HbA1c for Diabetes Diagnosis

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HbA1c (also known as glycated haemoglobin), since late 1970s, and currently is being used to measure how well your diabetes is managed, and to assess how your diet has controlled during a period of three months.

Haemoglobin in the red cell is a protein. Glucose floating in the blood serum tends to adhere to haemoglobin within the red cells and measures the percentage of glycated haemoglobin, or A1c in the blood. Haemoglobin in red cells carries oxygen in the blood. When blood sugar is too high it combines with haemoglobin. To check whether you are a pre-diabetic or full blown diabetic the standard tests performed by the doctors up to now are-

Presently, and in the past many blood tests were done to diagnose diabetes: Testing your glucose level at home with your monitor measures the blood sugar at a given moment, the A1c test indicates the average for over past few months.

- Fasting blood sugar in non-diabetic subjects would vary from- 70mg/dl to 99mg/dl (4.0m.mol to 5.5m.mol), and considered as within normal range.

Diabetes patients may have higher ranges varying from 100mg/dl to 126mg/dl. These ranges also indicate an increased risk of developing full blown diabetes. This range is also labelled as *Pre-diabetes.*

Fasting blood sugar test may expose problems with insulin functioning.

Prolonged fasting triggers a hormone called *glucagon,* which is produced by the pancreas. It causes the liver to release glucose (blood sugar) into the bloodstream. If a person doesn't have diabetes, his or her body reacts by producing insulin, which prevents hyper-glycaemia (high blood sugar). However, if one's body cannot generate enough insulin or cannot appropriately respond to insulin, fasting blood sugar levels will stay high as in non-treated diabetes.

Some of you may wonder why the fasting blood sugar changes to a higher level without having breakfast, when tested late in the mornings. This increase glucose in the blood is produced from *glucagon*. So always check your overnight fasting (12 hrs) level at about 6am. Tests done for fasting sugar level later during the day will confuse you. Production of sugar through the hormone glucagon is a natural phenomenon in the natural "survival kit", to compensation when marooned on an island, or lost in the jungle, with no food.

- Postprandial blood sugar (value depends on the quantity of carbohydrates consumed two hours prior)

- Random blood sugar (non-diabetics record less than 180mg/dl -10m.mol). In Diabetes the level rise above this value due to lack of insulin or insulin resistance, when not stabilised with medication.

- Glucose tolerance test. This is a nuisance test done only for confirmation of diabetes.

- Fructosamine Test-This is a test similar to A1c test on the blood. It also used to measure overall blood glucose levels. The difference is that the fructosamine test measures levels over a period of two to three weeks, rather than two to three months as with A1c test.

The fructosamine test is a blood test, like the A1c, except that it measures glycated protein in the blood instead of glycated hemoglobin. Sugar molecules that are present in your blood stick to proteins. These proteins circulate in your bloodstream for 14 to 21 days, so measuring them gives a picture of the amount of sugar in your blood for that time period.

Your doctor might order a fructosamine test if you've had a recent change in your medications or insulin, so he can monitor the effectiveness of the new treatments.

The current tend is to bypass all these tests and do the HbA1c test to diagnose diabetes , in addition to using the test to assess the control of blood glucose, over the previous three months period.

Patients do not need to fast before the test is given, and it is far less likely to identify clinically irrelevant fluctuations in blood sugar because it measures average blood glucose levels over several months.

The new guidelines do not call for replacing traditional screening with the A1C test

The A1C test may help identify a large number of people who go undiagnosed and also detect the early pre-diabetics, says former ADA president for medicine and science John Buse, MD, PhD. Buse, who is chief of endocrinology at the University of North Carolina, Chapel Hill, helped draft the new American Diabetes Association (ADA) diabetes care guidelines, which were made public recently.

"We now know that early diagnosis and treatment can have a huge impact on outcomes by preventing the complications commonly seen when diabetes is not well controlled," he says. "Our hope is that people with early or prediabetes that might otherwise not be tested would have the A1C test."

Under the new recommendations, people with A1c levels about 5% are considered non-diabetes: between 5.7% and 6.4% will be considered to have prediabetes and those with levels of 6.5% or higher will be considered to have diabetes.

The American Diabetes Association (ADA) recommends an A1c target of less than or equal to 7%. The American Association of Clinical Endocrinologists recommends a level of 6.5% or below.

The National Institutes of Health (NIH) says that, in general, every percentage point drop in an A1C blood test results (e.g., from 8% to 7%) reduces the risk of eye, kidney and nerve disease by 40%.

Please do not get confused. HbA1c test is now recommended to diagnose diabetes, also.

You still need to do your glucose testing with your glucometer to check whether you are taking correct maintenance doses, of your tablets and or insulin injections.A1c test does not replace self-testing of blood glucose.

This is an update to my previous article on," Ways to maintain a normal glucose level in diabetes."