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Letter to Editor

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# Rates of Estimated Glomerular Filtration as a Predictor of Mortality in Acute Coronary Syndromes. A Current perspective

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***Abstract***

*Acute Myocardial Infarction (AMI) is one of the leading causes of death in Cuban and the world. Currently, 20-30% of patients with coronary heart disease have kidney failure. Glomerular filtration rates are one of the methods used to estimate renal function. Studies show that the decrease in estimated glomerular filtration rates is statistically related to the increase in mortality in patients with AMI, with a good predictive capacity and greater accuracy with the eGFR Chronic Kidney Disease Epidemiology Collaboration. The assessment of renal function by estimating glomerular filtration rates provides useful and very valuable information for the early prognostic stratification of patients with an acute coronary syndrome.*

**Keywords:** Acute Myocardial Infarction; Creatinine; Glomerular Filtration; Mortality; Renal Insufficiency

## 1. Editorial

The importance of ischemic heart disease in today's society is evident in the almost epidemic number of people affected. It is estimated that some 15.400.000 Americans suffer from ischemic heart disease (IHD), of which 7.800.000 have angina pectoris and 7.600.000 have suffered an acute myocardial infarction (AMI) **[1,2]**.

In 2010, IHD produced 48% of all deaths related to cardiovascular disease and was the most frequent isolated cause of death in North Americans of both sexes, responsible for one out of every six deaths in the United States. In this country the economic cost of the IHD is formidable and in 2010 it was estimated that it reached 204.400 million dollars **[1,2]**. In Cuban in 2017, cardiovascular disease also remained the leading cause of death with 27,176 deaths, of which 7,982 represented AMI with a rate of 71 per 100 000 inhabitants **[3,4]**.

Several factors have been related to an unfavorable prognosis in patients with cardiovascular disease. One of these factors is renal function, which in recent decades has become more evident the importance of its correct evaluation, especially as a result of studies that have shown that this direct relationship between renal function and cardiovascular events already appears in phases of moderate renal dysfunction, and even, mild. Accurate evaluation of renal function therefore allows early identification of patients at high risk of cardiovascular events, in order to improve their prognosis through early intervention in diagnosis and treatment. In addition, it enables close monitoring of certain interventions such as drug adjustment and prevention of nephrotoxicity by various agents in high-risk patients **[5]**.

Creatinine has been classically the most used endogenous substance to estimate glomerular filtration. However, the main drawback is that the speed of creatinine production varies greatly from individual to individual, mainly due to differences in muscle mass. Women and elderly people with significant reductions in glomerular filtration may have deceptively low creatinine concentrations **[6]**.

Given the disadvantages of creatinine, several equations have been developed to estimate glomerular filtration through easy-to-obtain clinical and laboratory data. All of them incorporate a series of variables that attempt to resolve the deficiencies of plasma creatinine as the only marker of renal function. However, its accuracy is not constant in all scenarios and there are still situations in which we do not have a reliable method to know the degree of real renal deterioration of the patient **[5]**. In fact, in critical patients these formulas have not been studied at the same level as in chronic patients, it is even suggested that they do not have the same validity due to possible variations of renal function in short periods of time **[7]**.

Despite this, there are a series of studies in which the decrease in estimated glomerular filtration rates (eGFR) are statistically related to the increase in mortality in patients with AMI. In the study Valsartan in Acute Myocardial Infarction Trial (VALIANT) that included patients with ventricular dysfunction or heart failure after an AMI. All major cardiovascular events, such as total cardiovascular mortality, AMI, heart failure and stroke, were closely related to the degree of renal dysfunction. The incidence of these events doubled or tripled in patients with glomerular filtration <45 mL / min / 1.73m$^2$ compared to those with a glomerular filtration rate> 75 mL / min / 1.73m$^2$**[8]**. In the Survival and Ventricular Enlargement (SAVE) study, with a similar design, the same results were obtained **[9]**.

According to the reviewed literature, the eGFR that has shown greater accuracy is the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) in relation to the Cockcroft-Gaul (CG) and the Modification of Diet in Renal Disease (MDRD4). This is justified because the eGFR (CG) depends on the estimations of the ideal weight or weight, being able to complicate the calculation and the presentation of the results. Regarding eGFR (MDRD4) both in its full and abbreviated form, easily obtainable laboratory data are used, but systematically underestimate the glomerular filtration rate when serum creatinine concentrations are very high, which can lead to misdiagnosis **[6]**.

Gutiérrez HB and colleagues in a study conducted with 295 patients admitted to an ICU with a diagnosis of AMI found that the distribution of eGFR was lower in patients who died in relation to survivors, with a good predictive capacity, but with greater accuracy in eGFR (CK-EPI) with an area under the ROC curve 0.980 (95% CI: 0.965-0.995) (p <0.0001) **[10]**.

## 2. Conclusions

The assessment of renal function by estimating glomerular filtration rates provides useful and very valuable information for the early prognostic stratification of patients with an acute coronary syndrome. Any decrease in eGFR, especially eGFR (CK-EPI), reflects an increase in the probability of death in this type of patient.

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