

DIABETES

Albuminuria and eGFR predict cardiovascular and renal risk

Although albuminuria and reduced glomerular filtration rate are believed to be markers of cardiovascular risk in individuals with type 2 diabetes, limited data on the association of these parameters with adverse cardiovascular outcomes in these patients exists. Toshiharu Ninomiya and colleagues have found that urinary albumin-to-creatinine ratio (UACR) and estimated glomerular filtration rate (eGFR) predict cardiovascular and renal risk in individuals with type 2 diabetes independently of other known risk factors and of each other.

The researchers analyzed data from the randomized, controlled ADVANCE trial that studied the effects of a routine blood pressure lowering approach on adverse outcomes in patients with type 2 diabetes. Of 11,140 ADVANCE participants, baseline levels of UACR, a measure of albuminuria, and of serum creatinine were available in all but 500. Ninomiya *et al.* found that among the 10,640 qualifying participants baseline values for UACR and eGFR—calculated using the Modification of Diet in Renal Disease (MDRD) formula—were independent of each other. After adjusting for potential confounders

and for regression dilution bias, at an average follow-up of 4.3 years, a tenfold increment in UACR increased the risk of cardiovascular events by 2.5-fold, that of cardiovascular death by 3.9-fold and that of renal events by 10.5-fold. Every halving of baseline eGFR was associated with a 2.2-fold increase in risk of cardiovascular events, a 3.6-fold increase in risk of cardiovascular death, and a 63.6-fold increase in risk of renal events. Results were similar if the Cockcroft–Gault formula was used to calculate eGFR. Importantly, the study also found that the risk of cardiovascular and renal events was higher in patients with stage 2 chronic kidney disease (CKD) manifested only by albuminuria than in patients with normoalbuminuria and stage 3 CKD (Figure 1). The authors therefore suggest that albuminuria status might be used to stratify stage 3 CKD into subgroups based on risk of cardiovascular and renal events.

A notable difference of this study compared with studies published previously is the implementation of a correction for regression dilution bias—the statistical effect by which random variations in UACR and eGFR within

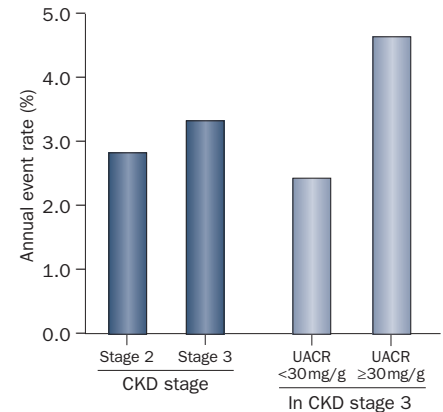


Figure 1 | Rates of cardiovascular events in selected qualifying participants of the ADVANCE study. Abbreviations: CKD, chronic kidney disease; UACR, urinary albumin-to-creatinine ratio.

any individual weaken the relationship with the observed outcomes. “The relationship between cardiovascular risk and both albuminuria and reduced eGFR,” Ninomiya points out, “were substantially strengthened after adjustment for regression dilution, and were stronger than the relationship with other known cardiovascular risk factors.”

Baldo Lucchese

Original article Ninomiya, T. *et al.* Albuminuria and kidney function independently predict cardiovascular and renal outcomes in diabetes. *J. Am. Soc. Nephrol.* 20, 1813–1821 (2009).