ICU Insulin Infusion
Protocol Gains Ground

Washington — More hospitals are implementing standardized insulin infusion protocols, many of which emulate the Yale protocol, Dr. Philip A. Goldberg said at a consensus conference sponsored by the American Association of Clinical Endocrinologists, American College of Endocrinology, and the American Diabetes Association.

Dr. Goldberg, a postdoctoral fellow at Yale University, New Haven, Conn., said the protocol was implemented at his institution in 2001 after the publication of the landmark Leuven, Belgium study (N. Engl. J. Med. 2001;345:1559-67). Until then, the “state of the art” in the intensive care unit had been to tolerate blood glucose levels as long as they did not exceed 200 mg/dL and to rarely address plasma glucose elevations. Glucose levels were rarely checked in nondiabetic patients, and existing “sliding scale” insulin regimens were “inconvenient, impractical, and stressful,” Dr. Goldberg noted.

And in 2004, the Yale group again updated their protocol following the publication of the first American Association of Clinical Endocrinologists’ national guideline on inpatient diabetes and metabolic control (Endocr. Pract. 2004;10:77-82) and the American Diabetes Association’s technical review (Diabetes Care 2004;27:553-91). The blood glucose targets were lowered to 90-119 mg/dL and the IV bolus was increased by about 40% to gain more rapid control. In 34 consecutive cardiothoracic ICU patients, mean blood glucose levels were another 12-13 mg/dL lower on average with the new protocol and with no concomitant increases in hypoglycemia. Similarly, mean glucose level was 118 mg/dL among 47 consecutive medical ICU patients receiving 63 drips. With the old protocol, levels averaged 121 mg/dL. The new protocol reduced the median time to reach a glucose level below 140 mg/dL (the old target).

These results would have been impossible without “buy in” from the nursing staff, Dr. Goldberg emphasized. “The ICU nurses are the ones who are doing this. You have to recognize that up front.”

A major barrier still to be overcome is the long-held fear of hypoglycemia. Many hospital personnel believe that levels of 150-200 mg/dL are “normal” and that anything below 100 mg/dL is cause for concern. “There is a culture of hyperglycemia, with a fear of hypoglycemia, or even of low normal,” he said.

To address these concerns, inservice training at Yale consists of 35 minutes addressing the “why” of the protocol and just 10 minutes for the “how.” The trainers review the published data and reinforce the message that most hypoglycemic episodes are benign and treatable. It’s also important to acknowledge to the nursing staff that the infusions will cause them extra work, Dr. Goldberg said. Some of the impact can be minimized with efficient use of ancillary staff, additional glucose meters, and use of lines in place for other reasons to sample venous or arterial blood for glucose measures.

Continuous glucose monitoring systems—currently approved only in diabetic outpatients—might also prove useful in the ICU setting. In a preliminary study, the Yale group found good correlation between glucocorticoid-predominant Medtronic’s CGMS system and capillary glucose values (Diabetes Technol. Ther. 2004;6:339-47).

The protocol was complex enough to achieve strict glycemic control in critically ill patients and practical enough to be implemented by busy ICU nurses.

There is still a culture of ‘hyperglycemia,’ with a fear of hypoglycemia, or even of low normal.

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Continuous glucose monitoring systems—currently approved only in diabetic outpatients—might also prove useful in the ICU setting. In a preliminary study, the Yale group found good correlation between glucocorticoid-predominant Medtronic’s CGMS system and capillary glucose levels in 22 medical ICU patients (Diabetes Technol. Ther. 2004;6:339-47).

Metabolic Syndrome Linked to Carotid Thickening in Women

BY DEEANNA FRANKLIN
Associate Editor

Metabolic syndrome predicts a worsening of intima-media thickness in the carotid artery of elderly women, according to findings from a 12-year population-based study.

Maja Hassinen and her colleagues at the Kuopio Research Institute of Exercise Medicine in Finland recently selected 299 women, aged 50-60 years, from a large risk-factor survey. The women were followed from 1982 to 2003, at which point complete data were available on 101 women, who were then aged 70-80 years.

Patients were considered to have metabolic syndrome if they met at least three of the following criteria from the National Cholesterol Education Program: high blood pressure (130/85 mm Hg or greater, and/or drug treatment), high blood glucose levels (110 mg/dL or greater), HDL cholesterol levels less than 50 mg/dL, triglycerides of at least 150 mg/dL, and a waist circumference greater than 88 cm.

The women had an average of 1.5 risk factors for metabolic syndrome at baseline. Of the 13 women with metabolic syndrome at baseline, their mean carotid intima-media thickness (IMT) was 18% greater than in those without metabolic syndrome (1.21 mm vs. 1.03 mm), said Ms. Hassinen and colleagues (Arch. Intern. Med. 2006;166:444-9).

By the end of the study all participants had an average of 2.3 metabolic risk factors, and 46% had metabolic syndrome. For all participants, waist circumference increased by 10%, body mass index increased by 2%, and glucose levels rose by 11% over the 12-year period. Additionally, their levels for LDL cholesterol dropped by 16%, HDL cholesterol decreased by 21%, and systolic and diastolic blood pressure levels decreased by 8% and 19%, respectively. The use of medications for hypercholesterolemia rose from 7% to 10% among the 13 women in the metabolic syndrome group.

Of the 88 women who did not have metabolic syndrome at baseline, 34 had developed incident metabolic syndrome. After adjusting for factors such as age, prevalent cardiovascular disease, physical activity, smoking, LDL cholesterol levels, carotid IMT, and a baseline National Cholesterol Education Program score for metabolic risk, the mean carotid IMT in these 34 women was two times greater than it was for the 54 women without incident metabolic syndrome. Furthermore, “the more metabolic risk factors that occurred during the 12-year period, the greater the increase in the mean carotid IMT,” said Ms. Hassinen and her colleagues.

The researchers concluded that “incident metabolic syndrome is not the increasing number of metabolic risk factors [were] able to predict the progression of carotid IMT in elderly women.” They thus provide “additional information regarding the progression of preclinical atherosclerosis beyond conventional risk factors and can therefore improve the prediction of clinical [cardiovascular disease].” Because of the rapidly growing elderly population in many Western countries, “carefully planned health promotion programs and preventive treatments for the metabolic syndrome are urgently needed,” they concluded.

Depression in Diabetic Patients Intensifies With Rise in CHD Risk

BY MIRIAM E. TUCKER
Senior Writer

Denver — Increased risk of coronary heart disease is significantly associated with stronger symptoms of depression in diabetic adults, Susan M. Barry-Bianchi, Ph.D., reported in a poster presented at the annual meeting of the American Psychosomatic Society. Dr. Barry-Bianchi, of the Behavioral Cardiology Research Unit at the University Health Network in Toronto, and her colleagues recruited 335 patients for the study from an ongoing investigation, the Community Outreach and Health Risk Reduction Trial. The average patient age was 56 years.

The average score on the Beck Depression Inventory (BDI) was 11.1 among the 184 patients at high risk for coronary heart disease (CHD), compared with 8.8 among the 169 patients at low risk (p < .001). Dr. Barry-Bianchi wrote. The 10-year absolute risk for CHD was nearly 22% for high-risk patients and 9% for the low-risk patients.