



Invited commentary

Microalbuminuria is an independent prognostic information for cardiovascular disease



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Cardiovascular disease (CVD) is the commonest cause of death in patients with end-stage renal disease (ESRD). Moreover, higher rates of CVD are seen in patients with moderate and even mild renal dysfunction [1]. Recent studies have indicated [2,3] that even modest elevations in serum creatinine and urinary albumin excretion are associated with increased CVD risk, not only in subjects with diabetes or hypertension but also in the general population. It is important to screen for renal disease in those with hypertension, diabetes, and other CVD risk factors because it predicts those who are at high risk for major CVD events.

Elevated serum creatinine levels are common in the community and are strongly associated with older age, treatment for hypertension, and diabetes in the Framingham Heart Study [4]. In a Japanese general population, proteinuria, and hypercreatininemia or reduced estimated glomerular filtration rate (eGFR) and their combination were significant predictors of CVD and all-cause mortality [5]. Microalbuminuria confers increased risk of death and CVD to a similar extent as the metabolic syndrome. It is suggested that microalbuminuria should be included in health examinations as a cardiovascular risk factor besides the metabolic risk factors [6]. There is a strong association between

microalbuminuria and the metabolic syndrome (MetS). Microalbuminuria is associated with an increased risk of ESRD, cardiovascular events and all-cause mortality [7]. Several studies have shown that MetS is independently associated with an increased risk for chronic kidney disease (CKD) and microalbuminuria among the general population of western countries [8,9].

The objective of the paper from Sibilitz et al., published in the current issue of *Atherosclerosis* [10], is to examine the relationship between elevated plasma creatinine but not eGFR and increased risk of myocardial infarction, ischemic heart disease, and early death, and to examine these relationships stratified by some creatinine categories. The obtained results from a large sample size of over 10,489 healthy subjects followed up over 30 years with 4499 CVD events are very important. They suggest that moderately elevated creatinine but not reduced eGFR were associated with most cardiovascular risk factors, including creatinine level percentile category, with significant trends found with HDL-cholesterol (inversely), high prevalence of hypertension and diabetes and higher BMI. These findings may be consistent with associations of the components of MetS rather than cardiovascular risk factors.

In the future, it will be worthwhile investigating associations between creatinine or eGFR and myocardial infarction, ischemic heart disease and early death. Because creatinine levels are strongly affected by muscle volume which is independent of early renal dysfunction, different results might be obtained from this study if authors would measure levels of microalbuminuria.

It is possible that MetS is independently associated with CKD [8], myocardial infarction and ischemic heart disease [11]. However, Färbom P et al. [12] concluded that in patients with hypertension, GFR and microalbuminuria both add independent prognostic information regarding cardiovascular risk. Importantly, the cardiovascular risk associated with microalbuminuria increases with the decline in GFR as demonstrated by a significant interaction between microalbuminuria and GFR. Because estimation of total cardiovascular risk is essential for how aggressively blood pressure and other cardiovascular risk factors should be treated, simultaneous inclusion of GFR and microalbuminuria in global cardiovascular risk assessment is likely to have major clinical utility.

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