

The Katrina Aftermath
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Summary Prepared by Rob Lindsay, MD

Potpourri

I will use this section to go over a variety of abstracts, posters and presentations that all apply to pediatric diabetes but have no other connection with each other. The first poster dealt with the increasing prevalence rates of children with Type I diabetes in the United States. Remember that prevalence means the number of patients that have diabetes as opposed to incidence which is the number of patients that develop diabetes each year. This group estimated the prevalence rate of Type I diabetes in youth less than or equal to 19 years of age from 1994 to 2007. They used the Ingenix research data mart which is a data base containing the medical claims of a diverse group of health plans in the United States which covers approximately 8% of the national population. They included all patients with the diagnosis code 250.01 or 250.03 which is controlled and uncontrolled diabetes Type I. The age adjusted prevalence rate of Type I diabetes was estimated to be 93.2 per 100,000 in 1994 and it had increased to 192.6 per 100,000 in 2007. The prevalence rate of Type I diabetes increased from the prior year in every year except 2000. They concluded that the increasing incidence rates of Type I diabetes which has been reported before were reflected in the increasing prevalence rates in youth. *These studies play in nicely with a EURODIAB register which is an international collaborative effort from seventeen countries in Europe looking at the incidence of diabetes.* They found an overall annual increase in incidence from all the centers at about 3.9%. The incidence rose faster in the 0 to 4 years of age group (5.4%) versus the 5 to 9 years of age group (4.3%) and the 10 to 14 year age group (2.9%). They were predicting that the prevalence of Type I diabetes in children less than 15 years of age in these seventeen countries would rise from 94,000 in 2005 to 160,000 in the year 2020. *We have been very much aware at our clinic that our rate of new onset diabetes is increasing, particularly in children less than 5 years of age, and we are acutely aware that we are seeing far too many patients in clinic. The rapid rise in the incidence and prevalence of Type II diabetes has been well documented but Type I seems to be going up at fairly astronomical rates. At this point we have absolutely no idea why this is occurring but it is very worrisome.* A group from Houston looked at disaster preparedness in their city. They conducted a survey in 2008 and a total of 115 families

caring for children with Type I diabetes filled the questionnaire just before hurricane Ike struck. They found that 62% of the families were generally unprepared for a major disaster. “However, when looking specifically at self-management of diabetes, 75% of the families had adequate 3-day supply kit to maintain care through a disaster.” They concluded that increased education and empowerment of families to prepare for any emergency is especially important if they care for a child with special needs such as diabetes. *Since emergency preparedness is a particular interest for many Utah families, I thought this study was particularly appropriate. Each family should look to make sure that they can take care of their child should there be an earthquake or other natural disaster.* A group headed by the Joslin Clinic in Boston looked at weight gain in patients with intensive insulin therapy. The background of this question dates back to the DCCT in the 1990s which found that intensive insulin therapy caused a significantly greater weight gain than did the standard insulin regimen. The current study followed a set of 117 youth prospectively for ten months. The patients had an average age of 12.2 years. Thirty-five percent were on pumps, 40% were on basal bolus injections (Lantus and Analog) and 25% were on conventional daily injections. They found that the change in body mass index was not related to the change in Hgb A1c. They concluded, “these findings indicate that, in the current era of intensive insulin therapy, inappropriate weight gain no longer appears to be an adverse outcome. However, like other US youth, a substantial proportion of US youth with Type I diabetes are overweight or obese.” Their results are listed in the following chart:

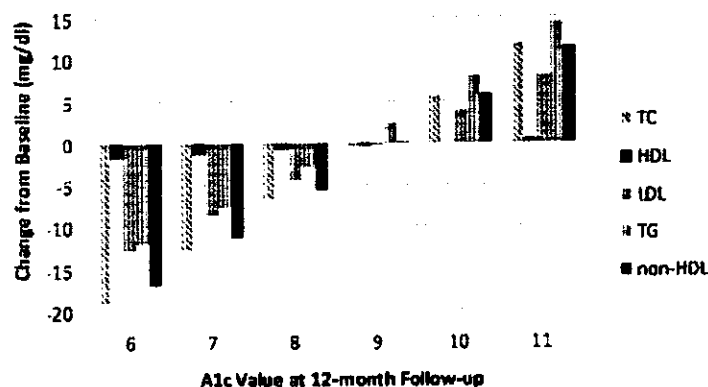
N=417	CSII	B-B Rx	Conv Rx	P value
Age (yrs)	12.2±1.7	12.2±1.7	12.2±1.7	NS
Duration (yrs)	5.7±2.8	5.5±3.2	4.7±2.9*	0.03
zBMI	0.59±0.77	0.61±0.79	0.69±0.90	NS
U/kg/day	0.9±0.2*	1.0±0.3	1.0±0.3	<0.01
A1c (%)	8.2±1.1*	8.6±1.1	8.9±1.5	<0.01

*Vs other 2 groups

As you can see, the control was not outstanding in that the best group (the pump patients) had a Hgb A1c of 8.2%. Nevertheless, it is important for our patients to understand that they can have good control without unappreciated weight gain. The newer approaches to insulin therapy have provided us with many benefits. Speaking of weight and diet, some of the same group submitted a poster on family and peer influences on dietary choices in youth with Type I diabetes. They did 21 focus groups including 36 families with children with diabetes between the ages of 8 and 16 years. Parents reported that they maintained uniform eating patterns among their children with and without Type I diabetes, primarily by controlling portion sizes and by modifying the overall family diet. The parents not surprisingly also reported a greater sense of control over the child’s eating habits when the diabetic was younger versus older and when they ate at home versus away. Many of the parents perceive the child’s social eating with peers as a challenge to diabetes management with poor choices oftentimes offered in social situations. The children with diabetes agreed about the challenges of making healthy food choices when with peers. When their peers chose unhealthy options, they found it difficult to make alternative healthy choices due to the appeal of unhealthy food. Although they denied direct peer pressure, they indicated that choosing healthy options

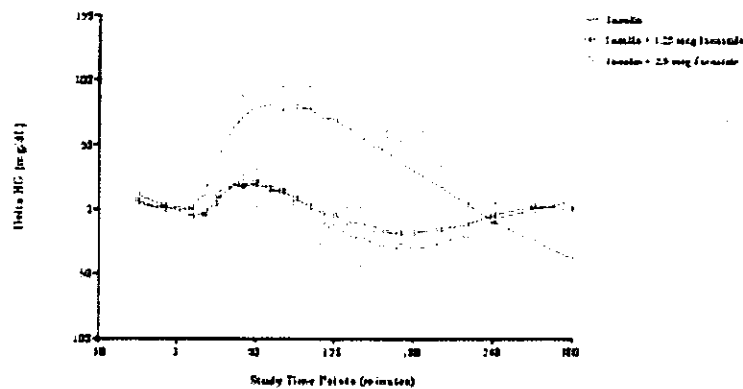
was not typically followed. The study concluded that “contemporary dietary education for families of youth with Type I diabetes often focuses on carbohydrate quantity rather than overall healthy dietary choices. Strategies are needed to incorporate healthy eating into the routines of families and youth with Type I diabetes”. *Hear, hear. I think that in many cases we have become so obsessed with carbohydrate counts that we forget to mention that our patients and children still need to eat in a healthy manner. So much time is spent making sure our counting is correct that maybe we do not emphasize appropriate choices as much as we ought to. I am sure our dieticians might disagree with this opinion but that tends to be what I see with my patients nowadays.* The SEARCH for Diabetes in Youth Study presented a very interesting report on short-term changes in lipid profiles in relationship to glucose control. They looked at 1,402 individuals with an average age of 10.6 years. They followed them for one year and plotted the changes in their fasting lipids against the changes in Hgb A1c. The average Hgb A1c at the onset of the study was 7.8% which is very similar to our patients. They found the change in Hgb A1c over one year was significantly associated with changes in total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides and non-HDL cholesterol. The accompanying chart shows the change in lipids assuming a baseline A1c of 9% and a twelve-month interval.

**Change in Lipids
Assuming 12 month visit interval
and Baseline A1c of 9%**



As you can see as the Hgb A1c drops, so do all the levels of lipids. They concluded that in youth with Type I diabetes, improved glycemic control results in a more favorable lipid profile. A reduction in Hgb A1c may be an effective primary therapy for dyslipidemia. *We have been telling our patients for years that some of their abnormal lipids may well be due to their poor control. Much of this was based on assumption so it is very nice to see a study that demonstrates it so very cleanly. Remember that keeping lipids in the normal range is very important to help prevent long-term atherosclerosis and heart disease. Just another reason that we must keep our children's diabetes in control.* Along these lines, the SEARCH group looked at inflammatory markers in children with Type I diabetes. They noted that low-grade inflammation is a known feature of long-standing Type I diabetes and is a contributor to the development of complications (particularly cardiovascular disease). They compared 575 patients with Type I diabetes (mean age 15 years) to 215 matched controls who did not have diabetes.

They found that “compared with controls, youth with Type I diabetes had higher interleukin-6 and fibrinogen levels and patients with a Hgb A1c of greater than 9.3% had an elevation in C-reactive protein. They concluded that Type I diabetes is characterized by excess inflammation which is independent of adiposity, pubertal status and duration and that poor glycemic control is associated with an increase in markers of inflammation. *These results help explain why patients with diabetes have a much greater chance of cardiovascular disease. Once again control seems to make a very large difference.* A group from Jacksonville, Florida also looked at some of the markers of inflammation and oxidative stress in patients with Type I diabetes. They compared children with diabetes who were on continuous glucose monitoring and a group that were on typical blood glucose testing to a group of lean non-diabetic children. They found the C-reactive protein and glutathione (a marker of oxidative stress) to be higher in both groups of diabetics. Other markers of oxidative stress and thrombosis were not elevated in the well-controlled Type I diabetics but were elevated in the poorly controlled. They concluded “these data suggest an increased cardiovascular risk even in young children with Type I diabetes”. *These studies are somewhat discouraging and beg for much more research. I would not worry about them too much until we know quite a bit more about the process. Control does seem to make a major difference but it may not be the sole factor involved.* The final study I want to mention in this section came from Houston again. They looked at the use of Exenatide in older teenagers. They had eight subjects aged 17 years who had had diabetes for five years. Their overall control was good with a Hgb A1c of 7.4%. They studied these patients first with insulin alone and then with two different doses of Exenatide along with the insulin. They found the following results on the curve.



They concluded that adjunctive therapy with Exenatide reduced post-prandial hyperglycemia and was associated with delayed gastric emptying. This reduction in glucose excursion occurs despite a reduction in insulin dose. *I have very little experience with Exenatide. My patients that have tried it have found that they have considerably better post-prandial blood glucose control. They also find that they have to reduce their dose of insulin as much as 50% in order to avoid hypoglycemia at that time. I think that we will be looking at Exenatide as an adjunct to insulin therapy in the not-too-distant future in our teenagers. As we worry more and more about post-prandial blood glucose levels, Exenatide may become a welcome help.* There was an interesting study from Russia looking at a novel tool to control hypoglycemia in very young children. It was something known as the glucose rapid spray which is a device that consists of a 19 mL bottle containing 10 grams of glucose solution with the addition of artificial flavors and

excipients to facilitate buccal (cheek) absorption delivered by spray that puffs glucose in quantities as small as 0.5 grams. They compared the use of this device to patients who used sugar, fruit juice etc. for the hypoglycemia. They found that the children using the device had a tendency for less severe hypoglycemic episodes during the day compared to the control group. There was also a statistically significant difference in the improvement of Hgb A1c. Presumably this improvement meant that they did not overcompensate when the children dropped low. *I will be very interested to see if something along these lines becomes available in the future. Simply spraying on the inner cheek certainly is simpler and easier for parents of very obstinate 2-year-olds.*

PARDON MY PLANET

by Vic Lee

