



## After-Meal Glucose Monitoring: Something to Chew On

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Regular readers of this column in *Diabetes In Control* know that I'm pretty much a one-trick pony when it comes to diabetes. "Control is King" is my motto, and helping you to get there quickly and safely is what this is all about. Several studies performed in both type 1 and type 2 diabetes have shown that tight glucose control is the best way to avoid serious complications of diabetes like blindness and irreversible damage to kidneys and nerves. Virtually all of the many recommendations that doctors give to patients relate to the goal of reducing blood sugar levels to as normal as possible; from diet and exercise to oral drugs and insulin, it's all about the glucose. Because blood sugar levels can vary dramatically over the course of a day, physicians put a lot of stock into a test called the hemoglobin A1c, which provides an average of the blood sugar over the preceding three to four months.

One situation where diabetic control is taken super-seriously is during pregnancy. Lower hemoglobin A1c levels have been associated with much better outcomes than are seen in uncontrolled diabetes, including reductions in the rates of miscarriage and birth defects. This relationship between glucose control and safer pregnancy has been known for a long time, but in 1995 a study was published that showed the way to making this easier for many women. Instead of focusing on blood sugar levels before eating, like most diabetics, this study asked women to test themselves one hour after meals, and to change their insulin based on those post-meal numbers. Lo and behold, the women who followed this course of action (as opposed to traditional pre-meal testing) had better glucose control and healthier babies. Perhaps not surprisingly, this study changed the way pregnant diabetics are managed almost overnight.

This result got a lot of people thinking: if after-meal (called "post-prandial" in medical parlance) monitoring works so well in pregnancy, perhaps it might be the way to go in non-pregnant people as well. There has been considerable debate about this in the ensuing six years, but very little good data to help guide physicians and patients. Some information may now be coming to light, but before looking at it, let's take a step back and consider some basic physiology and pharmacology in diabetes.

When people talk about blood sugars, they usually refer to fasting blood glucose. Many studies have shown that controlling fasting blood sugars leads to a reduction in hemoglobin A1c, and it makes intuitive sense to people that a diabetic ought to have a near-normal sugar at times when sugar is normally lowest.

Many drugs, including long-acting insulin (eg. NPH) and metformin (Glucophage™), do their best work between meals. Post-prandial sugars, on the other hand, rise after meals, and then return to lower levels a few hours later. An abnormal rise in post-prandial glucose may be one of the earliest signs of diabetes, and drugs like acarbose (Precose™), miglitol (Glyset™), and rapid-acting insulin lispro (Humalog™) work best in this time frame.

The question we're interested in, of course, is which numbers are more important in determining the hemoglobin A1c level? Is it the fasting and pre-meal levels or is it the post-prandial glucose level? A few older studies failed to shed much light, but new data may be accumulating that post-prandial may be the way to go. In the most recent study, patients were taking a sulfonylurea that did not adequately control their blood sugars. Researchers then added either bedtime NPH insulin to decrease fasting blood glucose, Glucophage™ to lower pre-meal glucose levels, or Humalog™ to reduce post-prandial levels. The lowest hemoglobin A1c levels were seen in the group receiving Humalog™, despite the fact that they had much higher fasting blood sugars than the other two groups.

This was a small study, and much larger groups of patients will need to be examined to see if these trends hold up. It also remains to be seen if controlling post-prandial blood sugars will lead to reductions in the things that matter most, i.e. diabetic complications. For the record, the American Diabetes Association released a Consensus Statement earlier this year declaring that evidence was insufficient to recommend the exclusive adoption of post-prandial glucose measurements for non-pregnant diabetics. Still, all physicians who treat diabetes have seen patients with near-perfect fasting and pre-meal blood sugars but lousy hemoglobin A1c values. For such patients, it might be reasonable to try a course of post-prandial monitoring, and perhaps a little rapid-acting insulin to go with that after-dinner mint.

#### References

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