able at the time that these patients underwent scanning, is there any reason to believe that scan results influenced any decisions to perform revascularization procedures?

Finally, the last paragraph of the discussion section suggests a bias against electron beam CT scanning as a screening test. The stated purpose of the report is to "assess the relation of coronary calcifications and angiographic stenoses and the relative contribution of both of these to future coronary heart disease events in symptomatic patients referred for angiography," yet the authors conclude that "clinical application of electron beam computed tomographic screening should be restricted to the evaluation of symptomatic patients only." Because none of their patients were asymptomatic, why have the authors concluded the discussion section with a statement that has nothing to do with their study?

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Reference

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Prognostic Value of Coronary Calcification—II

The correlation between coronary atherosclerosis and coronary calcification has given rise to the concept that detection of calcium in coronary arteries may serve as a useful screening technique. Detrano et al. (1) suggest that electron beam computed tomographic (EBCT) coronary calcium scores are a good screening marker for the prediction of coronary events in symptomatic patients undergoing angiography.

We fully agree with these authors that simple fluoroscopic imaging is incapable of demonstrating the real distribution and amount of calcium deposits in coronary arteries. Although Margolis et al. (2) could show a relation between fluoroscopic calcifications and coronary end points, the distribution of calcium, as well as the active calcification process in atherosclerotic lesions, is highly underestimated by fluoroscopic imaging. Although we accept intravascular ultrasound (IVUS) as a better reference standard for visualizing intracoronary calcium—in complete accordance with Detrano et al.—we have shown that different histologic types of calcific deposits in the coronary artery wall may be undetectable even by the IVUS technique (3).

Therefore, we suggest that not only is the actual amount of calcification underestimated by EBCT, but, furthermore, no information is provided about the distribution of intralesional calcium within the vessel wall (which affects the likelihood of plaque rupture). In addition, we do not know the correlation between plaque rupture and the amount of coronary calcium in nonstenotic coronary segments. Recent studies (4) have shown the large impact of intralesional calcium on coronary interventions. This interaction reflects the biomechanical process of severe stenotic coronary segments exposed to important shear stress effects.

Furthermore, we have shown that calcification in coronary segments does not significantly influence the remodeling process of the coronary vessel. We found a large variety of compensatory responses to atherosclerotic disease that were independent of plaque composition (5). Even with the results of experimental studies showing a higher likelihood of plaque rupture in the presence of vessel calcification (6), we suggest that besides the volume of calcified plaque there are still unidentified variables involving the type and distribution of calcium that contribute to the failure of compensatory enlargement of coronary arteries and subsequent plaque disruption.

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Reply

Guerci directs his comments to our study (1) of 491 symptomatic patients undergoing electron beam computed tomography (EBCT) for assessment of coronary calcification and coronary angiography for various indications, including those enumerated in his letter. The research team assessed clinical status 30 months after angiography and found a sixfold increase in events in patients with calcium scores higher than the median. This finding suggests that EBCT can be helpful in the decision to perform angiography for a symptomatic patient. Numerous others (2,3), including Guerci (4), have found that coronary calcium tests can be helpful in managing these patients.

End points were determined by phone call followed by acquisition of hospital records for all incident hospital admissions and transcripts of conversations with next-of-kin in cases of out-of-hospital deaths. Only acute infarction and coronary heart disease death were considered by the three cardiologists who reviewed these records in blinded manner to adjudicate event occurrence.

Many of these patients underwent revascularization during the hospital period during which angiography was performed. One patient who died during this index hospital period was excluded. Infarctions occurring during the index hospital period were also excluded from analysis. There were no procedure-related deaths or infarctions during later hospital periods.