Hyperglycemia and Mortality in Over 200,000 Critically Ill Patients

Mercedes Falciglia, MD of the University of Cincinnati presented data from a large database of critically ill patients admitted to intensive care units (ICUs). Data from 216,775 consecutive ICU admissions (September 2002 – March 2005) at 177 surgical and cardiac ICUs from 73 US Veterans Administration (VA) medical centers were analyzed. The analysis was performed using a logistic regression model developed and validated by the VA. In the model, glucose levels of 70-100 mg/dL were considered normal. Mortality risk was calculated using admitting diagnosis, co-morbidities, lab results and age. In a second model, the patient's mean blood glucose level and their mortality risk were calculated.

The most common admitting diagnosis was cardiac (46.8%), followed by gastrointestinal (15.6%) and respiratory (12.0%). The majority of the patients were male (97.4%), and 62,865 (29.0%) had diabetes.

Dr. Falciglia found that risk-adjusted mortality was higher with higher levels of blood glucose. Hyperglycemia was independently associated with mortality regardless of ICU type. The following admitting diagnoses had significant associations with hyperglycemia and mortality: stroke, unstable angina, acute myocardial infarction, pneumonia, gastrointestinal bleed, respiratory failure, sepsis, acute renal failure, congestive heart failure, carotid endarterectomy, and anemia. The greatest effect was seen in those patients with stroke, where hyperglycemia raised the risk of mortality from 3.4 to 15.1. Chronic pulmonary obstructive disease, hepatic failure, diabetic ketoacidosis, gastrointestinal neoplasm, hip fracture, peripheral vascular disease with bypass, and orthopedic issues were not significantly associated with increased mortality with high glucose. For unknown reasons, mortality was greater in hyperglycemic patients that did not have diabetes.

"These findings suggest that different disease states are variably affected by hyperglycemia, with the strongest association in individuals with cardiovascular disorders," said Dr. Falciglia. This information should help researchers focus on the correct populations for future prospective studies. "Since such randomized controlled trials are expensive and difficult to organize, it may be a wise use of resources in future trials to consider disease type and focus on those populations that appear to be at greatest risk," concluded Dr. Falciglia.