The Promise of a Warranty

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Type 2 diabetes mellitus is among the most powerful independent risk factors of the cardiovascular disease presence and is associated with a 3 to 5x higher cardiovascular event risk. This has long been recognized by the National Cholesterol Education Program report in the United States and European guidelines, both labeling type 2 diabetes mellitus a coronary artery disease (CAD) equivalent. Although ever since the original publication by Haffner et al suggesting that asymptomatic patients with diabetes mellitus have the same cardiovascular risk as patients with previous myocardial infarction, a controversy has been raging as to whether indeed all patients with diabetes mellitus are equal.

See article by Valenti et al

During the past 20 years, large cohort studies, including the Framingham Heart Study and the Multiethnic Study of Atherosclerosis along with registries alike, have demonstrated that patients with diabetes mellitus are not a homogeneous risk cohort and as individuals are at different levels of risk of clinical events, including mortality.

The same can be said for atherosclerotic disease. Indeed, the study by Valenti et al in this issue of Circulation: Cardiovascular Imaging assessed the amount of coronary artery calcium (CAC) as a measure of subclinical CAD and found that ≤30% of patients with diabetes mellitus are free of subclinical CAD. Moreover, the increased risk of clinical events in diabetic patients closely tracks with an increased prevalence and extent of CAD when compared with nondiabetics, including CAC, nonobstructive plaque, and significant stenosis. For example, the risk of cardiovascular events increases from a hazard ratio of 5 for nonobstructive CAD to a hazard ratio of 12 for obstructive CAD. Equally if not more important were suggestions of previous studies that patients without subclinical CAD have a low risk of future clinical events for a period of 5 years subsequent to imaging similar to individuals without diabetes mellitus and hence may not meet criteria for high-risk asymptomatic patients.

The study by Valenti et al expands the time horizon on the prognostic value of the absence of CAC to a long-term 15-year perspective for all-cause mortality. Specifically, the study reports that among 9715 asymptomatic individuals undergoing CAC scoring, the mortality rate for patients without CAC is low for both those with (2.55% [1.22%–5.26%]) and without diabetes mellitus (1.24% [0.96%–1.61%]) at 5 years. However, the mortality rate increased to much greater extent in patients with diabetes mellitus (11.67% [8.26%–16.34%]) when compared with those without diabetes mellitus (4.53% [3.92%–5.23%]) after 15 years.

On one hand, the data to some extent rehabilitate the notion of diabetes mellitus as CAD risk equivalent as they demonstrate a detrimental effect of diabetes mellitus in the long term even in those without subclinical CAD at baseline. On the other hand, the data suggest that a calcium score of 0 predicts a low risk (akin to a warranty period) for ≤5 years in patients with diabetes mellitus and ≤15 years in those without diabetes mellitus. Thus, probably the most important implication of these data is that adequate intervals for observation for subclinical CAD may be 5 years in patients with diabetes mellitus and 15 years in those without. This represents a pragmatic example of how phenotyping of disease could shape a more personalized approach toward risk management.

The opinions expressed in this article are not necessarily those of the editors or of the American Heart Association.

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Circ Cardiovasc Imaging is available at http://circimaging.ahajournals.org
DOI: 10.1161/CIRCIMAGING.116.004389
gain more insights into the multifaceted conditions potentially mitigating increased cardiovascular risk in diabetes mellitus.

Overall, there is an important need to improve preventive cardiovascular risk management for diabetic patients. The work by Valenti et al represents an important first step using phenotyping of subclinical CAD with CAC scanning. Moreover, the study further strengthens the notion that CAC is a measure that reflects the cumulative assault of atherosclerotic risk factors on the coronary arteries. Efficacy trials comparing imaging- and nonimaging-guided prevention strategies in diabetic patients would provide the ultimate proof of whether imaging could indeed be beneficial and affordable.

Disclosures
Dr Hoffmann reports receiving grants from American College of Radiology Imaging Network, HeartFlow Inc, and from Siemens Healthcare on behalf of his institution.

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_Circ Cardiovasc Imaging_. 2016;9:e004389
doi: 10.1161/CIRCIMAGING.116.004389

_Circulation: Cardiovascular Imaging_ is published by the American Heart Association, 7272 Greenville Avenue,
Dallas, TX 75231
Copyright © 2016 American Heart Association, Inc. All rights reserved.
Print ISSN: 1941-9651. Online ISSN: 1942-0080

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://circimaging.ahajournals.org/content/9/2/e004389

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