Exercise-Induced Ischemia and Carotid Atherosclerosis

To the Editor:

We read with interest the recent article by Nagai et al.1 detailing the significant association between exercise-induced myocardial ischemia and carotid artery intimal-medial thickness in asymptomatic participants in the Baltimore Longitudinal Study of Aging. These findings highlight and support previously reported observations from our laboratory on the relation between exercise ECG manifestations of ischemia and carotid artery structure and plaque.2

The relationship of exercise ECG myocardial ischemia to the presence of carotid atherosclerosis and to carotid and left ventricular structure and function was examined in a population of 204 asymptomatic subjects free of clinical evidence of cardiovascular disease. We found that exercise-induced myocardial ischemia, as defined by an abnormal chronotropically adjusted ST/heart rate (HR) slope3 but not by standard ST depression criteria, was associated with a nearly 3-fold greater likelihood of discrete carotid plaque and with older age, male sex, higher systolic and diastolic blood pressures, greater left ventricular mass and mass index, and greater common carotid artery intimal-medial thickness and cross-sectional area index. Stepwise logistic regression analyses that included standard cardiac risk factors revealed that only carotid cross-sectional area index, systolic blood pressure, and/or left ventricular mass index predicted the presence of exercise-induced myocardial ischemia.

Although the subjects in our study were on average 15 to 20 years younger than the subjects examined by Nagai et al., the findings from the 2 studies are remarkably similar with respect to the associations between ECG evidence of ischemia and carotid atherosclerosis, thus extending these observations to nearly the entire adult life span. These findings have important prognostic implications. In addition to the well-known relationship of obstructive carotid disease and asymptomatic carotid plaque to adverse cardiac events,4 increased carotid intimal-medial thickness alone has also been linked to an increased risk of cardiac morbidity.4 Together with the increased cardiac morbidity and mortality associated with abnormal HR-adjusted ST-segment depression indexes,5 these findings suggest that asymptomatic individuals with carotid thickening due to atherosclerosis or hypertrophy and exercise-induced ischemia may be at a substantially increased risk of future coronary events. The 55% reduction in 7-year mortality when asymptomatic men with an abnormal ST/HR index were exposed to a rigorous risk factor reduction program5 suggests that asymptomatic patients with both exercise-induced ischemia and increased carotid intimal-medial thickening may derive even greater prognostic benefit from aggressive risk factor modification.

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