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Glomerular hyperfiltration as Risk Factor of Major Adverse Cardiovascular Events after Acute Myocardial Infarction

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Objectives: A reduced glomerular filtration rate (GFR) is a definite risk factor for major adverse cardiovascular event (MACE) in acute myocardial infarction (AMI) patients. While glomerular hyperfiltration (GHF) is associated with early phases of kidney disease, it is unclear whether GHF is associated with higher risk of MACE.

Methods: 9,561 AMI patients with estimated GFR ≥ 60 mL/min/1.73 m^2 were enrolled from prospective population-based national cohort. GHF was defined as GFR > 90th percentile after adjustment for age, sex, lean body mass and history of diabetes and hypertension, systolic blood pressure, left ventricular ejection fraction and use of angiotensin converting enzyme inhibitor or receptor blocker. Patients were divided into two groups (normal filtration group vs. GHF group) and occurrence of 3-year MACEs after AMI were investigated. Sensitivity analyses with different adjusted variables for hyperfiltration or with different patient exclusion criteria, and propensity score matching were conducted to determine consistency of our results.

Results: The GFR in 956 patients with GHF was 113.1±13.1 and it was significantly higher than those in normal filtration patients (87.7±13.1; P<0.001). The incidence rate of MACEs was higher in patients with GHF, and patient with GHF showed significantly higher risk of MACEs even after adjustment for several confounders (hazard ratio [HR] 1.37; 95% confidence interval [CI] 1.11-1.63) compared to normal filtration patients. GHF group had significantly higher risk of all-cause mortality (HR 1.65; 95% CI 1.26-2.17) and cardiac death (HR 1.80; 95% CI 1.28-2.54). There was no significant difference in the risk of non-cardiac death between two groups. Sensitivity analyses and propensity score matched analysis also showed similar findings.

Conclusions: GHF was independently associated with increased risk of MACE after AMI and the hazardous effects of GHF was pronounced in all-cause mortality and cardiac death. Our findings suggest that GHF might be a useful marker for predicting MACE after AMI.