent among women with coronary artery disease; however, female patients are generally older and have more comorbidities compared with men.[9–11] Certain studies have shown that CKD has a different prognostic impact on short-term and mid-term mortality following STEMI in women and men,[9,10] i.e., in patients with angiographically proven coronary disease.[11] The results of some of these studies have shown that CKD is an independent predictor of mortality following STEMI exclusively in women.[10] In contrast, other studies suggest that CKD is an independent predictor of mortality in both sexes but exhibits a negative prognostic significance in men.[9] Patients with LSVD following STEMI represent a group with a high risk of mortality, and this risk is additionally increased by the presence of CKD.[1–3,12] The combined presence of CKD and LVSD is the most important independent predictor of one-year overall mortality after pPCI.[13] To the best of our knowledge, the prognostic significance of CKD in women and men with LVSD after acute myocardial infarction has not been analyzed to date.

The objective of this study is to evaluate the prognostic value of renal function on long-term mortality in men and women with left ventricular systolic dysfunction following STEMI.

## 2. Method

### 2.1. Study population, data collection and definitions

In the present study, data from the prospective Clinical Center of Serbia STEMI Register for a subgroup of 348 consecutive patients with LVSD hospitalized between February 2006 and April 2008 were used. The purpose of the prospective Clinical Center of Serbia STEMI Register has been published elsewhere.[14] In brief, the objective of the register is to gather complete and representative data on the management and short- and long-term outcomes of patients with STEMI undergoing primary PCI at our centre. The local research ethics committee approved the study protocol. All consecutive patients with STEMI aged 18 or older who were admitted to the Coronary Care Unit after undergoing pPCI at our centre were included in the register. For the purpose of this study, patients with cardiogenic shock at admission were excluded. Coronary angiography was performed via the femoral approach. Primary PCI and stenting of the infarct-related artery (IRA) was performed according to the standard technique. Aspirin (300 mg) and clopidogrel (600 mg) were administered to all eligible patients before pPCI. Selected patients with visible intracoronary thrombi were also administered the GP IIb/IIIa receptor inhibitor tirofiban during pPCI. Flow grades were assessed according to the Thrombolysis in Myocardial Infarction (TIMI) criteria. After pPCI, patients were treated according to current guidelines.

Demographic, baseline clinical, angiographic and procedural data were collected and analyzed. The baseline CKD was defined as creatinine clearance (CrCl) < 60 ml/min/$m^2$ at admission.[15] Creatinine clearance was calculated using the Cockrof-Gault formula:

$$CrCl = ((140\text{-years})*\text{body weight})/(72*\text{creatinine in mg/dl}).$$

The value was multiplied by 0.85 in females.

Echocardiographic examination was performed within the first three days after pPCI. The left ventricular ejection fraction (LVEF) was assessed according to the biplane Simpson method, in classical two- and four-chamber apical projections. LVEF<40% was considered as LVSD. LVEF was absent in 10% of patients. The missing data were imputed via the single imputation method.

Patients received follow-up for five years after enrolment. Follow-up data were obtained by scheduled telephone interviews and outpatient visits.

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