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Prediction of diabetic nephropathy: The need for a sweet biomarker

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Implication for health policy/practice/research/medical education:
The ability to identify diabetic patients at high risk for progressive renal decline should be one of the priorities of nephrology community. Early identification may lead to improved clinical management, quality of life, and a decrease in the already high burden of morbidity. An ideal biomarker should be relatively inexpensive and readily measured either in serum or urine.

Editorial

D iabetes Mellitus is a common disease with an increasing prevalence worldwide. It is estimated that diabetes affects 25.8 million Americans, or 8.3% of the US population. According to the Centers for Disease Control, 11.3% of adults 20 years of age or older and 26.9% of individuals over the age of 65 have diabetes in the USA. The prevalence is even higher for Hispanics, Native Americans, and non-Hispanic blacks (1). The total estimated cost of prediabetes and diabetes in 2007 was $218 billion (2). The economic and social burdens of diabetes are undeniable. Chronic hyperglycemia can lead to serious complications in multiple organ systems, including the kidneys, eyes, nerves, and blood vessels. Early diagnosis and treatment of diabetes is crucial to prevent its complications. Even patients with good glycemic control can develop secondary complications of diabetes. The risk for death among people with diabetes is approximately twice that of age-matched individuals without diabetes (1).

Diabetes is the leading cause of end stage renal disease, adult-onset blindness, and non-traumatic lower limb amputations. However, there is great variability among patients in the location, severity, and timing of the onset of diabetic complications. For example, one individual with uncon-

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trolled diabetes for more than 30 years may have a mild degree of complications, while another individual with a 10 year history of diabetes may be blind and dialysis-dependent. Current guidelines recommend controlling blood glucose, blood pressure, and lipid levels, smoking cessation, and administration of antiplatelet agents in order to delay the progression of diabetes complications. Annual testing of serum creatinine and urine albumin excretion is recommended to screen for nephropathy (3). However, beyond recommendations for screening and treatment, there is no practical method to predict which patients who develop complications will have a progressive course to end points such as end-stage kidney disease.

Glomerular mesangial expansion, thickening of the basement membranes as well as glomerular sclerosis are considered the hallmark pathologic changes in diabetic kidney disease (4). Although the structural changes in diabetic nephropathy may be the same but the clinical manifestations of diabetic kidney disease may not be similar for different patients. We currently treat all diabetic patients with the same strategies, although we are aware that their individual response and risk of renal progression may be different. Currently, there are no reliable biomarkers available that can predict a more progressive course in patients with diabetic nephropathy. In theory and in practice, it would be extremely useful to have a biomarker that can predict a more rapid decline in renal function among diabetic patients. Several clinical, genetic, and cellular markers have been proposed and tested for predicting the development of diabetic nephropathy in the past decade (5). The majority of the markers used in clinical practice, such as microalbuminuria, turn out to be markers of diabetic nephropathy rather than being predictors of its progression (6).

The ability to identify diabetic patients at high risk for progressive renal decline should be one of the priorities of the nephrology community. Early identification may lead to improved clinical management, quality of life, and a decrease in the already high burden of morbidity. An ideal biomarker should be relatively inexpensive and readily measured either in serum or urine. Our task is far from being completed.

Conflict of interest

The authors declared no competing interests.

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