Glucose Control Stagnates at Diabetes Camp

BY MIRIAM E. TUCKER

ATLANTA — Hemoglobin A_{1c} levels and glycemic excursions among children attending a residential diabetes camp did not change significantly over a 12-year period, despite increased use of insulin pumps, designer insulins, and glucose self-monitoring, study results showed.

Data were collected from children and adolescents who attended one of two week-long camping sessions at Camp Seale Harris in Jackson's Gap, Ala., during 1996, 2002, and 2008. The research hypothesis was that children attending diabetes camp in 2008 would be able to achieve better overall control and have fewer hypoglycemic and hyperglycemic excursions while at camp than in either of the earlier study years because they now have access to improved diabetes management, education, and technology.

"Compared to 1996, in 2008 we had better insulin analogues, better insulin pumps, more children using pumps, better glucose monitors, and more children receiving HbA_{1c} analyses from their primary caregiver before coming to camp. All of these factors should contribute to better glycemic control and fewer severe glycemic excursions," Dennis J. Pillion, Ph.D., said at the annual meeting of the American Association of Diabetes Educators.

What was actually observed was "unexpected, and points out the fact that diabetes care in 2008 remains imperfect," said Dr. Pillion, professor of pharmacology and toxicology at the comprehensive diabetes center of the University of Alabama at Birmingham.

The children were aged 8-17, and all had type 1 diabetes. Hemoglobin A_{1c} levels were recorded from the medical charts in 2002 and 2008, while in 1996 they were actually measured at camp. Blood glucose levels during camp were measured four to six times daily—including twice during the night—and the daily activity regimen was held constant. About 150-300 campers attended each of the week-long sessions, one of which was for teenagers, the other for younger children.

The proportions of children using insulin pumps rose from about 40% in 2002 to 60% in 2008, with the relative proportions using injections falling as a consequence. Data on pump use weren't available for 1996, although it was estimated that no more than 5%-10% were using the pump back then. Among those using injections, the proportion using basal-bolus regimens and insulin analogues rose, while the use of split-mix regimens and of regular and other human insulins declined.

The mean HbA_{1c} value dropped from 9.4% in 1996 to 8.5% in 2008, a nonsignificant difference.

DR. PILLION

The mean HbA_{1c} value dropped from 9.4% (for 119 children) in 1996 to 8.5% (for 184 children) in 2008. The difference was not statistically different, because of the wide range in HbA_{1c} values. In 1996, just 7% of campers had an HbA_{1c} value below 7%. By 2008, that number had risen to only 11% among the campers who used pumps, while remaining at just 7% among those taking injections, despite the increased use of multiple daily injections and bolus dose adjustments. The drop from 7% to 11% represented a trend but was not statistically significant, Dr. Pillion noted.

The number of moderate or severe hypoglycemic events (defined as blood glucose levels of 50-70 mg/dL or below 50 mg/dL) also did not differ between 2002 and 2008, with campers experiencing an average of 1.5-2.0 moderate hypoglycemic events and 0.5 severe events during their week at camp. Campers using insulin pumps were no less likely to experience low blood sugar than were those taking injections. (Those data were not available for 1996.)

Hyperglycemic excursions also were not significantly less common in 2008 than in 2002, with campers experiencing about four to five moderately high (200-300 mg/dL) levels and one to two extremely high (greater than 300 mg/dL) levels during the camping week. Moreover, "the insulin pump did not provide a significant advantage over subcutaneous injections in terms of the number of severe or moderate glucose excursions that occurred at camp," Dr. Pillion said.

Dr. Pillion stated that he had no financial relationships relevant to this program. ■

Insulin Correction Dosing Refined by Using Weight

BY MIRIAM E. TUCKER

ATLANTA — Using a weight-based method for calculating insulin correction dosing resulted in superior blood glucose control, compared with a traditional sliding-scale method in a pilot study of hyperglycemic inpatients.

In recent years, it has become clear that nonindividualized sliding-scale regimens often result in out-of-target blood glucose levels. "Sliding scales look backwards to correct the past, and fail to anticipate the future," Diane M. Thompson, R.N., said at the annual meeting of the American Association of Diabetes Educators.

'Sliding scales look backwards to correct the past, and fail to anticipate the future.'

MS. THOMPSON

In cooperation with a local endocrinologist and critical care physician, Ms. Thompson and Heatherann Cundiff, R.N., who both work for Nashville, Tenn.–based Diabetes Healthways, which contracts with the hospital for diabetes management, developed a method for using a patient's weight to calculate the insulin dose needed to correct an elevated blood sugar. In a 2006 pilot study at Monroe Regional Medical Center, Ocala, Fla., the weight-based method resulted in 70% of 681 blood sugar values being less than 180 mg/dL in 54 patients, versus 46% of 719 values in 64 patients treated based on the sliding-scale method.

The weight-based method uses this formula to derive a sensitivity factor (SF): 3,000/kg body weight. The SF expresses how many mg/dL the blood glucose is lowered by 1 U of fast-acting insulin. The SF is calculated on admission, and documented on the patient's order sheet after verification by two nurses.

The correction dose is designed to bring the blood glucose to a target of 110 mg/dL, assuming that basal and prandial needs are met, either with medication or naturally by the body. This formula is used to calculate the required number of units of insulin: subtract 110 from the blood glucose in mg/dL, divide the result by the SF, then round the result to the nearest whole number.

For example, a 124-kg patient would have a SF of 24 (3,000/124). If her blood glucose was 250 mg/dL before breakfast, her correction dose would be 5.83 (250 – 110 = 140; 140/24 = 5.83), which would be rounded up to 6 U.

In the pilot study, the weight-based method was used in 64 patients during 1 month, yielding 31 different SFs (range 19-86). The number of blood glucose readings greater than 300 mg/dL dropped from 85 to 38 in those 64 patients, and the number of readings between 180 mg/dL and 300 mg/dL dropped from 270 to 168. The average blood glucose was 186 mg/dL with the sliding-scale method and 149 with the weight-based method, Ms. Cundiff reported. ■