Economic development and urbanization have promoted a lifestyle characterized by a diet high in saturated fats and diminished physical activity, which can favor atherogenesis. Such environmental factors are now prevalent globally and atherosclerosis has become an epidemic, as populations have increasingly survived early mortality from communicable diseases and malnutrition. On a worldwide scale, cardiovascular mortality will likely surpass that of every major disease group, including infection, cancer, and trauma, in the near future. Novel and effective strategies against atherosclerosis are needed to overcome this formidable disease.

Atherosclerosis takes a long time to develop and begins to affect the arteries in the second and third decades of life. Therefore, early detection of atherosclerotic lesions is mandatory in implementing early and preemptive interventions to suppress the atherogenic process and prevent atherosclerosis.

Coronary artery disease (CAD) is the main cause of mortality from atherosclerotic diseases worldwide, and myocardial infarction (MI) represents the first clinical manifestation of CAD in 50–65% of previously asymptomatic patients. Thus, several imaging risk markers have been proposed to reclassify asymptomatic intermediate-risk subjects, and among the imaging modalities used is cardiac computed tomography (CCT). CCT has been used with increasing frequency in the past 15 years to assist in CAD risk assessment of asymptomatic patients. The amount of coronary artery calcium (CAC) measured by CCT has been considered a reasonable marker for risk stratification in asymptomatic subjects at intermediate risk, and higher CAC scores are associated with higher event rates. For the high (400–1,000) and very high (>1,000) CAC scores, CAD death and MI rates were 4.6% and 7.1% at 3–5 years of observation.

Several previous studies have investigated the relation between CAC score and endothelial function, they have yielded inconsistent results. Contrary to previous investigations, the present authors focused on patients with no detectable CAC and reported that the absence of CAC was highly correlated with normal endothelial function. This finding may bring an answer to the conflicting results about the association between CAC score and endothelial function, and provide new clinical insights into the role of endothelial function and CAC.

In addition, the authors described that the median calcium score was 23.0 in the CAC ≥0 group, which was within the range of the mild-risk CAC scores, and that a small change in CAC score between the CAC=0 and CAC >0 groups resulted in a significant difference in the prevalence of normal endothelial function. Therefore, this study adds new evidence for
the existence of a threshold effect between the absence and presence of CAC, even if the CAC score is very low.

A principle of cardiovascular disease prevention that is generally accepted is that the intensity of intervention for each individual should be adjusted to the baseline risk level. The goals of this principle are to optimize the efficacy, safety, and cost-effectiveness of the intervention. Although the concept is most often applied to higher-risk persons who are potential candidates for risk-reducing drugs, it also is an important consideration for lower-risk persons either in clinical practice or for public health strategies. In view of this principle and concept, the absence of CAC will be beneficial in risk stratification of lower-risk subjects because it can reliably distinguish persons with very low risk from those with low risk. Further examinations are warranted to verify that a CAC score of 0 can be used to modify the prediction of outcome in lower-risk populations.

CAC measurement inherently have the risk of radiation exposure and the disadvantage of their low cost-effectiveness. Hence, the usefulness of endothelial function measurements with PAT or flow-mediated dilatation should also be recognized in differentiating between subjects with very low risk and those with low risk, in order to find atherosclerotic changes at the early stage and implement preemptive and cost-effective interventions for overcoming atherosclerosis.

References