Editorial / *Editöryal Yorum*

The association between serum uric acid level and heart failure and mortality in the early period of STEMI

STYME'li hastalarda ürik asit düzeyi ile erken dönem kalp yetersizliği ve mortalite arasındaki ilişki

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In the article by Gazi et al. entitled 'The association between serum uric acid levels with heart failure and mortality in the early period of ST-elevation acute myocardial infarction", the association between in-hospital cardiovascular mortality or development of serious heart failure and hyperuricemia upon hospital admission was evaluated.[1] In this study, age (≥70 years), hyperuricemia, diabetes mellitus, a glomerular filtration rate of < 60 mL/min/m2, and the absence of treatment with thrombolytics, beta blockers and angiotensin-converting enzyme inhibitors were found to be associated with inhospital mortality in univariate analysis. Of these, hyperuricemia and the absence of a thrombolytic and beta-blocker treatment were indicated to be predictors of in-hospital mortality in multivariate analysis. In multivariate analysis, age (≥ 70 years), hyperuricemia, and chest pain lasting for more than 6 hours were presented as the predictors for development of heart failure.

In patients admitted due to acute myocardial infraction, an association between adverse outcomes and serum uric acid levels upon admission has been shown in previous studies.[2,3] In these studies, there is no homogeneity in terms of the type of acute myocardial infarction (ST-segment elevation or non-ST-segment elevation) and reperfusion treatments (thrombolytic or percutaneous coronary intervention). In our study, admission uric acid levels were associated with long-term adverse outcomes in 2249 patients with ST-elevation myocardial infarction undergoing primary coronary intervention.[4] The study performed by Gazi et al. differs from previous studies, and makes a different contribution to the literature in that it consists of only patients with ST-elevation myocardial infarction who had not undergone percutaneous intervention. However, the study has some limitations and its content requires critical evaluation.

Uric acid is a weak organic acid and it is presented as an end-product of purine nucleotides degradation. In human body, uric acid eliminates free oxygen radicals and is also an indicator of oxidative stress related to increased xanthine oxidase enzyme activity. Therefore, monitoring the increase in free oxygen radicals by serum uric acid levels in acute myocardial infarction will provide prognostic data.[5,6] However, serum uric acid levels may course at high levels in patients with acute myocardial infarction due to some concomitant diseases (gout, renal failure, hematological tumors, and hypothyroidism), administered drugs (salicylates received at daily doses more than 2 mg, diuretics, ethambutol, pyrazinamide, and cancer drugs) or alcoholism. Evaluating the prognosis of patients with acute myocardial infarction and high uric acid levels demands for these conditions to be excluded. However, in this article, these conditions were not discarded in the evaluation of patient prognosis.

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In the above-mentioned article, patients were retrospectively selected from cases admitted to the emergency department in two years with symptoms of ST-elevation myocardial infarction. Patients whose uric acid levels were unknown or those referred to other centers for rescue percutaneous coronary intervention (PCI) were excluded from the study. The number of patients excluded for these reasons was not indicated in the article. Especially, patients who require rescue PCI are at higher risk of mortality and heart failure.[7] As is already known, rescue PCI is required in cases where thrombolytic therapy has failed.[8] Successful reperfusion is one of the factors defining the mortality and development of heart failure in myocardial infarction. [9] In the present study, none of the patients had undergone primary coronary intervention and some had been receiving pharmacological thrombolytic treatment. However, in these patients, the criteria to achieve a successful reperfusion were not focused, on constituting a major limitation of the study.

Patients with advanced age, preexisting left ventricular dysfunction or failure, anterior myocardial infarction, transmural myocardial infarction, excessively high levels of serum cardiac injury markers, and the absence of reperfusion therapy are at a higher risk of developing heart failure in acute myocardial infarction. In the present article, anterior myocardial infarction was not found to be related with the development of heart failure. This condition might have stemmed from the referral of seriously ill patients requiring rescue percutaneous intervention to other centers and not including them into the study. Thus, it may not be possible to generalize the study outcomes for all patients with ST-elevation myocardial infarction.

Only 20% of the present study population comprised female patients and most had higher uric acid levels (17 *vs* 36% of the patients; p=0.001). Hence, most of the study data was acquired from the male population. A meta-analysis evaluating the association between uric acid levels and mortality in coronary artery disease in 26 studies including nearly 403.000 patients demonstrated increased mortality risk of nearly 70% in hyperuricemic female patients; however, such correlation could not be displayed in male patients.[10]

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