

Abstract

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Telomere length and progression of diabetic nephropathy in patients with type 1 diabetes.

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OBJECTIVES: To determine whether short telomere length of blood leucocytes from patients with type 1 diabetes is associated with or predictive of progression of diabetic nephropathy.

DESIGN AND METHODS: Two consecutive DNA samples were obtained from 132 patients from the nationwide Finnish Diabetic Nephropathy Study with type 1 diabetes. Control DNA samples were taken from 44 healthy blood donors. Telomere length was measured by Southern blot. Patients were divided into three groups according to their urinary albumin excretion rate (AER): 48 patients with normoalbuminuria (AER < 20 $\mu\text{g min}^{-1}$); seven patients with microalbuminuria (AER \geq 20 $\mu\text{g min}^{-1}$ < 200 $\mu\text{g min}^{-1}$) and 77 patients with macroalbuminuria (AER \geq 200 $\mu\text{g min}^{-1}$). Progression was defined as a change in albuminuria to a higher level.

RESULTS: Progression occurred in 21 patients. Progressors had shorter mean telomere length (8.1 \pm 0.7 kb, mean \pm SD; $P = 0.017$) and higher percentage of short telomeres (32.0 \pm 8%, $P = 0.002$) than nonprogressors (8.5 \pm 0.7 kb and 27 \pm 7.2%, respectively). Thus, both shorter telomeres (HR = 0.190, 95%CI 0.065-0.558, $P = 0.0025$) and higher proportion of short telomeres (HR = 1.115, 1.039-1.195, $P = 0.0023$) were independent predictors of diabetic nephropathy. Telomere length was not associated with the degree of albuminuria and was not different in patients with type 1 diabetes compared with healthy controls.

CONCLUSIONS: Short telomeres are independent predictors of progression of diabetic nephropathy in patients with type 1 diabetes.

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