Coronary artery disease progression assessed by electron-beam computed tomography.

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The ability to observe changes in atherosclerotic plaque burden over time should provide an accurate measure of efficacy for different cardiovascular therapies. Electron-beam computed tomography (EBCT), by quantification of coronary artery calcification, is a noninvasive measure of atherosclerosis burden. This article summarizes data from abstracts and publications related to coronary artery calcium measurement and its use in progression studies. The issues related to interscan variability and reproducibility of this measure are detailed. The limitations of multidetector spiral computed tomography (high radiation dose and poor reproducibility) are also addressed. Several studies of progression using 2 scans, administered > or =1 year apart, demonstrate significant annual progression (22% to 52% per year). All studies demonstrate that therapy with cholesterol-lowering agents slows the atherosclerotic process, and that it may lead to regression of coronary calcium over time. There are 2 small prognostic studies that demonstrate that coronary events predominantly occur in those patients who exhibit significant progression of coronary artery calcium. Large multicenter trials are underway to evaluate the prognostic significance of coronary artery calcium progression. The progression of coronary artery atherosclerosis can be observed noninvasively by monitoring the progression of coronary calcification with EBCT. With annual progression rates of 22% to 52% and a median interscan variability of only 5% to 8%, this technology provides an opportunity to noninvasively monitor patients to assess the clinical efficacy of medical therapies in studies as short as 1 year.