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THE ASSOCIATIONS OF METABOLIC SYNDROME AND ALBUMINURIA WITH ALL-CAUSE MORTALITY IN PATIENTS WITH CORONARY ARTERY DISEASE AND NO HISTORY OF DIABETES

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INTRODUCTION
Both albuminuria and metabolic syndrome are prevalent in patients with long duration of diabetes. However, at present, there are limited studies in which both the effects of albuminuria and metabolic syndrome on all-cause mortality are examined. Given that albuminuria has been associated with endothelial dysfunction, we investigated the associations of metabolic syndrome and albuminuria with all-cause mortality in patients with proven coronary artery disease with no history of diabetes.

METHODOLOGY
From December 2009 to July 2013, a total of 823 patients with coronary artery disease admitted in our institution for angiography were enrolled. Patients were stratified based on the presence of metabolic syndrome and albuminuria. Continuous variables were reported as mean ± SD while categorical data were reported as proportions. Statistical differences were tested using the Student's t-test for normally distributed data, the Mann-Whitney U-test for non-normally distributed variables, and the χ2-test for categorical variables. Event-free survival was calculated using the Kaplan-Meier estimation with a log-rank test. A two-sided p <0.05 was considered statistically significant.

RESULTS
The proportion of newly diagnosed diabetes mellitus based on fasting plasma glucose, oral glucose tolerance test or HbA1c, is significantly higher among those with metabolic syndrome (39.0 vs. 14.0%; p = 0.025) and those with albuminuria (37.0 vs. 24.0%; p = 0.007). During a median follow-up period of 8.94 years, there was no significant difference in terms of mortality among patients with and without metabolic syndrome in both unadjusted and adjusted models. The presence of albuminuria was associated with an increased risk of mortality in both unadjusted HR = 2.517 (95% CI: 1.755, 3.610; p <0.001) and adjusted HR = 1.631 (95% CI: 1.128, 2.358; p = 0.009) models, respectively. Further classification depending on the level of albuminuria showed that the presence of microalbuminuria was associated with a 59% increase in risk of mortality, HR = 1.588 (95% CI: 1.056, 2.388; p = 0.026) while the presence of macroalbuminuria showed a trend of elevated mortality risk but was not statistically significant, HR = 1.623 (95% CI: 0.820, 3.213; p = 0.164). Time-to-event analysis showed an adjusted HR remaining significantly higher (p <0.001) in the albuminuria group compared to those in the normoalbuminuric group.

CONCLUSION
We demonstrated that albuminuria was independently associated with long-term all-cause mortality in patients with coronary artery disease and no history of diabetes, while the presence of metabolic syndrome was not. Our findings suggest that the presence of albuminuria (≥30 mg/g) is a more important risk factor for long-term all-cause mortality than metabolic syndrome in patients with coronary artery disease and support the use of albuminuria, rather than metabolic syndrome, for prognostication in these patients.

KEYWORDS
albuminuria, coronary artery disease, metabolic syndrome, mortality