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

Michael Gordon Silverman, Johns Hopkins Ciccarone Center for the Prevention of Heart Disease
Michael J. Blaha, Johns Hopkins Ciccarone Center for the Prevention of Heart Disease
Matthew J. Budoff, Harbor UCLA
Juan J. Rivera, Johns Hopkins Ciccarone Center for the Prevention of Heart Disease
Paolo Raggi, Emory University
Leslee J Shaw, Emory University
Daniel Berman, Cedars-Sinai Medical Center
Tracy Callister, Tennessee Heart and Vascular Center
John A. Rumberger, Princeton Longevity Center
Jamal S. Rana, Cedars-Sinai Medical Center

Only first 10 authors above; see publication for full author list.

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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.

From the 1Johns Hopkins Ciccarone Center for the Prevention of Heart Disease, Baltimore, Maryland; the 2Los Angeles Biomedical Research Institute at Harbor-UCLA, Torrance, California; the 3Division of Cardiology, Emory University, Atlanta, Georgia; the 4Department of Imaging and Medicine, Cedars-Sinai Medical Center, Los Angeles, California; the 5Tennessee Heart and Vascular Center, Hendersonville, Tennessee; the 6Princeton Longevity Center, Princeton, New Jersey; and the 7Section of Cardiovascular Medicine, Department of Internal Medicine, Yale University, New Haven, Connecticut.

Corresponding author: Khurram Nasir, knasir1@jhmi.edu.

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**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 555 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
High risk (recommended) recently provided up-controversial. Given the con-

among individuals with diabetes remains

Intermediate risk (5–10%)

Intermediate risk (10-year CVD risk 5

Table 1—All-cause mortality rates by CAC score according to estimated 10-year CVD risk per the recent aspirin use guidelines* (based on age, sex, and presence of RFs)

<table>
<thead>
<tr>
<th>Predicted 10-year CVD risk per guidelines</th>
<th>Number of individuals (%)</th>
<th>Number of deaths (%)</th>
<th>Mortality rate/1,000 person-years at risk</th>
<th>95% CI for rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk (&lt;5%) “aspirin not recommended”</td>
<td>89</td>
<td>38 (42.7)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CAC = 0</td>
<td>38 (42.7)</td>
<td>0</td>
<td>0</td>
<td>0.81–40.83</td>
</tr>
<tr>
<td>CAC 1–100</td>
<td>35 (39.3)</td>
<td>1 (2.9)</td>
<td>5.75</td>
<td>1.63–10.00</td>
</tr>
<tr>
<td>CAC &gt;100</td>
<td>16 (18)</td>
<td>3 (18.8)</td>
<td>39.42</td>
<td>12.72–122.24</td>
</tr>
<tr>
<td>Intermediate risk (5–10%)</td>
<td>979</td>
<td>288 (29.4)</td>
<td>3 (1)</td>
<td>2.29</td>
</tr>
<tr>
<td>“aspirin to be considered”</td>
<td></td>
<td></td>
<td></td>
<td>0.74–7.09</td>
</tr>
<tr>
<td>CAC = 0</td>
<td>370 (37.8)</td>
<td>10 (2.7)</td>
<td>6.24</td>
<td>3.36–11.59</td>
</tr>
<tr>
<td>CAC 1–100</td>
<td>321 (32.8)</td>
<td>27 (8.4)</td>
<td>20.37</td>
<td>13.97–29.71</td>
</tr>
<tr>
<td>CAC &gt;100</td>
<td>1,316</td>
<td>209 (15.9)</td>
<td>6 (2.9)</td>
<td>6.59</td>
</tr>
<tr>
<td>High risk (&gt;10%) “aspirin reasonable”</td>
<td></td>
<td></td>
<td></td>
<td>2.96–14.67</td>
</tr>
<tr>
<td>CAC = 0</td>
<td>733 (55.7)</td>
<td>86 (11.7)</td>
<td>28.60</td>
<td>23.15–33.33</td>
</tr>
<tr>
<td>CAC 1–100</td>
<td>374 (28.4)</td>
<td>26 (7.7)</td>
<td>16.32</td>
<td>11.11–23.97</td>
</tr>
<tr>
<td>CAC &gt;100</td>
<td>35 (39.3)</td>
<td>1 (2.9)</td>
<td>5.75</td>
<td>0.81–40.83</td>
</tr>
</tbody>
</table>

*Risk classification according to recent guidelines for aspirin use in patients with diabetes (7): 1) high risk (10-year CVD risk >10%: ‘aspirin is reasonable’: men ≥50 and women ≥60 with 1 or more RF; 2) inter-

mediate 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 recom-

mended’: men <50 and women <60 without RF.

CONCLUSIONS—We have shown that CAC measurements may help risk stratify patients with diabetes across age-

group, sex, and RF burden. Most individuals with diabetes <60 years of age have a low near-term risk of <5 deaths/1,000 person-years when CAC = 0. Additionally, we have shown that most individuals with CAC >100 have a mortality rate of >10 deaths/1,000 person-years. We have also demonstrated that individuals with diabetes ≥60 years have a mortality rate of >10 deaths/1,000 person-years, regardless of CAC score, when at least one other RF is present.

Although diabetes is defined by some guidelines as a CHD risk equivalent, the use of aspirin for primary prevention among individuals with diabetes remains controversial. Given the conflicting data, a consensus group recently provided updated recommendations concluding that

limitations, the use of categorical RF data has been validated as a method of risk stratification (9).

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 ≥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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