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Diabetes Management: Glycated Hemoglobin Testing (HbA1c)

Background

Monitoring blood glucose control, as performed by patients and health care providers, is considered the cornerstone of diabetes care.¹ The Diabetes Control and Complications Trial (DCCT), a ten year landmark study, demonstrated unequivocally that maintaining near-normal blood glucose levels significantly lowers a person's risk of developing complications related to diabetes.² Monitoring blood glucose control includes several different components: blood glucose testing, urine ketone testing and glycated hemoglobin testing (hemoglobin A1c, glycosylated hemoglobin).¹

Glycated Hemoglobin Testing – A Test with a Memory

Glycated hemoglobin, also known as glycohemoglobin, glycosylated hemoglobin, HbA1c or HbA1, refers to a series of stable hemoglobin components formed by the combination of glucose and hemoglobin.¹ Individuals with higher levels of blood glucose will have higher levels of glycated hemoglobin. Because the hemoglobin components are stable, the level provides an average indication of the overall blood glucose levels over the prior two to three month period. The most commonly used version of the glycated hemoglobin test is the HbA1c.

Maintaining a Lower Glycated Hemoglobin Prevents Complications of Diabetes

The DCCT found that an average HbA1c level of 7.2% resulted in a 76% reduction in retinopathy, a 60% reduction in neuropathy, a 50% reduction in kidney disease and a 35% reduction in cardiovascular disease.^{2, 3}

Just Knowing the Glycated Hemoglobin Level Improves Glycemic Control

A randomized study found that when health care providers and patients are informed about the glycated hemoglobin results, blood glucose control improved. The greater the HbA1c at baseline, the greater the decline in the study. Simply knowing the results improves glycemic control, either through improved efforts by the patient or the provider.⁴

Measuring and Interpreting Glycated Hemoglobin

Glycated hemoglobin is a simple blood test that can be taken any time of day without regard to food intake or blood glucose at the time of testing.

Unfortunately, laboratory test procedures for glycated hemoglobin and consequent test results vary from lab to lab. Efforts to standardize this testing are currently underway.

Labs should report the normal non-diabetic range for their assay. The recommended goal for HbA1c levels is less than 7% (or 1% above the upper limit of normal.) For example, if the non-diabetic range is 4-6%, then the goal of therapy for a person with diabetes would be 7%, and at levels consistently greater than 8% the treatment regime should be re-evaluated.²

How Often Should Glycated Hemoglobin be Measured?

All patients with diabetes mellitus should have glycated hemoglobin tests performed routinely. Because the results reflect the level of control over the previous 2-3 months, measurement approximately every 3 months is required to determine whether or not blood glucose control is improving. For any individual patient, the frequency of testing depends on the treatment regimen employed and the judgement of the clinician. Expert opinion recommends that glycated hemoglobin be measured at least twice a year in patients who are meeting treatment goals and more frequently for those whose therapy is changing.²

Alaska Data

Data on Alaska populations find that, with the exception of patients being treated by the Indian Health Service Diabetes Programs, few people with diabetes are getting glycated hemoglobin measurements or are being informed about the results.

Data Source	Definition	Result
Alaska BRFSS (adult population; 1995-96) ⁵	% of people with diabetes who had heard of HbA1c	33%
Medicaid (1995-97) ⁶	% of people with diabetes with a claims record for HbA1c at least once in 3 yr period	22%
Indian Health Service Diabetes Programs, 1997 ⁷	% of people with diabetes with HbA1c found on chart review during prior year	60-92%

Summary – Recommendations

Improvement is needed in the utilization of glycated hemoglobin testing among most Alaskans with diabetes. Glycated hemoglobin tests should be obtained routinely in all persons with diabetes, first to document the degree of blood glucose control at the time of diagnosis and then as part of continuing care. Subsequent measurements are recommended at least every 6 months in stable patients, and approximately every three months among others.

References

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