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The Link Between Hypoglycemia and Cardiac Arrhythmias: An Answer to Why Tight Glycemic Control May Increase Mortality in People with Diabetes and a Possible Explanation for the “Dead in Bed” Syndrome for People with Type 1?

-- Overnight low blood glucose levels often undetected in people with advanced type 2 --

Alexandria, VA (April 22, 2014) – In 2008, part of a government-funded clinical trial that examined whether tight glycemic control could reduce cardiovascular events in people with type 2 diabetes was terminated early when a higher than expected number of patients died – though researchers were uncertain what caused the deaths. Now, a separate study by researchers in the United Kingdom being published in the May issue of the journal *Diabetes* suggests the answer may lie in the link between overnight low blood glucose levels and abnormal heart rates that disturb the flow of blood to the heart.

Researchers from the University of Sheffield found that overnight hypoglycemia was associated with increased susceptibility to cardiac arrhythmias in patients with type 2 diabetes who had a history of cardiovascular disease. This population is similar to the subgroup that experienced a higher than expected mortality rate in the Action to Control Cardiovascular Risk in Diabetes (ACCORD) study. Researchers note that these new findings may also shed light on the “dead in bed” syndrome experienced by people with type 1 diabetes, who often experience high rates of nocturnal hypoglycemia that can lead to death.

“We don’t want to alarm the diabetes community, particularly patients” said lead researcher Simon Heller, of the Department of Human Metabolism at the University of Sheffield, United Kingdom. “But what we’ve found is potentially important in explaining a possible mechanism by which hypoglycemia can lead to prolonged, slow heart rates that disturb blood flow to the heart and can result in a lethal cardiovascular event.”

Heller said his team used continuous glucose monitoring and ECGs to track blood glucose levels and heart rates over the course of a week in a group of older patients with type 2 diabetes and a history of cardiovascular disease. While they expected to find some hypoglycemia, they were startled to find how extensively it was occurring overnight and that it was sometimes lasting for several hours. When this occurred, patients also registered prolonged periods of very slow heart rate rhythms.

“Hypoglycemia is not widely reported in patients with type 2 diabetes,” Heller said, though the problem is well documented in patients with type 1 diabetes.

Heller noted that the older patients with type 2 diabetes in his study did not report symptoms of hypoglycemia or arrhythmias and it was only detected because they were being monitored. “In the older group with a known history of cardiovascular disease, this might turn out to be something to be very concerned about,” he said.

While the ACCORD research team has previously ruled out hypoglycemia as a cause of death for patients in their study, Heller said they would likely have been unaware of overnight hypoglycemic events of this type since nobody had known to look for them. He emphasized that further investigation is needed to confirm the mechanism suggested by his group’s findings.

An editorial commentary accompanying the study, by lead author Dr. Simon Fisher of Washington University in Saint Louis, concurs that the issue merits further investigation and consideration when setting blood glucose targets for patients.

“Fortunately, hypoglycemia is only rarely fatal,” the commentary authors wrote. “Nonetheless, given the relatively high incidence of hypoglycemia and associated cardiac arrhythmias in patients observed in this study, along with the increased mortality seen in the ACCORD study, one take-home message for patients and health care providers is that target glycemic goals should be individualized and adjusted to avoid severe hypoglycemia and potentially fatal hypoglycemia-induced arrhythmias.”

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Diabetes publishes original research about the physiology and pathophysiology of diabetes. Published by the American Diabetes Association, it is the leading peer-reviewed journal of basic research into one of the nation’s leading causes of death by disease. Diabetes also is a leading cause of heart disease and stroke, as well as the leading cause of adult blindness, kidney failure, and non-traumatic amputations.

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