Prognostic Value of Coronary Artery Calcification

To the Editor:

The study by Kondos et al1 confirms that coronary artery calcification (CAC) predicts increased risk for coronary heart disease (CHD). However, the summary effect size of the prognostic value of calcification is not appreciably changed after adding this and other new data to a previous meta-analysis.2–4

The Kondos et al study, as with others in this research area, suffers from several methodological problems that could affect the validity of their conclusions regarding the predictive value beyond conventional risk prediction. These include a substantial loss to follow-up (37%); the use of revascularization procedures as an outcome; and the use of unmeasured, self-reported risk factors. We are most concerned about the latter issue.

In contrast to the precise and sensitive measurement of calcification using coronary CT, Kondos et al used crude self-reported measurements of risk factors. Self-reporting of risk factors grossly underestimates the prevalence of risk factors; for example, based on the National Health and Nutrition Examination Survey (www.cdc.gov/nchs/nhanes.htm), almost one-third of Americans with hypertension are not aware of it. Additionally, to substitute a categorical (often dichotomous) measure for continuous variables (even if one assumes self-reporting of risk factors is accurate) loses much of the predictive power of these variables. Indeed, in Kondos’ report, their data indicate that diabetes, hypertension, hyperlipidemia, and tobacco use are not predictive for CHD hard events, despite the wealth of data to the contrary. This lack of internal validity severely reduces our confidence in their findings.

The published studies that used self-reported data have found the highest relative risk for events associated with calcification, and in most of these studies, CAC was found to be substantially additive in risk prediction. On the other hand, the single study that measured risk factors as continuous variables showed a more modest 2-fold relative risk associated with CAC and only a marginally additive effect on risk prediction.5 Demonstrating that CAC adds to conventional risk prediction for hard CHD events remains a worthy, yet unresolved, research question. Further reports should require rigorously measured risk factors to be included in the multivariate analyses, much as we would expect coronary calcification to be rigorously measured.

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