Protocol Reduces Rate of Hypoglycemia Events

BY JOHN R. BELL
Associate Editor

A treatment protocol used at the University of Pittsburgh Medical Center has nearly cut in half the number of severe hypoglycemic events experienced by inpatients with diabetes.

"There was a lack of a standardized approach to the treatment of hypoglycemia in the hospital" before the protocol was developed, according to Dr. Mary T. Korytkowski, professor of medicine in the division of endocrinology at the university and head of the hospital's Diabetes Patient Safety Committee (DPSC), which developed the protocol in 2001.

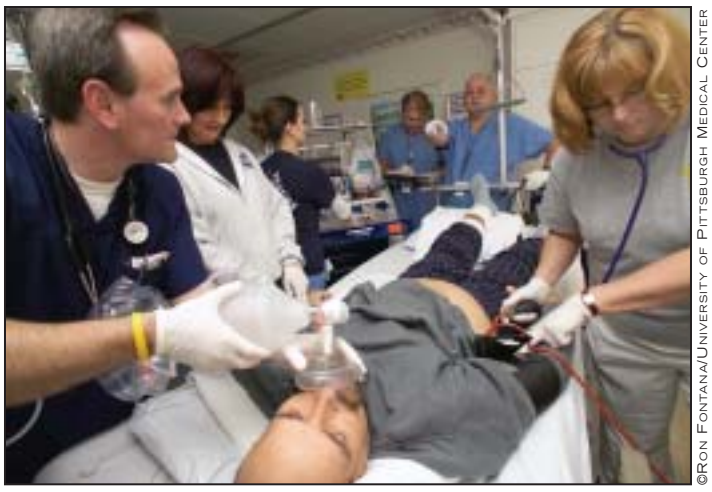
The committee includes physicians, nurses, nutritionists, a patient-safety representative, a quality-improvement specialist, and a pharmacist. It was formed in response to concerns first raised by the hospital's "Condition-C" (for "condition crisis") rapid-response team. A rapid-response team is a specially designated group of nurses and other clinicians who immediately respond to acute patient problems at a hospital.

Rapid responders at UPMC had noticed that some diabetes patients it had treated experienced a change in consciousness, which occurred after their blood glucose level had significantly dropped, Dr. Korytkowski said.

"There was no standard approach for treating low blood sugar," she explained. "Where some nurses might go and get juice for a patient, others might call the physician ... and wait for the physician to respond and prescribe treatment before actually giving something. So there would be a delay, which could take what would be an otherwise mild reaction and have it turn into a more severe reaction."

To prevent severe hypoglycemia episodes and to develop a consistent response to milder cases as well, the DPSC developed the protocol for use when a patient's blood glucose drops below 70 mg/dL (see box).

To see how well the protocol was working, Dr. Korytkowski and her colleagues examined the non–critical care patient data for 1 month in 2001, before implementation of the protocol, and for the same month in 2004, following implementation, counting nadir blood glucose in each 4-hour period to avoid overcounting of events. They found there had been a 48% decrease in severe hypoglycemic events (blood glucose less than 40 mg/dL), a 38% drop in moderate hypoglycemic events (blood glucose 40-49 mg/dL), and an 8% reduction in mild hypoglycemic events (blood glucose 50-69 mg/dL). They observed a 43% decline in combined moderate and severe hypoglycemic events.



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A hospitalwide strategy to aggressively manage hypoglycemia has reduced severe episodes by almost half at UPMC.

Moreover, since the introduction of the hypoglycemia protocol in 2001, the number of hypoglycemic events treated by the hospital's rapid-response team has dropped from a high of 29 episodes per 1,000 patient-days/month to 22 episodes per 1,000 patient-days/month, according to Dr. Korytkowski. She and her colleagues plan to publish these results in the near future.

"It's hard to attribute it directly to the hypoglycemia treatment protocol ... but we've tracked the frequency of events, and it does look like there's a decrease in the amount of time people spend with severe low blood sugar," she said. The frequency of bedside glucose monitoring has also increased, and the number of instances requiring the care of the rapid-response team has dropped.

The initial version of the protocol took 6 months to develop and was examined and commented on by departments throughout the hospital. It was approved by each department as well as by the medical executive committee.

The protocol eventually expanded to include orders for insulin, postsurgical guidelines for diabetic patients, a protocol for hyperglycemia in critical care units, and others. "I think that developing the protocol for hypoglycemia unmasked some of the other issues that were related to diabetes management," she said.

The patient safety committee reviews all cases of hypoglycemia that activate the rapid-response team but considers those for which blood glucose drops to less than 40 mg/dL (regardless of mental state) to be severe.

Dr. Michael DeVita, associate medical director for quality and safety at UPMC, noted that the hospital had seen "a series of poorly managed patients" when it came to hypoglycemia in patients with diabetes. Now, thanks to the use of the protocol, "We have much better glycemic management," he said. "I'd rather be hospitalized here for diabetes than anywhere in the country."

He emphasized that it is not the glucose level that triggers the rapid-response team in hypoglycemia cases. "We're looking for changes in respiration, consciousness, blood pressure, pulse. ... Those are very similar criteria to others that have been described in the literature."

"It's a really unusual thing nowadays [at the medical center] to have an event due to hypoglycemia," Dr. DeVita said. "We still have the occasional one, but it's nothing like what it had been. ... The old [rate] is one event per unit per day of low blood sugar—and now we're seeing one event per six units per day. It's a big drop."

The hospitalwide collaboration in the protocol has been crucial to its success, he added. For example, "they're even working out the relationship between insulin dosing and distribution of meals—two completely different areas and responsibilities of the hospital, and yet they've coordinated medication and food delivery to make it safer for patients." ■

Proceedings from a recent conference chaired by Dr. DeVita on rapid-response teams are available online at www.metconference.com.

Nurses Key to Consistency, Monitoring

The UPMC hypoglycemia treatment protocol need not be administered by a physician but can be initiated by the bedside nurse, Dr. Korytkowski noted. For all patients covered by the protocol, the responder is required to contact a physician and to recheck glucose 15 minutes after the initial treatment.

In each of three categories of blood glucose and patient consciousness level, the protocol lists treatment options and required steps. For example, for alert patients with blood glucose less than 50 mg/dL, the initial options are to give the patient an 8-ounce glass of milk, to give two tubes of glucose gel if the patient can swallow thick liquids, or if the patient can't take anything by mouth, to give 50 mL 50% dextrose solution intravenously (1 ampule). Intravenous dextrose 5% in water can be started at 100 mL/hour for a prolonged episode.

In patients with blood glucose near the upper end of the 70-mg/dL limit who are still conscious, the treatment may be "as simple as a glass of orange juice," Dr. Korytkowski said. For other patients, the treatment might be intravenously administered glucose.

High Dietary Iron Is Linked to CHD Risk in Type 2 Women

BY DOUG BRUNK
San Diego Bureau

The risk of coronary heart disease among women with type 2 diabetes appears to be elevated for those who consume high levels of heme iron and red meat, according to a large, long-term analysis from the ongoing Nurses' Health Study.

"Whether the increased iron intake is causally related to increased risk in CHD remains to be proven," Dr. Lu Qi, of the department of nutrition at the Harvard School of Public Health, Boston, and colleagues wrote. "These findings suggest that patients with type 2 diabetes may consider reducing their consumption of heme iron and red meat for the prevention of CHD."

The study included 6,161 women from the Nurses' Health Study who self-reported a physician diagnosis of type 2 diabetes between 1980 and 2000. The researchers excluded women with a history of CHD, stroke, or cancer as reported on follow-up questionnaires the women filled out prior to or during 1980 (Diabetes Care 2007;30:101-6).

At baseline, the women were divided into quintiles based on their median intakes of heme iron and red meat. The investigators then analyzed three of those five quintiles. In quintile 1, the median intakes were 1.70 mg/day and 0.55 servings per day, respectively. In quintile 3, the median intakes were 2.23 mg/day and 1.22 servings per day, respectively. In quintile 5, the median intakes were 2.83 mg/day and 2.39 servings per day, respectively.

During the follow-up period, which included 54,455 person years, the researchers documented 550 cases of CHD among the 6,161 women. These included 259 nonfatal myocardial infarctions, 153 CHD deaths, and 138 bypass operations or angioplasties.

After the researchers adjusted for age and body mass index, they found that women who consumed high levels of heme iron and red meat faced a significantly increased risk of fatal CHD, coronary revascularization, and total CHD, compared with those who consumed lower levels. The risk of total CHD was 50% greater among women who consumed the highest levels of heme iron compared with those who consumed the lowest levels.

The associations remained consistent when the researchers adjusted for level of physical activity, aspirin use, duration of diabetes, and other covariates.

Subanalysis revealed that postmenopausal women were at greater risk of CHD, compared with premenopausal women. "Premenopausal women may lose a significant amount of iron during menstruation, which may dilute the relationship between iron intake and CHD risk," the researchers hypothesized.

They acknowledged limitations of the study, including its self-reported nature and "the possibilities of residual confounding because of imperfect measures of diet and lifestyle factors."

The study was funded by the National Institutes of Health. ■