

Research says Diabetics Most at Risk from Neglected Post Meal Sugar Peak

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Christmas time is full of food when most of us simply have to worry about our expanding waist lines but new research led by the University of Warwick's Medical School says that people with diabetes need to pay attention to the dangers of a neglected post meal peak in blood glucose. Indeed the research shows that this post meal peak can do even more damage than a more sustained rise in blood sugar.

Until recently, the main focus of therapy for people with diabetes has been on lowering blood sugar or glycated haemoglobin (HbA1c) levels, with a strong emphasis on fasting plasma glucose. People with diabetes are now extremely proficient at maintaining the best overall blood glucose levels. However this new study shows that that is insufficient in itself to obtain optimal glycaemic control.

The research report entitled "Guideline for management of Postmeal Glucose" was carried out for The International Diabetes Federation by an international panel of diabetes specialists chaired by Professor Antonio Ceriello of Warwick Medical School at the University of Warwick.

The Warwick Medical School researchers looked at a range of studies that examined in particular the two hour post meal peak in blood sugars and found a substantial body of evidence that reducing postmeal plasma glucose is as important, perhaps even more important for achieving overall optimum HbA1c levels.

Postmeal plasma glucose levels seldom rise above 7.8 mmol/l (minimoles per litre) in people with normal glucose tolerance and typically return to normal levels two to three hours after food ingestion. Therefore it would be best to ensure that the two-hour postmeal plasma glucose levels in people with diabetes should also not exceed 7.8 mmol/l as long as hypoglycaemia is avoided.

However the Warwick Medical School researchers found a number of studies in which this was not the case. In one cross-sectional study of 443 individuals with type 2 diabetes, 71% of those studied had a mean two hour post meal plasma glucose of greater than 14 mmol/l. Another study looking at daily plasma glucose profiles from 3,284 people with non-insulin-treated type 2 diabetes showed that post meal plasma glucose values of greater than 8.9 mmol (160 mg/dl) were recorded at least once in 84% of those studied.

The researchers also found a number of studies that suggested that the intensity of these post meal blood sugar peaks (and the obvious increased variability they bring to people's glucose levels) can sometimes do even more damage than sustained high blood sugar levels.

Numerous studies support the hypothesis of a causal relationship between hyperglycaemia and oxidative stress leading to vasoconstriction (a narrowing of the blood vessels) and thus high blood pressure. Acute glycaemic variability appear to play particular important roles in this mechanism. One study examined human umbilical vein endothelial cells that were subjected in cell culture to steady state and alternating glucose concentrations which found that variability in glucose levels may be more damaging than a constant high concentration of glucose.

Other studies examined by the research team included: a study that showed the post meal peak increased the risk of atherosclerosis is (chronic inflammation in the walls of arteries), a study from Japan that

demonstrated that postmeal hyperglycaemia is a better predictor of diabetic retinopathy (non-inflammatory damage to the retina of the eye) than HbA1c, a study linking it to increased damage to cells that line the inner surface of all blood vessels, research linking it to diabetes related kidney disease, pancreatic cancer, and much more.

The research noted a number of effective dietary and pharmaceutical methods were available to effectively target the problem of postmeal plasma glucose and said that self-monitoring of blood glucose (SMBG) was the best and most practical method for monitoring postmeal glycaemia. SMBG allows people with diabetes to obtain and use information about "real-time" plasma glucose levels. This facilitates timely intervention to achieve and maintain near-normal glycaemia and provides feedback to people with diabetes. Most diabetes organizations and other medical associations advocate use of SMBG in people with diabetes.

The researchers also concluded that a two-hour timeframe for measurement of plasma glucose concentrations was the safest for people treated with insulin. This was because testing any earlier than that could cause people to respond inappropriately to, for instance, elevated one-hour plasma glucose levels with additional insulin without waiting for their initial intake of insulin to take full effect. This can lead to a problem is often referred to as "insulin stacking," and can lead to severe hypoglycaemia.

The research also pointed to the benefits of the emerging technology of Continuous glucose monitoring to help self monitoring people with diabetes keep track of this post meal peak.

CGM employs a sensor to measure glucose every 1 to 10 minutes and transmits this reading to a data storage device. Results can be either downloaded to a doctor, or displayed in "real time" in the monitor.

The full report is available as a pdf here:

www.idf.org/webdata/docs/Guideline_PMG_final.pdf

Source: University of Warwick

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