

ICU patients with unknown diabetes have more complications during hospital stay

December 11 2015, by Janet Christenbury

Emory researchers have found that patients who do not know they have diabetes when hospitalized in an intensive care unit (ICU) have greater complications during their stay and poorer outcomes than patients without diabetes. Complications include higher blood glucose levels often requiring an insulin drip, more deaths, and discharge to hospice or rehabilitation instead of home.

The findings are published in the online December issue of *Critical Care Medicine*.

Diabetes is a disease in which [blood glucose levels](#) are too high—referred to as hyperglycemia. This occurs when the body has too little insulin or can't use insulin effectively. In [critical care](#) situations, hyperglycemia can result from physiologic stress in [patients](#) with or without [diabetes](#), from alterations in medications in patients with diabetes, or from side effects of newly initiated medications. Hyperglycemia is commonly seen in the ICU, and is associated with an increased number of deaths and infections.

"The main purpose of this study was to identify patients in the ICU with diabetes that neither the care team nor the patient knows about," says Craig Coopersmith, MD, professor of surgery at Emory University School of Medicine and associate director of the Emory Critical Care Center. "Because we are seeing an epidemic of diabetes in the U.S., finding out early if a critically ill patient in the ICU has diabetes may change the course of treatment for that patient. The diagnosis also has

important implications for a patient's long-term health."

Coopersmith is the current president of the Society of Critical Care Medicine, the world's largest multi-professional intensive care organization.

Checking a patient's hemoglobin A1c (HbA1c) through a blood draw is a method to diagnose diabetes in hospitalized patients not previously known to have the disease, according to Coopersmith. Because HbA1c provides a measure of the average glucose concentration over approximately 120 days, it is less affected by acute stress than random blood glucose levels, and should be more accurate than random blood glucose levels in diagnosing patients with unknown diabetes, even in a critically ill patient.

The study enrolled 15,737 patients admitted to an adult ICU within the Emory Critical Care Center between March 1, 2011, and Sept. 30, 2013. At admission to the ICU, or earlier during their hospital stay, researchers administered HbA1c and blood glucose tests to participants.

Diabetes was diagnosed via one of two methods: elevated HbA1c or medical history obtained from electronic medical records. Patients with an HbA1c greater than 6.5 percent were diagnosed as having diabetes. Patients were then placed in one of four groups: unknown diabetes (HbA1c greater than 6.5 percent, without history of diabetes); no diabetes (HbA1c less than 6.5 percent, without history of diabetes); controlled known diabetes (HbA1c less than 6.5 percent, with documented history of diabetes) and uncontrolled known diabetes (HbA1c greater than 6.5 percent, with documented history of diabetes).

The researchers found that 5,635 patients had diabetes—1,460 had unknown diabetes, 2,115 had controlled known diabetes and 2,060 had uncontrolled known diabetes. Patients with unknown diabetes accounted

for 41.5 percent of patients with an HbA1c level greater than 6.5 percent, and 9.3 percent of all ICU patients. HbA1c levels were higher in patients with unknown diabetes and uncontrolled known diabetes than those in patients with no diabetes or controlled known diabetes.

"Patients with unknown diabetes were more likely to have hyperglycemia and hypoglycemia (low blood [glucose levels](#)) than those without diabetes," says David Carpenter, MPAS, physician assistant with the Emory Critical Care Center and lead author on the study. "This population also more likely required an insulin drip, had higher overall mortality and were less likely to be discharged home after their hospitalization."

According to the Centers for Disease Control and Prevention (CDC), seven million people have unknown diabetes. The population of the U.S. is over 321 million people, meaning approximately 2.5 percent of the country has unknown diabetes.

"The prevalence of unknown diabetes identified in the nine ICUs in this study is more than four times higher than national estimates of [undiagnosed diabetes](#) in the general population," says Carpenter. "Furthermore, 25.9 percent of all patients with diabetes admitted to the ICU in this study did not carry the diagnosis, similar to the CDC's estimate that 27 percent of patients with diabetes are unknown."

"Approximately one out of every 10 patients in the ICU doesn't know they have diabetes," says Coopersmith. "Since this risk can be identified at admission by an elevated HbA1c, we believe that monitoring blood glucose more frequently or treating abnormal [blood glucose](#) levels more aggressively in this sizable patient population is key for better outcomes."

During the study, the Emory Critical Care Center was comprised of

eight ICUs totaling 135 beds, and expanded to nine ICUs totaling 147 beds by the end of the study. The ICUs, located at Emory University Hospital and Emory University Hospital Midtown, included two medical ICUs, one surgical/transplant ICU, one surgical ICU, two cardiovascular surgery ICUs, two neurosciences ICUs and one coronary care unit.

More information: David L. Carpenter et al. Prevalence and Impact of Unknown Diabetes in the ICU, *Critical Care Medicine* (2015). [DOI: 10.1097/CCM.0000000000001353](https://doi.org/10.1097/CCM.0000000000001353)

Provided by Emory University

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