Potential Implications of Coronary Artery Calcium Testing for Guiding Aspirin Use Among Asymptomatic Individuals With Diabetes

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Potential Implications of Coronary Artery Calcium Testing for Guiding Aspirin Use Among Asymptomatic Individuals With Diabetes

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OBJECTIVE—It is unclear whether coronary artery calcium (CAC) is effective for risk stratifying patients with diabetes in whom treatment decisions are uncertain.

RESEARCH DESIGN AND METHODS—Of 44,052 asymptomatic individuals referred for CAC testing, we studied 2,384 individuals with diabetes. Subjects were followed for a mean of 5.6 ± 2.6 years for the end point of all-cause mortality.

RESULTS—There were 162 deaths (6.8%) in the population. CAC was a strong predictor of mortality across age-groups (age <50, 50–59, ≥60), sex, and risk factor burden (0 vs. ≥1 additional risk factor). In individuals without a clear indication for aspirin per current guidelines, CAC stratified risk, identifying patients above and below the 10% risk threshold of presumed aspirin benefit.

CONCLUSIONS—CAC can help risk stratify individuals with diabetes and may aid in selection of patients who may benefit from therapies such as low-dose aspirin for primary prevention.

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Although diabetes has been considered a coronary heart disease (CHD) risk equivalent (1), not all individuals with diabetes carry equivalent risk. Coronary artery calcium (CAC), a marker of atherosclerosis, has been shown to independently predict cardiovascular events as well as enhance risk stratification in patients with diabetes (2–5). Although recent guidelines recommend consideration of CAC testing for risk assessment in adults with diabetes ≥40 years (6), we sought to evaluate whether CAC effectively stratifies individuals with diabetes across age, sex, and risk factor (RF) burden. This question is particularly important given recent guidelines recommending selected use of aspirin in patients with diabetes based on underlying CHD risk (7).

RESEARCH DESIGN AND METHODS—The study cohort consisted of 44,052 asymptomatic individuals without known CHD referred for CAC screening. There were 2,384 (5.4%) individuals with diabetes by self-report. Details for RF collection have been described previously (8). All subjects underwent CAC scoring at baseline and were followed for a mean of 5.6 ± 2.6 years (median 5 years, range 1 to 13 years) for the primary end point of all-cause mortality verified using the Social Security Death Index. Annualized all-cause mortality rates were estimated by dividing number of deaths by number of person-years at risk.

The population was stratified into the following age-groups: <50, 50–59, and ≥60 years. Additionally, individuals were stratified into high-, intermediate-, and low-risk subgroups (based on age/sex and presence of additional RF) per recent guidelines detailing aspirin use in patients with diabetes as follows: 1) high risk (10-year cardiovascular disease [CVD] risk ≥10%: ‘aspirin is reasonable’): men ≥50 and women ≥60 with 1 or more RF; 2) intermediate risk (10-year CVD risk 5–10%: ‘aspirin might be considered’): men ≥50 and women ≥60 without RF and men <50 and women <60 with RF; and 3) low risk (10-year CVD risk <5%: ‘aspirin should not be recommended’): men <50 and women <60 without RF (7).

RESULTS—Mean age of the 2,384 study subjects was 58 ± 11 years; 52% were men. A total of 500 participants (21%) were <50 years old, 863 (36%) were age 50–59, and 1,021 (43%) were at least 60 years old. A total of 535 individuals (22%) had CAC = 0, whereas 779 (33%) and 1,070 (45%) had CAC 1–100 and >100, respectively. Overall, there were 162 deaths (6.8%). CAC was a strong predictor of mortality in each age-group (expressed in deaths/1,000 person-years with 95% CI): age <50, CAC 0: 0; CAC 1–100: 7.8 (3.7–16.3); CAC >100: 18.2 (9.1–36.4); age 50–59, CAC 0: 3.2 (1–10.1); CAC 1–100: 7.3 (3.9–13.5); CAC >100: 16.6 (11.1–24.7); and age ≥60, CAC 0: 9.9 (4.4–22); CAC 1–100: 19.2 (12.5–29.5); CAC >100: 33.1 (26.7–41).

Notably, all individuals ≥60 years with ≥1 RF had a mortality rate >10 deaths/1,000 person-years.

Table 1 presents mortality rates by CAC score according to estimated 10-year CVD.
In conclusion, CAC has the ability to help risk stratify individuals with diabetes across age-group, sex, and RF burden and may help identify individuals who may benefit from more aggressive therapy, such as low-dose aspirin, for primary prevention. Our study also points to individuals with diabetes who likely will not benefit from CAC testing; namely those \( \geq 60 \) years with additional RF, because their 10-year CVD risk is \( > 10 \). Although our study is informative, definitive recommendations must come from clinical outcomes trials where treatment decisions are driven by CAC-based risk stratification.

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