Hyperglycemia Predicts COVID-19 Death Even Without Diabetes

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Nearly half of hospitalized COVID-19 patients without a prior diabetes diagnosis have hyperglycemia, and the latter is an independent predictor of mortality at 28 days, new research indicates.

The findings, from a retrospective analysis of 605 patients with COVID-19 seen at two hospitals in Wuhan, China, were published online July 10 in *Diabetologia* by Sufei Wang, of the Department of Respiratory and Critical Care Medicine, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, and colleagues.

Several previous studies have demonstrated a link between hyperglycemia and worse outcomes in COVID-19, and at least one diabetes diagnosis, but this is the first to focus specifically on that group of patients.
Wang and colleagues found that a fasting blood glucose of 7.0 mmol/L (126 mg/dL) or greater on admission — present in 45.6% of those without a prior diabetes diagnosis — was an independent predictor of 28-day mortality. Although A1c data weren't analyzed, the population is believed to include both individuals with pre-existing but undiagnosed diabetes and those without diabetes who have acute "stress hyperglycemia."

"Glycemic testing and control should be recommended for all COVID-19 patients even if they do not have pre-existing diabetes, as most COVID-19 patients are prone to glucose metabolic disorders," they emphasize. "Addressing elevated fasting blood glucose at an early stage can help clinicians better manage the condition and lower the mortality risk of COVID-19 patients," Wang and colleagues note.

Hyperglycemia Predicts COVID-19 Death, Complications

The study involved consecutive patients with COVID-19 and definitive 28-day outcome and fasting blood glucose measurement on admission to two Wuhan-area hospitals between January 24 to February 10, 2020. A total of

605 patients did not have a previous diabetes diagnosis. They were a median age of 59 years and 53.2% were men.

Just over half, 54.4%, had a fasting blood glucose below 6.1 mmol/L (110.0 mg/dL). The rest had dysglycemia: 16.5% had a fasting blood glucose of 6.1-6.9 mmol/L (110-125 mg/dL), considered the prediabetes range, and 29.1% had a fasting blood glucose of 7 mmol/L (126 mg/dL) or above, the cutoff for diabetes.

"These results indicate that our study included both undiagnosed diabetic patients and nondiabetic patients with hyperglycemia caused by an acute blood-glucose disorder," the authors note.

Over 28 days of hospitalization, 18.8% (114) of the patients died and 39.2% developed one or more in-hospital complications.

The authors used the CRB-65 score, which assigns 1 point for each of four indicators — confusion, respiratory rate > 30 breaths/min, systolic blood pressure ≤ 90 mmHg or diastolic blood pressure ≤ 60 mmHg, and age ≥ 65 years — to assess pneumonia severity.

Just over half, 55.2%, had a CRB-65 score of 0, 43.1% had a score of 1-2, and 1.7% had a score of 3-4.

In multivariable analysis, significant independent predictors of 28-day mortality were age (hazard ratio [HR], 1.02), male sex (HR, 1.75), CRB-65 score 1-2 (HR, 2.68), CRB-65 score 3-4 (HR, 5.25), and fasting blood glucose ≥ 7.0 mmol/L (HR, 2.30).

Compared to patients with normal glucose (< 6.1 mmol/L), 28-day mortality was twice as high (HR, 2.06) for those with a fasting blood glucose of 6.1-6.9 mmol/L and more than threefold higher for ≥ 7.0 mmol/L (HR, 3.54). Pneumonia severity also predicted 28-day mortality, with hazard ratios of 4.35 and 13.80 for patients with CRB-65 scores of 1-2 and 3-4, respectively, compared with 0.

Inhospital complications, including acute respiratory distress syndrome or acute cardiac, kidney, or liver injury or cerebrovascular accident, occurred in 14.2%, 7.9%, and 17.0% of those in the lowest to highest fasting blood glucose groups.

Complications were more than twice as common in patients with a fasting blood glucose of 6.1-6.9 mmol/L (HR, 2.61) and fourtimes more common (HR, 3.99) among those with a fasting blood glucose ≥ 7.0 mmol/L compared to those with normoglycemia.

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