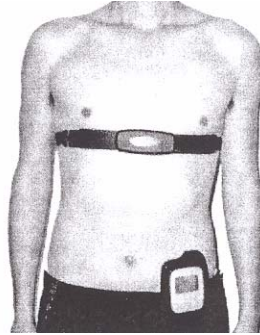


**Windy City Whispers**  
**67th Scientific Sessions American Diabetes Association**  
**June 2007**

**Hypoglycemia**

Hypoglycemia was not an overly popular topic at the meetings this year which is surprising given the concern our parents and patients have about it. Steve Edelman from San Diego (and formerly from the University of Utah) presented a very interesting talk on the use of very low dose Glucagon administration to prevent nighttime hypoglycemia. He noted that hypoglycemia is the key limiting factor in our attempts to achieve tight diabetic control. In well controlled patients, it is typical to have 2.1 episodes of hypoglycemia per day with blood sugars of less than 70 for greater than 10 minutes. They tend to be hypoglycemic for as much as 2.3 hours per day. Long-time Type I diabetics have an insufficient glucagon response to hypoglycemia which is unfortunate since glucagon normally plays a key counter-regulatory role. In this study they used glucagon by an infusion pump with doses of 2, 4 and 8 ng/kg of weight per minute. They compared the results from nights when glucagon was infused to nights with the same patients without glucagon. During the control nights, the subject spent 30% of their time between 2200 and 0700 hours with blood sugars in the hypoglycemic range. This percentage dropped to 16% when treated with glucagon. The episodes per hour of hypoglycemia per hour decreased by 78% when the patient was receiving 8 ng of glucagon/kilogram/minute. Not surprisingly the fasting glucose levels were higher with the glucagon rising from 86 mg/dL without glucagon to 136 mg/dL with the higher glucagon infusion. They reported no drug-related adverse effects. They concluded that very low dose glucagon appears to help prevent nocturnal hypoglycemia in Type I diabetics. They are next going to try an extended release injection which would obviously not require an infusion pump. *I think this is a very interesting study and may be a way we go in the not too distant future. We may have a Depo-glucagon that can be given before bed that will help protect the patient through the night and allow parents to sleep.* Another study looked at the use of the Freestyle Navigator CGM system as a means of detection of hypoglycemia. They noted that there were 3 modes of detection with this system. 1) Threshold alarm - an alarm that activates when the reading crosses below a selected alarm value, 2) Projected alarm - an alarm that activates when the glucose values and rate of change predict that the threshold value will be crossed at 10, 20 or 30 minutes hence, and 3) accurate glucose value - an alarm does not sound but the displayed glucose value is accurate when compared to a lab machine. They set a threshold of 70 mg/dL. When the projected alarm was set at 10 minutes, the detection rate was 70% by alarms and 21% by accurate glucose which gave a total of 91% combined with a false alarm rate of 9%. Using a 20 minute time, the detection rate was 76% by alarms, and 17% by accurate glucose (93% combined) with a false alarm rate of 7%. Using the 30 minute setting, the detection rate was 80% by alarms and 16% by accurate glucose (96% combined) with a false alarm rate of 6.8%. They felt that the Freestyle Navigator System had a high rate of hypoglycemia detection with a low frequency of false alarms. *This will be another reason, and perhaps the greatest reason, that parents of young children will demand continuous glucose monitoring for their children in the future.* Finally I thought I ought to mention HypoMon, a

device that has been tested in Australia for several years. They present at the meetings each year and I don't believe I have mentioned them in the past. This system consists of a chest belt transmitter that houses a set of 4 skin-surface biosensor electrodes for the measurement of physiologic parameters (sweating, tremor and palpitations) and a wireless hand-held computer unit. The sensors notice hypoglycemia by changes in skin impedance, heart rate, rate corrected QT interval and their rates of change.



This system is still used only in a hospital setting but they have found now that during the day it has a sensitivity of 77% with a specificity of 94% and overnight it has a sensitivity of 76% with a specificity of 89%. Each year they seem to be getting slightly better results. *This seems to be a somewhat cumbersome system right now but again it may be something that will be useful in the future for our parents to determine nighttime hypoglycemia in their children. Only time will tell.*