Screening Using HbA_{1c} Misclassifies Many

BY DOUG BRUNK

FROM THE ANNUAL SCIENTIFIC SESSIONS OF THE AMERICAN DIABETES ASSOCIATION

SAN DIEGO – Slightly more than half of veterans targeted for screening have unrecognized diabetes or prediabetes, results from a recent analysis showed.

However, screening such patients by measuring hemoglobin A_{1c} "would result in major misclassification – missing disease when it is present and, to a lesser extent, mislabeling normals as having disease," Sandra L. Jackson, M.P.H., said at the meeting.

The findings are based on a study of 789 individuals from the Atlanta VA Medical Center that assessed the use of targeted screening to detect prediabetes and diabetes, and to compare HbA_{1c} testing with the oral glucose tolerance test (OGTT), said Ms. Jackson, a graduate student in the nutrition and health sciences doctoral program at Emory University, Atlanta.

Although screening to detect unrecognized diabetes and prediabetes is recommended, the best strategy for screening in patients in primary care settings is unknown. The upside of the OGTT, Ms. Jackson said, is that it's established in clinical use, it can detect all patients with prediabetes, "and the glucose measurement itself is accurate. On the downside, it requires [fasting] and morning testing. It's burdensome for patients and health care systems, and it has poor day-to-day reproducibility."

The upside of HbA_{1c}, she continued, is that it does not require a fast, "and it's only a single blood draw, so it's much more convenient, there's less day-to-day variation, and there's greater preanalytic stability. On the downside, measurement may be problematic as platforms vary, point-of-care testing can be unreliable, there's a lack of agreement on cutoffs, and there may be racial and age disparities such that blacks and older persons may have higher HbA_{1c} independent of glucose."

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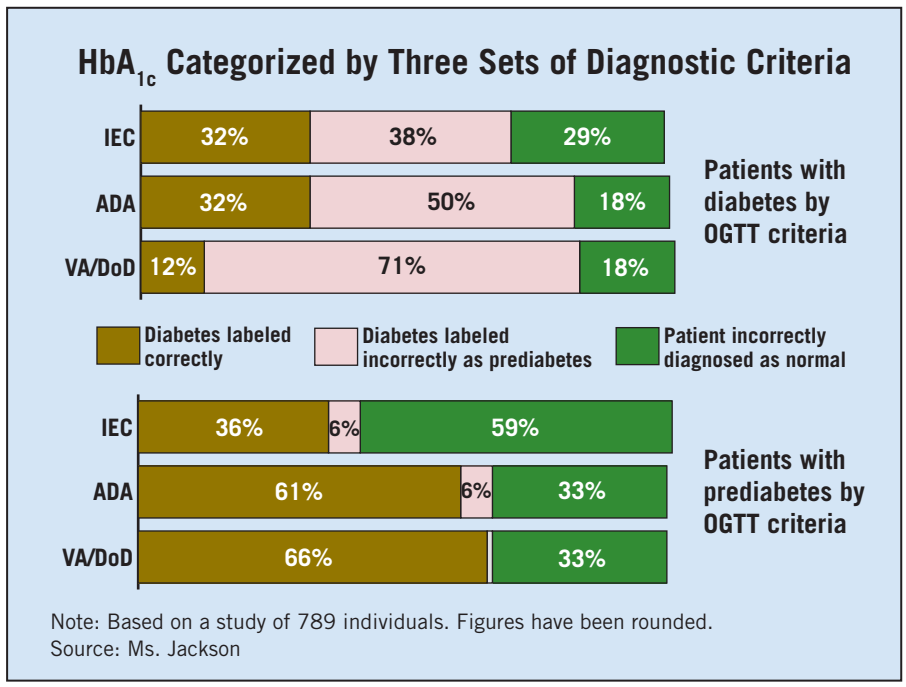
Major Finding: In patients with diabetes by an oral glucose tolerance test, HbA_{1c} classification by International Expert Committee criteria labeled 32% correctly, 38% incorrectly as having prediabetes, and 29% incorrectly as being normal. American Diabetes Association criteria labeled 32% correctly, 50% incorrectly as having prediabetes and 18% incorrectly as being normal; and Veterans Affairs/Department of Defense criteria labeled 12% correctly, 71% incorrectly as having prediabetes, and 18% incorrectly as being normal.

Data Source: A study of 789 individuals from the Atlanta VA Medical Center that set out to examine the use of targeted screening to detect prediabetes and diabetes, and to compare HbA_{1c} testing with the oral glucose tolerance test.

Disclosures: The study was supported by a grant from the VA's Health Services Research and Development Service. Ms. Jackson said that she had no relevant financial conflicts of interest.



Note: Based on a study of 789 individuals. Figures have been rounded.
Source: Ms. Jackson

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They categorized HbA_{1c} results according to three sets of diagnostic criteria: the International Expert Committee (IEC) (prediabetes 6.0%-6.4%, diabetes 6.5% or greater), ADA (prediabetes 5.7%-6.4%, diabetes 6.5% or greater), and the Department of Veterans Affairs/Department of Defense (VA/DoD) (prediabetes 5.7%-6.9%, diabetes 7.0% or greater).

The mean age of the 789 study participants was 58 years, 95% were men, 74% were black, and their mean BMI was 30.5 kg/m^2.

Screening was offered to patients meeting National Institutes of Health guidelines for screening: without known diabetes, and with age greater than 45 years or a BMI of more than 25 with another risk factor.

Fully 10% of patients met criteria for diabetes based on the OGTT, which was a higher rate compared with the HbA_{1c} guidelines (6.7% by the IEC, 6.7% by the ADA, and 1.5% by the VA/DoD guidelines, respectively). "This would indicate that these cutoffs are insensitive compared with the OGTT for detecting diabetes," she said.

According to the OGTT, 42% had prediabetes: 27% had isolated impaired fasting glucose, 6% had isolated impaired glucose tolerance, and 9% had both.

In patients with diabetes by OGTT criteria, HbA_{1c} classification by IEC criteria labeled 32% correctly, 38% incorrectly as having prediabetes, and 29% incorrectly as being normal; ADA criteria labeled 32% correctly, 50% incorrectly as having prediabetes, and 18% incorrectly as being normal; and VA/DoD criteria labeled 12% correctly, 71% incorrectly as having prediabetes, and 18% incorrectly as being normal.

In patients with prediabetes by OGTT criteria, HbA_{1c} classification by IEC criteria labeled 36% correctly, 6% incorrectly as having diabetes, and 59% incorrectly as being normal; ADA criteria labeled 61% correctly, 6% incorrectly as having diabetes, and 33% incorrectly as being normal; and VA/DoD criteria labeled 66% correctly, 1% incorrectly as having diabetes, and 33% incorrectly as being normal.

The prevalence of diabetes increased in a stepwise fashion with increasing BMI, from 1.5% among those with a normal BMI (18.5-24.9) to 15% among those who met criteria for class III obesity (BMI more than 40). "For every 1 unit increase in BMI, we observed a 10% increase in the odds of having diabetes," she said.

Ms. Jackson also reported that with the IEC, ADA, and VA/DoD cutoffs for diabetes, screening with HbA_{1c} was specific but insensitive, with a false-negative rate of 68% at the 6.5% cutoff and a false-negative rate of 89% at the 7.0% cutoff. ■

Early Carotid Thickening Seen in Type 1 Diabetes

BY DOUG BRUNK

FROM THE ANNUAL SCIENTIFIC SESSIONS OF THE AMERICAN DIABETES ASSOCIATION

SAN DIEGO – Adolescents and young adults with type 1 diabetes have thicker and stiffer carotid arteries, compared with their healthy peers, results from a multicenter study showed.

"Type 1 diabetes has an adverse effect on carotid thickness and stiffness, and we can measure this by the time patients reach young adulthood," Dr. Elaine M. Urbina said at the meeting. "It's independent of demographics, lipids, and blood pressure, but may be influenced by adiposity. We need to control risk factors, especially obesity, in these adolescents and young adults to improve cardiovascular outcomes in type 1 diabetes."

As part of the SEARCH CVD study, a collaboration between investigators at the University of Colorado at Denver, the Colorado School of Public Health in Aurora, and Cincinnati Children's Hospital Medical Center, Dr. Urbina and her associates set out to examine whether type 1 diabetes has a measurable effect on carotid arteries in adolescents and young adults. They studied 162 people aged 13-26 years, collecting data on demographics, anthropometrics, blood pressure, fasting lipid and hemoglobin A_{1c} levels, and carotid ultrasound to measure the common, bulb, and internal carotid intima-media thickness (cIMT).

Of the 162 study participants, 127 (78%) had type 1 diabetes and 35 were healthy controls who attended clinics at the two locations, said Dr. Urbina, director of preventive cardiology at Cincinnati Children's Hospital. Their mean age was 20 years, 51% were male, 81% were white, and their mean duration of diabetes was 10 years.

Dr. Urbina reported that there were significantly higher proportions of males and whites among cases, compared with controls (55% vs. 34% and 90% vs. 50%, respectively), but there were no significant differences between the two groups in anthropometric or lipid values.

After adjustment for age, sex, race, mean arterial pressure by mercury sphygmomanometry, and lipids, patients with type 1 diabetes had a significantly thicker internal cIMT, compared with controls (mean, 0.56 mm vs. 0.50 mm, respectively), with a trend for a thicker common cIMT (mean, 0.63 mm vs. 0.60 mm). Bulb cIMT was the same in both groups (mean, 0.61 mm).

Patients with type 1 diabetes also had significantly stiffer carotids, compared with controls (mean PEM, 193 vs. 169 mm Hg, respectively; mean YEM, 204 vs. 182 mm Hg/mm; mean Einc, 963 vs. 862 mm Hg).

After adjustment for body mass index, there was a trend only for significantly thicker internal cIMT, although PEM remained stiffer for the patients with type 1 diabetes who were at least 20 years old.

SEARCH CVD is funded by the National Institutes of Health and is an ancillary study of the SEARCH for Diabetes in Youth study, funded by the Centers for Disease Control and Prevention and the NIH.

Dr. Urbina had no relevant disclosures. ■