Renal Function Assessment As An Independent Predictor Of Prognosis In Patients With Acute Coronary Syndrome

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ABSTRACT

This study was conducted on the basis of the Samarkand regional branch of the Republican Specialized Scientific and Practical Medical Center of Cardiology (SRF RSNPMC). The study investigated the prognostic value of renal dysfunction as a risk factor for cardiovascular death in patients with acute coronary syndrome (ACS). The study included 122 patients with ACS aged 32 to 85 years. All patients underwent a general clinical examination (collection anamnesis, anthropometric and physical examination of the patient, measurement of blood pressure, heart rate). Laboratory and instrumental examination included clinical blood tests, biochemical blood test on admission and in dynamics on the 2nd and 7th days of admission, ECG, echocardiography. A decrease in GFR of less than 60 mL/min affects cardiovascular mortality in patients with STEMI, but does not affect the prognosis in patients with STIM. The widespread introduction of the GFR calculation method will make it possible to timely detect even a moderate impairment of the filtration function of the kidneys and make corrections to the patient's therapy, thereby reducing the number of adverse outcomes.

Keywords: Acute coronary syndrome, kidneys, ECG, echocardiography, GFR, etc.

Topicality

Acute coronary syndrome (ACS), which includes unstable angina pectoris and myocardial infarction (MI), is often accompanied by abnormal renal function that occurred prior to the coronary event, or is due to heart failure or contrast media. Epidemiological studies record an increase in the number of patients with comorbid renal impairment. Acute renal injury (AKI) is a serious complication of myocardial infarction (MI) [2, 3]. According to the literature, AKI is registered in 10-60% of patients [2-4]. With the development of renal injury, a more severe course of MI is noted, which increases the risk of death in these patients, as well as the cost of their treatment [4, 19].

Back in 2008, C. Ronco et al. formulated a definition of cardiorenal syndrome (CRS). This term combines the influence of pathological

processes in the cardiovascular system and kidneys. At the same time, acute or chronic dysfunction of one organ leads to acute or chronic dysfunction of the other [1, 5]. Kidney damage in myocardial infarction occurs due to inadequate kidney perfusion. This is largely due to a decrease in cardiac output. Due to insufficient renal perfusion, the glomerular filtration rate (GFR) decreases [6-9]. At the same time, ischemia of the tubules of the kidneys occurs with their damage. This exacerbates and aggravates acute kidney injury.

The American Heart Association, in conjunction with the National Kidney Foundation, recommends that all patients with cardiovascular disease be screened for chronic kidney disease (CKD) by assessing glomerular filtration rate (GFR) and testing for microalbuminuria. A GFR equal to or less than 60 mL/min/1.73 m2 is considered to be an abnormal decrease in renal function (Class I, level of evidence B). The relationship between the heart and the kidneys is a complex and bidirectional process. Renal dysfunction has a negative impact on the structures and functions of the heart [10, 20], changes the properties of the vascular wall, blood rheology, and increases the calcification of coronary and systemic arteries [11, 15]. At the same time, coronary disease in combination with arterial hypertension (AH), type 2 diabetes mellitus (DM), and anemia are independent predictors of the progression of end-stage chronic kidney disease (CKD) [12-16]. According to the results of numerous clinical studies, the role of renal dysfunction as a factor worsening the prognosis in acute coronary syndrome has been proven. So, with age, the risk of developing both kidney dysfunction and cardiovascular diseases increases. The combination of such risk factors as hypertension, diabetes, and smoking leads to irreversible kidney pathology, as well as an increase in morbidity and mortality from coronary artery disease, which determines the urgency of this problem [17-20].

The aim of the study was to study the prognostic value of impaired renal function as a risk factor for cardiovascular death in patients with acute coronary syndrome.

Material and methods. The study included 122 patients with acute myocardial infarction aged 32 to 85 years, hospitalized in the departments of coronary heart disease and acute coronary syndrome of the Samarkand regional branch of the Republican Scientific and Practical Medical Center of Cardiology. All patients underwent a general clinical examination (anamnesis, anthropometric and physical examination of the patient, measurement of blood pressure, heart rate). Laboratory and instrumental examination included clinical blood tests, biochemical blood test on admission and in dynamics on the 2nd and 7th days of admission, ECG, echocardiography.

Outcomes. In 22.3% of all patients, renal dysfunction occurred (GFR <60 mL/min). Renal dysfunction was reported in 39.9% of cases in STEMI and 41.9% in STST. The prevalence of different levels of renal dysfunction in patients with different types of ACS was as follows: with STEMI with GFR 59-45 ml/min – 19.8%, with GFR 44-30 ml/min – 8.4%, with GFR less than 30 ml/min – 4.7%; with AMIdST at GFR 59-45 ml/min – 21.3%, with a GFR of 44-30 ml/min – 10.6%, with a GFR of less than 30 ml/min – 2.8%.

In-hospital mortality among all ACS patients was registered in 4.3% of cases. In-hospital mortality among all ACS patients was registered in 4.3% of cases, in patients with UTI - 8.7%, IMbPST - 3.1%. The highest in-hospital mortality was observed in the group of patients with GFR<60 ml/min – 24.2% in patients with STEMI, in 1.4 patients with STIM, while among patients with GFR>60 ml/min – 4.2%, in 2%, respectively. Initially, low GFR values were associated with a poor prognosis, for example, at a GFR level of 45 to 59 ml/min, in-hospital mortality was 2.9%, at a GFR level of 30 to 44 ml/min – 19.4%, at a GFR level of 15 to 29 ml/min – 31.6%, with a GFR level of less than 15 ml/min – 50%, while in groups with higher GFR values in-hospital mortality was much less common ($p<0.001$). Among patients, there was a statistically significant decrease in glomerular

filtration rate with increasing age (p<0.001). A decrease in GFR was associated with a decrease in LVEF in patients with STEMI (p=0.005), which can probably be explained by a more extensive myocardial lesion among this group of patients, leading to a decrease in myocardial contractility and the development of acute cardio-renal syndrome. All patients received standard pharmacological therapy. In 97.4% of cases, CAG was performed, the frequency of CAG decreased with a decrease in GFR (p<0.001). CAG for GFR over 90 ml/min was performed in 98.2%, GFR 60-89 ml/min – 98.5%, GFR 45-59 ml/min – 95.2%, GFR 30-44 ml/min – 100.0%, GFR 15-29 ml/min – 73.7%. Acute renal injury (AKI) developed in 22.2% of patients with ACS, in the group of patients with STEMI – in 21.4%, AMI ST in 26.5% (p=0.690).

Conclusions: Thus, a decrease in GFR of less than 60 ml/min affects mortality from cardiovascular causes in patients with STEMI, but does not affect the prognosis in patients with STAMI. The widespread introduction of the GFR calculation method will make it possible to timely detect even a moderate impairment of the filtration function of the kidneys and make adjustments to the patient's therapy, thereby reducing the number of adverse outcomes.

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