

Abstract

Arterioscler Thromb Vasc Biol. 2010 Aug;30(8):1649-56.

Cellular Aging Reflected by Leukocyte Telomere Length Predicts Advanced Atherosclerosis and Cardiovascular Disease Risk.

Willeit P, Willeit J, Brandstätter A, Ehrlenbach S, Mayr A, Gasperi A, Weger S, Oberhollenzer F, Reindl M, Kronenberg F, Kiechl S.

Department of Neurology, Innsbruck Medical University, Innsbruck, Austria; the Division of Genetic Epidemiology, the Department of Medical Genetics, Molecular and Clinical Pharmacology, Innsbruck Medical University; the Department of Laboratory Medicine, Bruneck Hospital, Bruneck, Italy; the Department of Neurology, Bruneck Hospital; and the Department of Internal Medicine, Bruneck Hospital.

OBJECTIVE: To determine the association between leukocyte telomere length (TL) and atherosclerosis and its clinical sequelae stroke and myocardial infarction.

METHODS AND RESULTS: Within the scope of the prospective population-based Bruneck Study, leukocyte TL was measured by quantitative polymerase chain reaction in 800 women and men aged 45 to 84 years (in 1995). The manifestation of cardiovascular disease (CVD) (1995-2005) and the progression of atherosclerosis (1995-2000) were carefully assessed. The TL was shorter in men than in women (age-adjusted mean [95% CI], 1.41 [1.33 to 1.49] versus 1.55 [1.47 to 1.62]; $P=0.02$) and inversely correlated to age ($r=-0.22$, $P<0.001$) and family history of CVD ($P=0.03$). Participants with CVD events during follow-up ($n=88$) had significantly shorter telomeres (age- and sex-adjusted mean [95% CI], 1.25 [1.08 to 1.42] versus 1.51 [1.45 to 1.57]; $P<0.001$). In multivariable Cox models, baseline TL emerged as a significant and independent risk predictor for the composite CVD end point and its individual components (myocardial infarction and stroke); however, this was not the case for de novo stable angina and intermittent claudication. Subjects in the top and bottom TL tertile group differed in their CVD risk by a factor of 2.72 (95% CI, 1.41 to 5.28), which is the risk ratio attributable to a 13.9-year difference in chronological age. Remarkably, in our atherosclerosis progression model, TL was strongly associated with advanced, but not early, atherogenesis. All findings were consistent in women and men.

CONCLUSIONS: Our findings indicate a differential role of telomere shortening in the various stages of atherosclerosis, with preferential involvement in advanced vessel pathology and acute vascular syndromes.

PMID: 20508208