Albuminuria predicting outcome in diabetes: Incidence of microalbuminuria in Asia–Pacific Rim

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Albuminuria predicting outcome in diabetes: Incidence of microalbuminuria in Asia–Pacific Rim. Microalbuminuria is not an unusual finding in the general population, even in individuals without diabetes, hypertension, or cardiovascular risk factors. Prevalence studies in the United States, such as NHANES III, reported an overall incidence of microalbuminuria in 22,244 patients, with and without diabetes, of 7.8%. In those individuals with diabetes, the prevalence was 28.8%. Even in patients without diabetes, cardiovascular disease, or abnormal serum creatinine levels, the prevalence of microalbuminuria was still 5.1%. Similarly, a large Dutch study of 41,000 participants demonstrated a 7% incidence of microalbuminuria. In those individuals with diabetes, the microalbuminuria rate was 16%. Thus, in both the United States and Europe, prevalence studies indicate that microalbuminuria is not uncommon.

In southeast Asia and the western Pacific, the incidence of type 2 diabetes is rapidly escalating. It is expected that by 2025 the major prevalence of type 2 diabetes in the world will not be in North America or Europe but in Asia–Pacific Rim. Consequently, there is great interest in evaluating the incidence of microalbuminuria in this region. In the Microalbuminuria Prevalence Study (MAPS) the prevalence of macroalbuminuria was noted to be 18.8% and microalbuminuria 39.8% in a total of 6800 hypertensive diabetic adult patients from 10 Asian countries.

Thus, there is important evidence that the substantial prevalence of microalbuminuria and macroalbuminuria in the Pacific region indicates an impending pandemic of diabetic cardiovascular and renal disease.

Microalbuminuria appears to correlate with both cardiovascular and renal events, as well as all-cause mortality. Clinical investigations have demonstrated a continuous relationship between level of urinary albumin excretion and clinical end points in subjects both with and without diabetes [1]. For this reason, it is of great importance to develop effective screening programs to identify microalbuminuria and provide appropriate intervention.

Large prevalence studies have been conducted in both North America [2] and Europe [3] to evaluate the inci-dence of microalbuminuria and albuminuria in patients with and without diabetes. These studies illustrate an overall incidence of microalbuminuria of approximately 7%, which is substantially higher in patients with diabetes, ranging from 16% to 29%. However, there is little information on the prevalence of microalbuminuria in patients who live in southeast Asia. This is a major concern because the prevalence of type 2 diabetes is escalating at a rapid rate in these locations and will far exceed that seen in North America and Europe by 2025.

The purpose of this report is to provide new information on microalbuminuria prevalence in Asia.

METHODS

The Microalbuminuria Prevalence Study (MAPS) was a cross-sectional epidemiologic study designed to assess the prevalence of microalbuminuria and macroalbuminuria among consecutively screened hypertensive type 2 diabetic adult patients in 10 Asian countries [4]. Predictive factors for microalbuminuria and macroalbuminuria were characterized using a stepwise logistic regression model.

Patients were initially screened for microalbuminuria on a first morning void urine using a visual colorimetric semiquantitative urine test strip (Nephur test, Roche Diagnostics, Mannheim, Germany). If this test was negative for albumin, detection of microalbuminuria was performed on the same urine with a second specific semiquantitative test strip (Micral test, Roche Diagnostics). The intensity of the color-produced proportional to the albumin concentration was visually compared to the reference chart on the Micral test bottle. A measurement of 20 mg/L or above was considered positive. A within-trial validation of the Micral test was performed on a subset of patients and indicated an overall sensitivity of 91.9% and a specificity of 63.4% in comparison with an immunoturbidimetric determination. The overall sensitivity and specificity of the Micral test was 95% and 80%, respectively. Patients with leukocyte esterase or nitrates indicative of significant bacteria and patients with significant hematuria (2+ or above on the dip stick) were excluded.

As a result of this two-step screening, three albuminuric subgroups were defined: microalbuminuria, macroalbuminuria, and normal. Prevalence rates were calculated with a two-sided 95% confidence interval with a multivariate analysis. Links between two qualitative criteria were assessed by chi-square test, or a Fisher exact test if the assumptions of the chi-square test were not met. The best global model of prediction was assessed by a stepwise logistic regression. The significance level was fixed at 5%. All analyses were performed using SAS software version 8.02 (Cary, NC, USA).

RESULTS AND DISCUSSION

In the MAPS study, a total of 6801 patients were recruited from 103 medical centers throughout 10 Asian countries, including China, Hong Kong, Indonesia, Korea, Malaysia, Pakistan, Philippines, Singapore, Taiwan, and Thailand. The majority of the patients were Chinese (64%). Almost two thirds of the patients had at least one family member with a history of diabetes, hypertension, cardiovascular, or kidney disease. The prevalence of macroalbuminuria was 18.8%, and the prevalence of microalbuminuria was 39.8%. Mean systolic blood pressure was higher in the macroalbuminuria patients (148.3 mm Hg) compared to microalbuminuria and normal albuminuric patients: 142.9 and 140.0 mm Hg, respectively. Only 11.6% of patients had their systolic and diastolic blood pressure below the 130/80 mm Hg target. The mean age of the patients was 61.1 years, with a body mass index of 25.5. Angiotensin-converting enzyme (ACE) inhibitors (43.9%), calcium channel blockers (41.5%), angiotensin receptor blockers (19.2%), and beta-blockers (24.0%) were the most commonly used drugs. Only 19.4% of patients were receiving diuretics. Less than 40% were receiving a lipid-lowering agent. In the multivariate analysis, the predictive factors for the presence of microalbuminuria were increasing age, elevated body mass index, systolic blood pressure level, and ethnic origin (Korean).

Importantly, this study demonstrates a 40% incidence of microalbuminuria in the Asian Pacific Rim countries. This is a startling incidence that is substantially greater than what is seen in North American and European prevalence studies. Also interesting is that the body mass index of these patients is not as substantial as that seen in western countries, suggesting that there may be a different association between the incidence of obesity and diabetes with microalbuminuria in the Pacific Rim than in western countries. This high prevalence of microalbuminuria raises alarm because it has been well demonstrated that microalbuminuria is predictive of progressive deterioration of kidney function, and is associated with an increased risk of cardiovascular events and death. The high prevalence of microalbuminuria and macroalbuminuria in patients from the Asian Pacific Rim is of substantial concern and indicates an impending pandemic of diabetic, cardiovascular, and renal disease unless appropriate screening techniques and interventional strategies are utilized.

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