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Effect of body mass index on mortality risk in different renal function after acute myocardial infarction

Ri Ra[1], Shinyeong Kang[1], Jin Sug Kim[1], Yang Gyun Kim[1], Ju Young Moon[1], Kyung Hwan Jeong[1], Sang Ho Lee[1], Weon Kim[2], Hyeon Seok Hwang[1]
[1]Department of Internal Medicine-Nephrology, Kyung Hee University Medical Center, Korea, Republic of
[2]Department of Internal Medicine-Cardiology, Kyung Hee University Medical Center, Korea, Republic of

Objectives: Obesity is paradoxically linked to greater survival benefit after acute myocardial infarction (AMI). In chronic kidney disease patients, higher body mass index (BMI) is also associated with protective effects against cardiovascular and all-cause mortality. However, there are no studies investigating the interactive effects of BMI and renal function on mortality risk after AMI occurrence.

Methods: We enrolled 12,664 AMI patients from Korea Acute myocardial Infarction Registry between November 2011 and December 2015. Patients were categorized based on renal function; normal (≥90 mL/min/1.73m^2), mild (90-45 mL/min/1.73m^2), and moderate impairment (<45 mL/min/1.73m^2). BMI was divided into four groups; underweight (<18.5 kg/m^2), ideal (18.5-23 kg/m^2), overweight (23-25 kg/m^2) and obese (≥25 kg/m^2). The primary endpoint was 2-year mortality after AMI treatment.

Results: The proportion of overweight or obese patients was significantly lower in patients with moderate renal impairment than in those with normal function (P <0.001). In multivariable Cox-regression analysis, compared to underweight patients, ideal, overweight and obese patients were associated lower risk of mortality in all renal function categories. However, the survival benefit of each BMI stratum was decreased as renal function worsened. The adjusted mortality risk of obesity was 0.35 (95% CI 0.19-0.62), 0.52 (95% CI 0.37-0.74) and 0.65 (95% CI 0.45-0.94) for patients with normal, mild and moderate renal function impairment, respectively, compared to underweight. There was a significant interaction between BMI and renal function (P = 0.014).

Conclusions: The paradoxical effect of greater BMI on mortality risk after AMI was dependent on renal function. The association between greater BMI and survival benefit was weakened as renal function was decreased.