Diabetes (Diabetes Mellitus)

Hemoglobin A1c

Self testing of blood sugar (glucose) at home is an important part of controlling blood sugar for people with diabetes. The goal of diabetes treatment is to keep morning blood sugar levels between 80 to 120 mg/dl and anytime 2 hours after eating less than 140 mg/dl.

Blood sugar levels are usually tested before and after meals, and at bedtime.

The blood sugar level is typically determined by pricking a fingertip with a lancing device and applying the blood to a glucose meter, which reads the value.

There are a variety of meters on the market, for example: the Accu-Check Advantage, One Touch Ultra, Sure Step and Freestyle. Each meter has advantages and disadvantages (some use less blood, some have a larger digital readout, some take a shorter time to give you results, etc).

The blood sugar level results can then be used to help you make adjustments in your medications, diets, and physical activities.

Often blood sugar levels vary throughout the day and night and may be higher or lower than the blood sugar levels obtained during self testing and not representing a clear picture of your average blood sugar control.

The hemoglobin A1C test is a blood test that measures the average blood sugar level for the previous 3 months.

What is a hemoglobin A1c (A1c)?

The hemoglobin A1c is a blood test that measures how much sugar is attached to the red blood cells. If the blood sugar level is high and remains high…more sugar is attached to the red blood cells.

Red blood cells last for about 3 months, therefore a hemoglobin A1c level can determine how much sugar has attached to the red blood cells over the previous 3 months. After 3 months, red blood cells die and replace themselves with new ones.

A hemoglobin A1c level can be done every three months to determine your blood sugar control.

A hemoglobin A1c of 7% or less = diabetes well controlled
A hemoglobin A1c greater than 7% = diabetes poorly controlled

Measuring a hemoglobin A1c is a more accurate way to determine blood sugar levels control over the last three months.
There is a correlation between A1c levels and average blood sugar levels as follows:

<table>
<thead>
<tr>
<th>A1c(%)</th>
<th>Mean blood sugar (mg/dl)</th>
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<tbody>
<tr>
<td>6</td>
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The American Diabetes Association currently recommends an A1c goal of less than 7.0%, while other groups such as the American Association of Clinical Endocrinologists recommend a goal of less than 6.5%.

**A hemoglobin A1c less than 7% protects blood vessels and nerves.**

A hemoglobin A1c greater than 7% increases the risk of damage to the small and large blood vessels and nerves throughout the body including the brain, eyes, heart, kidneys, sexual organs, legs and feet.

Of interest, studies have shown that there is a 10% decrease in relative risk for every 1% reduction in A1c. So, if you start off with a hemoglobin A1c of 10.7 and drops to 8.2, though there are not yet at goal, you have managed to decrease your risk of microvascular (small blood vessel damage) complications by about 20%. The closer to normal the hemoglobin A1c, the lower the absolute risk for microvascular complications.

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