Insulin Use Linked With Risk of Falling in Hospitals

BY DOUG BRUNK

SAN DIEGO — Insulin was a surprise among the medications most commonly associated with patient falls in the hospital, results from a large single-center controlled study of 230 patients showed.

"Finding an association between insulin and falls was somewhat surprising and requires further study," said Caroline O'Neil, research coordinator in the infectious diseases division at Washington University in St. Louis. "Previous community studies have found a connection between diabetes and falling. In our study, diabetes was not associated with falling, but use of insulin was. The question is whether insulin is a marker of more severe diabetes, or if these patients have low blood sugars or peripheral neuropathy that is increasing the risk of falling."

Patients who fell were more likely to be taking hydantoins, haloperidol, benzodiazepines, or insulin.

MS. O'NEIL

Patients who fell were more likely than controls who did not fall to be taking hydantoin anticonvulsants (odds ratio 3.6), haloperidol (OR 3.4), benzodiazepines (OR 2.1), or insulin (OR 1.5).

Certain combinations of medications further increased the risk, especially the combination of hydantoins and insulin (OR 11.4), benzodiazepines and haloperidol (OR 5.7), benzodiazepines and hydantoins (OR 5.0), and benzodiazepines and insulin (OR 2.6). The data were presented in poster form at the annual meeting of the Society for Healthcare Epidemiology of America.

The study, which was led by Dr. Victoria J. Fraser, Ms. O'Neil, and her colleagues, evaluated 230 inpatients at the 1,250-bed Barnes Jewish Hospital in St. Louis. The patients were aged 21 years and older and had fallen in the hospital between July 1, 2007, and November 14, 2007; the study also included 690 randomly selected control patients who did not fall and were admitted within 1 day of the index case. Emergency department patients were excluded as were those from physical therapy, obstetrics/gynecology, oncology, and psychiatry units.

They used logistic regression to determine which medications and patient characteristics were risk factors for falls. The mean age of patients who fell was 62 years, 54% were male, and their average length of stay was 12 days.

"This study is among the largest and most detailed analyses of medication and other fall risk factors in the literature to date," the researchers wrote. "Linking medication risk with nursing fall risk assessments may provide a more comprehensive and predictive view of a patient's risk for falls."

Multivariate analysis also showed that the following variables were linked significantly with an increased risk of falls: history of falls within 3 months (OR 3.4), use of an assistive device (OR 3.3), BMI of 18 mg/kg^2 or less (OR 2.4), need for personal assistance to ambulate (OR 2.0), and urinary/stool frequency or incontinence (OR 1.7).

The study was funded by the National Institutes of Health and the Centers for Disease Control and Prevention. Ms. O'Neil said that she had no financial conflicts to disclose. ■

Hyperglycemia Before TPN Portends Poor Outcomes

BY BETSY BATES

Hyperglycemia prior to, and shortly after, initiation of total parenteral nutrition was strongly associated with poor clinical outcomes in critically ill hospitalized patients, whether or not they had a history of diabetes, Emory University researchers determined in a retrospective study.

Patients had an almost threefold risk of dying if their maximum blood glucose before or within 24 hours of beginning total parenteral nutrition (TPN) was more than 180 mg/dL, compared with patients whose maximum blood glucose was less than 120 mg/dL in the same time period.

Many other factors were taken into account for the statistical analysis, including age, sex, and diabetes status, Dr. Guillermo E. Umpierrez, professor of medicine at Emory University, Atlanta, said at the Southern regional meeting of the American Federation for Medical Research.

He described hyperglycemia as a common complication of TPN, but said its prevalence and impact on clinical outcomes have been uncertain.

Dr. Umpierrez and his associates reviewed the records of 276 medical/surgery patients who required TPN a mean 11 days after admission. The majority came from surgical or medical intensive care units or the burn unit, but nearly 25% came from non-ICU floors. Twenty-three percent had a history of diabetes.

Patients received TPN for a mean duration of 15 days. In-hospital mortality was 27% (75 patients).

Patients who died had a higher maximum blood glucose before initiation of TPN (mean 147 mg/dL) than those who survived (mean 131 mg/dL), as well as a higher maximum blood glucose reading within 24 hours of TPN initiation (mean 202 mg/dL, compared with mean 160 mg/dL). The differences in blood glucose were highly statistically significant at both time points.

A multivariate analysis found that not only mortality but the risk of pneumonia and acute renal failure were independently related to maximum blood glucose levels of greater than 180 mg/dL versus mean blood glucose levels of less than 120 mg/dL.

In a later interview, Dr. Umpierrez said that pre-TPN blood glucose levels could alert medical teams to the possibility of TPN-related hyperglycemia, allowing for anticipatory management.

"Hospitalists should pay attention to blood glucose levels, not only in those receiving TPN but in patients with hyperglycemia before TPN," Dr. Umpierrez said. "Frequent blood glucose monitoring is needed to prevent and/or correct hyperglycemia."

At his institution, the findings prompted a change in protocol to initiate insulin infusion as TPN is begun or to start insulin infusion in patients on TPN whose blood glucose is "persistently elevated," which he defined as a level over 140 mg/dL.

Dr. Umpierrez' research is supported by grants from the American Diabetes Association and the National Institutes of Health. ■

Inpatient Education Tied to Glucose Control in Adolescents

BY BETSY BATES

LOS ANGELES — Adolescents newly diagnosed with type 2 diabetes rapidly achieved an improvement in their glycemic control, but they tended to backslide within about a year in a longitudinal study conducted at Indiana University.

Key factors associated with better glycemic control throughout the first 2 years of follow-up included:

- Initial treatment with insulin rather than an oral hypoglycemic agent.
- Inpatient, rather than outpatient, education at diagnosis.
- More frequent follow-up visits.

An estimated 39,000 U.S. adolescents now have type 2 diabetes, and another 2.8 million have impaired fasting glucose.

The best initial management strategy for these youth "remains unclear," Dr. Paul S. Kim said at the annual meeting of the Society for Adolescent Medicine. With no randomized clinical trials for guidance, many centers are devising their own protocols based on what is known about newly diagnosed type 2 diabetes in adults.

To better delineate what factors might be important in establishing early glucose control and good habits in adolescents, Dr. Kim and his associates analyzed 13 years' worth of medical records for patients diagnosed with type 2 diabetes before the age of 21.

Among 154 cases identified, 72% were female. The average age at diagnosis was 13 years, said Dr. Kim, a fellow in adolescent medicine at the medical school and Riley Children's Hospital in Indianapolis.

Equal percentages of the cohort were African American and white, at 46% each, with the remaining patients representing other racial/ethnic groups.

Their mean BMI was 36.4 kg/m^2, and their mean HbA_{1c} value was 9%.

Nearly 60% received inpatient education at Riley Children's Hospital, while others received outpatient education at Riley Children's or education (in- or outpatient) at other institutions.

Among patient records that contained details about initial management, treatment strategies varied. Approximately equal percentages of patients began on oral hypoglycemic medication (mostly metformin) only or combination therapy (oral medication and insulin). Some patients received insulin only, and a few initially received only lifestyle modification advice.

Of the total 154 records, 133 (86%) represented patients seen in the Indiana University system for at least two follow-up visits within a mean 2.1 years of follow-up. Only the first eight follow-up visits of these 133 were included in the analysis.

During a mean 5.6 follow-up visits, patients' mean HbA_{1c} values declined from a baseline value of 9% to 6.8% by follow-up visit 3, and then gradually increased to 8% by visit 8, reported Dr. Kim.

"Having inpatient education and insulin treatment at diagnosis was associated with a more rapid decrease in HbA_{1c} levels during [the initial postdiagnosis] time period," he said.

The steady increase in HbA_{1c} values between the third and eighth visits was similarly less pronounced in patients who received inpatient education, insulin at baseline, and shorter intervals between follow-up visits. Slightly more than 20% of patients showed a significant increase in HbA_{1c} during the study period: at least a 1% increase from the lowest value they achieved. A subgroup analysis failed to detect any distinguishing characteristics in these patients.

The dip in glycemic control at about 1 year after diagnosis would not seem to bode well for young people with type 2 diabetes, Dr. Kim said, and may warrant special attention and interventions.

"Perhaps this is because of a decline in motivation," Dr. Kim said. "Therefore, re-education or an intensification of clinical management may be important at that time."

Dr. Kim and his associates reported no relevant financial disclosures. ■