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# Dipping blood sugars cause surprisingly irregular heart rhythms in diabetics

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The findings from the research – led by Professor Simon Heller of the University of Sheffield's Department of Human Metabolism and Sheffield Teaching Hospitals NHS Foundation Trust - could offer vital clues to the mechanism by which low blood sugar levels could contribute to life-threatening changes in heart rhythm, a major risk for patients with diabetes.

They also shed important new light on the 'Dead in Bed' syndrome – where young people without any history of long-term complications die suddenly from the disease.

Previous studies have apparently ruled out a direct effect of hypoglycaemia (very low levels of sugar in the blood) as a cause of death in patients with Type 2 diabetes.

Few of the patients taking part in the present study reported symptoms of low blood sugar levels or irregular heartbeats – and they were only detected through continuous glucose monitoring and electrocardiograms used by Sheffield researchers which tracked blood glucose levels and heart rates over a week in a group of older patients with Type 2 diabetes and a history of cardiovascular disease.

The breakthrough research was conducted by Elaine Chow, a specialist registrar at Sheffield Teaching Hospitals and the University of Sheffield under a £190K Biomedical Research Fellowship awarded by the National Institute for Health Research. The findings are being published

in the May issue of *Diabetes*, the journal of the American Association of Diabetes.

Professor Simon Heller, Professor of Clinical Diabetes and Honorary Consultant Physician, Sheffield Teaching Hospitals NHS Foundation Trust, said: "We don't want to alarm patients, but what we've found is potentially important in explaining a possible mechanism by which low overnight blood sugars lead to prolonged, slow heart rates that could disturb blood flow to the heart, causing life-threatening heart attacks.

"While we expected to find some low overnight blood sugars we were startled to find how extensively it was occurring overnight and that it was sometimes lasting for several hours. When this occurred, we also saw evidence of prolonged periods of very slow heart rate rhythms in patients.

"While a cause for concern, these slow heart rates were not associated with any very serious heart rhythm disturbances in the study. But the findings suggest that even those on standard insulin therapy who are not aiming for intensive glucose targets should be aware of the risk of running low sugars overnight, particularly if they have known cardiovascular disease."

Previous research has focused on the effects of high blood sugars on patients with diabetes, so more research was needed to understand how low blood sugars in patients with Type 2 diabetes caused irregular heartbeats, Professor Heller emphasised.

"In an older group with a known history of cardiovascular disease this might turn out to be something to be very concerned about, but further investigation is needed to confirm the link between overnight low blood sugar levels and abnormal heart rates that disturb the flow of blood to the heart. If patients are aware they have low blood sugar levels, they can act

accordingly, perhaps by checking their blood glucose in the middle of the night every now and then and talking with the doctor to change insulin type or the timing of the dose to minimise the risk of prolonged episodes of hypoglycaemia overnight.

"Clinicians responsible for the care of patients using insulin to treat Type 2 diabetes need to be more aware of the potential for prolonged nocturnal episodes of hypoglycaemia at night. They need to check for it and alter therapy to reduce the risk, especially for those who have known history of cardiovascular disease."

Provided by University of Sheffield