Risk Factors Can Predict Diabetes in Children

BY HEIDI SPLETE

Several office-based pediatric measures, including body mass index and systolic and diastolic blood pressure, were significant predictors of type 2 diabetes in adulthood, based on data from a pair of follow-up studies including nearly 2,000 school-aged children.

The ability to identify children who are on the path to adult type 2 diabetes may give physicians an opportunity to intervene with diet and exercise recommendations, said John A. Morrison, Ph.D., of Cincinnati Children's Hospital Medical Center.

Dr. Morrison and his colleagues reviewed data from two prospective studies. The National Growth and Health Study (NGHS) included 1,067 girls with a mean age of 10 years who were reassessed at a mean age of 19 years. The NGHS measured body mass index (BMI); systolic and diastolic blood pressure; waist circumference; HDL cholesterol, fasting insulin, glucose, and lipid profiles; and parental diabetes.

The second study, the Princeton Follow-Up Study (PFS), included 822 boys and girls 6-18 years (mean age, 12 years) who were reassessed at a mean age of 39 years. The PFS measured BMI, systolic and diastolic blood pressure, parental diabetes, triglycerides, HDL cholesterol, and fasting glucose.

The ability to identify children on the path to type 2 diabetes may provide an opportunity to intervene.

DR. MORRISON

The final analysis included data from 80% of the girls in the NGHS and 53% of the children in the PFS (Arch. Pediatr. Adolesc. Med. 2010;164:53-60).

After cases of diabetes were excluded at study entry, the incidence of diabetes at age 39 years in the PFS was 5%. The incidence was higher in black women than white women (10% vs. 4%) and higher in black men than white men (5% vs. 3%). In the NGHS, diabetes incidence after 9 years was 1.2% in black women and 0.2% in white women.

In the PFS, childhood systolic blood pressure, BMI in the top fifth percentile, and black race were significant predictors of type 2 diabetes at 39 years of age. Conversely, if childhood BMI, systolic blood pressure, and diastolic blood pressure all fell below the 75th percentile, the chance of type 2 diabetes at 39 years of age was 2% if the parents had diabetes and 1% if they did not.

In the PFS, "simple office and laboratory measurements and knowledge of parental diabetes usefully predicted" the development of type 2 diabetes 22-30 years later, the researchers wrote.

In the NGHS, childhood systolic blood pressure in the top fifth percentile and parental diabetes were significant predictors of type 2 diabetes at age 19 years. If childhood BMI, systolic blood pressure, and diastolic blood pressure all fell below the 75th percentile, the chance of type 2 diabetes at 19 years of age was 0.2% whether the parents had diabetes or not, and 0.3% if childhood insulin also was below the 75th percentile. ■

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ADA Officially Endorses HbA_{1c} for Diagnosis of Diabetes

BY MIRIAM E. TUCKER

The American Diabetes Association has officially endorsed the use of hemoglobin A_{1c} as an option for diagnosing diabetes.

In its Standards of Medical Care in Diabetes, updated annually, the ADA for the first time in 2010 is officially endorsing the use of HbA_{1c} as one of four options for diagnosing diabetes, with a cut-point of 6.5% or greater. Recommendations for use of the three previous diagnostic criteria remain unchanged, including a fasting plasma glucose (FPG) of 126 mg/dL or above, a 2-hour plasma glucose of 200 mg/dL or greater following a 75-g oral glucose tolerance test, or a random plasma glucose of 200 mg/dL or greater in an individual with classic symptoms of hyperglycemia (Diabetes Care 2010[suppl 1]:S11-61 [doi: 10.2337/dc10-S011]).

'Unfortunately, the ADA kept the glucose criteria,' so some people may be diabetic by one criterion but not the other.

DR. DAVIDSON

In June 2009, the use of HbA_{1c} for diabetes diagnosis was endorsed in a consensus statement by an expert panel comprising members of the American Diabetes Association, the European Association for the Study of Diabetes, and the International Diabetes Federation. However, that statement was not the official position of the respective organizations (Diabetes Care 2009;32:1327-34).

The new ADA endorsement is based in part on the fact that HbA_{1c} assays are now highly standardized, and "their results can be uniformly applied both temporally and across populations." In addition, epidemiologic data show a relation between HbA_{1c} and the risk of retinopathy similar to that shown for corresponding FPG and 2-hour postprandial glucose thresholds. The HbA_{1c} is also more convenient since fasting is not required, and is likely to be more stable than glucose measurements, the statement said.

The ADA acknowledged that these advantages must be balanced by greater cost, limited availability of HbA_{1c} in some parts of the developing world, and incomplete correlation between HbA_{1c} and the average glucose in certain individuals. Also, the HbA_{1c} can be misleading in patients with certain forms of anemia and hemoglobinopathies. Indeed, unpublished data suggest that use of the HbA_{1c} with a cutoff of 6.5% or higher identifies one-third fewer cases of undiagnosed diabetes than does a FPG of 126 mg/dL or greater.

However, the ADA said, "in practice, a large portion of the diabetic population remains unaware of their condition. Thus, the lower sensitivity of A_{1c} at the designated cut-point may well be offset by the test's greater practicality, and wider application of a more convenient test (A_{1c}) may actually increase the number of diagnoses made." (See sidebar for diagnostic criteria.)

Not everyone agrees. Dr. Zachary T. Bloomgarden of Mount Sinai School of Medicine, New York, said in an interview that while it may be appropriate to use HbA_{1c} as a screening tool to determine who would then be asked to return for an oral glucose tolerance test, using it for diagnosis is not appropriate because it could lead to overdiagnosis among people with high hemoglobin glycation, or "high glycators," and underdiagnosis of "low glycators."

The ADA's decision to endorse the HbA_{1c} as a diagnostic tool is "overall, not to my mind satisfactory," said Dr. Bloomgarden, editor of the Journal of Diabetes.

But Dr. Mayer Davidson, who was part of the expert panel that endorsed HbA_{1c} for diagnosing diabetes last summer, is on the opposite end of the spectrum. He said the recommendation to use HbA_{1c} for diabetes diagnosis is long overdue.

"Unfortunately, the ADA kept the glucose criteria, which will lead to the confusing situation of people who have diabetes by one criterion but not by the other when both are measured, which is likely to occur frequently," said Dr. Davidson, professor of medicine, Charles Drew University and David Geffen School of Medicine at the University of California, Los Angeles.

Based on the expert committee's deliberations, it's likely that the ADA and the other organizations will ultimately transition to use of HbA_{1c} alone for diagnosis, but it may take time. Until then, he advised that physicians who want to use repeat testing for diagnosis stick to the same test both times to avoid confusion. Bottom line: "One should not intermingle the glucose and A_{1c} criteria."

The ADA document says that using the same test is "preferred" but provides specific guidance for both testing scenarios.

Along with the 6.5% cutoff for diabetes diagnosis, the ADA now categorizes patients with HbA_{1c} levels of 5.7%-6.4% under the new heading "Categories of Increased Risk for Diabetes," replacing "Diagnosis of Pre-Diabetes."

The 5.7% threshold was derived from unpublished data suggesting that it has the best combination of sensitivity (39%) and specificity (91%) to identify cases of impaired fasting glucose. Other analyses suggest that an HbA_{1c} of 5.7% is associated with a diabetes risk similar to that of the high-risk participants in the landmark Diabetes Prevention Program trial.

Other significant changes from the ADA's 2009 Standards of Medical Care include the following:

► The section "Antiplatelet agents" has been extensively revised to reflect recent trial data that call into question the benefit of aspirin for primary cardiovascular disease prevention in moderate- or low-risk patients.

► The section "Retinopathy screening and treatment" has been updated to include a recommendation on use of fundus photography as a screening strategy.

► The section "Diabetes care in the hospital" has been extensively revised to reflect new evidence calling into question very tight glycemic control goals in critically ill patients.

Both Dr. Bloomgarden and Dr. Davidson stated that they have no financial disclosures. ■

The Diagnostic Criteria in Brief

1. Hemoglobin A_{1c} 6.5% or greater.*
OR
2. FPG 126 mg/dL or greater (fasting is defined as no caloric intake for at least 8 hours).*
OR
3. Two-hour plasma glucose of 200 mg/dL or greater during an oral glucose tolerance test.*
OR
4. In a patient with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose of 200 mg/dL or greater.

*In the absence of unequivocal hyperglycemia, criteria 1-3 should be confirmed by repeat testing.

Source: Diabetes Care 2010 (doi: 10.2337/dc10-S011)