Ischemia Imaging and Plaque Imaging in Diabetes: Complementary Tools to Improve Cardiovascular Risk Management

Response to Rutter and Nesto

We read with interest the letter by Rutter and Nesto (1) in reply to our review article; however, we believe we had already addressed several, if not all, of the concerns they express. In fact, we made the following statements in our study. 1) “Our goal was to verify whether existing data support the use of these techniques (ischemia and atherosclerosis imaging) in isolation or as complementary tools for improved risk prediction” (not necessarily management!). 2) “Continued research will be needed to confirm that the integration of several imaging modalities improves clinical outcome in a cost effective manner.” 3) “Figure 1 is an algorithm with . . . an attempt to integrate ischemia and atherosclerosis imaging . . . based on personal opinion.” 4) “Whether all asymptomatic diabetic patients should be tested remains debatable and unlikely to be financially affordable for society. To make asymptomatic screening more affordable at least one of the following conditions should be present . . .”

The tone of our writing was more one of hope for improvement in risk assessment than a call for unnecessary expenditure. Unfortunately, the prevailing argument used by Drs. Rutter and Nesto, that atherosclerosis imaging leads to unnecessary invasive diagnostic and interventional procedures, is a bit trite and not supported by substantial literature. On the contrary, some of us have shown that the performance of calcium screening in symptomatic patients at low-intermediate pretest probability of disease reduces the rate of normal cardiac catheterizations (hence unnecessary) and increases the number of “necessary” procedures, with a net 30–35% saving compared with a traditional diagnostic pathway (2). It was far from our intention to instruct physicians on doing unnecessary procedures; it was our desire to educate the readers as to what is currently known regarding coronary artery disease imaging in diabetes. The summary is that ischemia imaging is useful in some subgroups of diabetic patients, but it fails to completely define risk in a sizable portion of individuals and for any prolonged period of time. The enormous burden of disease inherent in diabetes deserves, therefore, better risk assessment. Evidence is accumulating that atherosclerosis imaging may help this task progress. Large amounts of calcium or an increased intima-media thickness actually adds useful prognostic information in diabetes (3,4), and absence of calcium is a good marker of low risk in diabetic and nondiabetic patients alike (3). Our appeal is for a conscientious application of imaging techniques while we learn more about their risk and benefit, as we use them daily.

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References

Cut Points of Waist Circumference

Response to Sone and Colleagues

Sone and colleagues (1,2) adopted Japanese criteria of abdominal obesity (waist circumference ≥85 cm in men and ≥90 cm in women) for the diagnosis of metabolic syndrome. These Japanese criteria of abdominal obesity were proposed by the Examination Committee of Criteria for Obesity Disease in Japan set up by the Japan Society for the Study of Obesity (3). They proposed waist circumferences of 85 cm in men and 90 cm in women as equivalent values for visceral fat area (VFA) of 100 cm2. However, these cut points of waist circumference resulted from the inappropriate presupposition that VFA is linearly proportional to waist circumference. They determined the values by linear regression lines without revealing the sensitivities and specificities of these cut points. In fact, the dots in their VFA–waist circumference graphs were not scattered along linear lines, though VFA and waist circumference correlated well (3). If they had determined the cut points of waist circumference by receiver operating characteristic curves as they did to determine the cut points of BMI and VFA and determined the cut points of VFA separately by sex, the cut points of waist circumference might have been equivalent to Asian criteria (≥90 cm in men and ≥80 cm in women). For example, Shiwaku et al. (4) reported that optimal cut points of waist circumference were 82 cm for men and 73 cm for women in Japan. If the Examination Committee calculated areas under receiver operating characteristic curves, waist circumference might reveal to be a poor discriminator of VFA especially in women. After all, waist circumference is a marker of abdominal (central) obesity not of visceral obesity, which is assessed by VFA using computer tomography scanning, exposing subjects to X-ray irradiation. Therefore, Sone et al. should reanalyze their data using Asian criteria of waist circumference (≥90 cm in men and ≥80 cm in women) before reaching conclusions on the prognostic significance of metabolic syndrome defined with both National Cholesterol Education Panel (1) and International Diabetes Federation (2) criteria in Asian diabetic patients.

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Cut Points of Waist Circumference

Response to Oda

W e are grateful for Dr. Oda’s comments (1) on our recent reports (2,3) regarding the utility of waist circumference cutoff values in clinical risk assessments for cardiovascular disease. We agree with his point that the current Japanese criteria for abdominal obesity (85 cm for men and 90 cm for women in waist circumference) (4) are problematical, notwithstanding their adoption by the International Diabetes Federation (IDF) (5) and the American Heart Association (AHA) (revised version by the National Cholesterol Education Program [NCEP]) (6) in their definitions of metabolic syndrome.

We recalculated the risk of metabolic syndrome, as defined by the IDF and the NCEP, for cardiovascular events applying the Asian cutoff for waist circumference (90 cm for men and 80 cm for women) (7) and found that the hazard ratio (HR) of metabolic syndrome in female diabetic patients improved to some extent but that waist circumference alone was still not predictive for cardiovascular disease. In female patients, the HR of NCEP–metabolic syndrome for stroke improved to become significant (2.68 [95% CI 1.20–5.97]), and the HR of NCEP–metabolic syndrome and IDF–metabolic syndrome for combined cardiovascular events (either of coronary heart disease or stroke) also improved to become significant (2.02 [1.13–3.62] and 1.91 [1.07–3.42], respectively) using the Asian waist cutoff. The HRs for male patients did not change significantly under this modification. Consequently, modifying the IDF and the NCEP definitions by substituting the Japanese for the Asian cutoff value significantly improved the prognostic implications for female Japanese patients with type 2 diabetes, although it is notable that the HRs were still lower than those obtained using the World Health Organization definition (3).

An important limitation to the waist cutoff data (both Japanese [4] and Asian [7]) is that the values were determined from cross-sectional observations rather than from prospective cohort studies. Before undertaking any further discussions on the most appropriate cutoff value for waist circumference, further large-scale prospective studies are necessary to determine whether waist circumference per se is in fact a significant risk factor for cardiovascular events and/or mortality in East Asian diabetic and nondiabetic populations.

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