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Advanced Diabetes Management: What I have learned

Introduction

My father and I have been very interested in how to best control my blood sugars. Some of the ways that we have done this is by counting carbs, fine-tuning my insulin to carbohydrate ratio, adjusting my insulin needs based on activity level, high protein and fat meals, traveling and by utilizing all of the technology available to me. These are ways of controlling my blood sugar that have worked for me and below I have described how I have done it. Check with your doctor before using these yourself, but I hope that what I have learned can help you.

Carbohydrate counting

One of the most important things about controlling blood sugars is knowing what it is that you are eating. There are always new things to try. As new foods come up, I usually estimate things by using my previous knowledge of other foods. The three major nutrient groups are carbohydrates, protein and fat. When I calculate the amount of carbohydrates in a meal, I also analyze the amount of fat and protein so I can give extra insulin if needed. I count my carbohydrates using the "carb-exchange" method of counting. In this method, fifteen grams of carbohydrate is considered to be one "carb exchange" or "carb". As an example, my dinner one night consisted of one cup of milk, one cup of watermelon, two-thirds of a cup of rice, one piece of bread and two low-fat sausages. The total number of carbs for this dinner was five and a half: one carb each for the milk and the fruit, one and a half for the bread, and two carbs for the rice. My insulin dose, if giving two units per carb, would be 11. Another key thing that I have learned is that size is very important when counting and estimating carbs. Doughnuts are a good example. I like doughnuts, but sometimes it is difficult to calculate the

number of carbs. I know that a doughnut is at least 4 carbs and usually around 6. Adding frosting, like with a maple bar, makes it even more. It is also important to recognize the carbs contained per cup of common foods. I eat some foods so often that no matter where I am, I can recognize what a half cup of beans or pasta looks like. It is good to just think about how much your eating and be conscious about it.

Insulin to carbohydrate ratio

Another important thing about controlling blood sugars is the insulin to carbohydrate ratio when you eat. After I was first diagnosed with diabetes, I gave 1 unit of Humalog for every fifteen grams of carbohydrate or 1 unit per carb. Then as I started to test more frequently, I realized that I had different needs at different meals. Now, my breakfast and dinner ratios are 2 units for every carb, and my lunch ratio is 1 unit per carb. If I eat a snack at bedtime, I give 1.8 units per carb. For snacks at other time of the day, I usually give 1 unit per carb. In order to judge the best insulin to carbohydrate ratio, I had to do testing before and after meals. Before I had an insulin pump, I was able to give different ratios by calculating the insulin dose in my head. My insulin pump can be programmed to give different ratios of insulin, which makes it easier, but it still takes testing to get it right.

Snacks

On weekends, sometimes I eat snacks in the daytime or evening. I give an insulin to carbohydrate ratio that matched the time of day. Sometimes I also must reduce the dose slightly to avoid stacking insulin, especially if I have a few snacks close together. Snacks may require extra insulin if I am inactive after them, such as when I go to a movie. For bedtime snacks, I have found that I may require an extended bolus of one half to one unit over 8 hours for every carb I eat as a snack.

Adjustment for fat or protein

Adjusting for fat and protein is something that I still sometimes struggle with. Before I had a pump, I had to give extra Humalog with the meal as well as a small dose of Humalog a few hours after the meal. Now that I have a pump, I have a much easier time dealing with foods that are high in fat and protein. This is because my pump will give an extended bolus (sometimes called a "square wave bolus") over a period of time that I can program. Most often, I use this feature when I eat things like pizza, salmon, or fried rice. I have learned that sometimes, I should give an extra 1-3 units for my immediate meal time insulin dose if I am eating something that has very high fat such as nachos. I need even more insulin if I eat something high fat and then am inactive for a long time. I can program my extended bolus to allow for this.

Adjustment for activity level

My blood sugar is strongly affected by exercise that I do. I have found that it also helps control my blood sugars on weekends, and other days when I am less active. Sometimes, I eat a snack to compensate for exercise. The amount of extra food depends on the exercise that I am doing. For longer activities, such as skiing or hiking, I can either eat more or reduce my basal rate. For shorter periods of exercise, if I have given an extended bolus, I might cancel the current extended bolus, and resume it after my exercise is finished. For example, when I tap dance, I need to check my blood sugar both before and after dancing. I usually eat something if my blood sugar is below 120 before dancing. I could remove my pump for dancing but I find it easier to manage my blood sugar by eating. I do remove my pump during performances, and then I just need to check more often afterwards. When hiking, I find it simpler to just eats 2 carbs per 30 minutes of hiking, rather than adjust my basal rate.

Adjustment for traveling

Keeping my blood sugar in good control while traveling is often very tricky. The key for me before I received my pump was that I had to test often and give extra insulin for inactivity or meals that were not my typical ones.

When I got my pump, I tested various temporary basal rate increases, and found that I do best with 160 to 200 percent or my usual basal rate. I was very surprised at this large dose increase. Time zone changes complicate things even more, and I have not learned a recipe to cover all situations. I just need to accept testing more often for a short time.

Extended bolus examples

I can program my insulin pump to give an extended bolus ("square wave") of "x" units of insulin over "y" hours. Below are examples of what has worked for me. It took some "trial and error" to get these right:

Supplement for high fat or protein: Extended bolus parameters (in addition to usual prandial bolus):
Bacon: 1 unit per whole slice, over 6 hours
Chicken breast: 6-9 units over 8 hours depending on size
Chicken thigh: 3-4 units over 8 hours depending on size
Eggs: 1.5 - 2 units per egg over 6 hours
French fries (cooked in oil): 1 unit per carb, over 6 hours
Fried rice: 1.5 units over 6 hours per carb of rice
Hamburger: 3 units per small hamburger (3 inch diameter), over 6 hours
Ice cream (as a bedtime snack): 1.5 unit per carb, over 8 hours
Lox (as breakfast): 1.5 units over 4 hours pre half of bagel
Macaroni and cheese: 1.5 units per carb, over 12 hours
Meat (sandwich-lunch): 1.5 units over 6 hours per ounce
Meat loaf: 6 units over 8 hours for a piece the size of a small hamburger
Nachos: 1 unit over 6 hours (per carb worth of chips)
Pizza: if assuming 3 carbs per slice (varies with size), give 2 units per slice over 6 hours
Popcorn (as a bedtime snack): 1 unit per carb, over 8 hours
Pot roast: 2 units per small hamburger (3 inch diameter), over 6 hours
Potstickers with meat: 1.5 units over 6 hours each
Ravioli: 1.5 units over 8 hours per carb
Salmon (dinner): 6 units over 8 hours for a piece the size of a 3" hamburger, plus 2 extra immediate per piece
Salmon burger: per burger, add 2 immediate, and 14 over 12 hours extended
Sausage (breakfast): 0.5 units per piece, over 6 hours

Sausage (dinner): 3.5 units per piece, over 8 hours
Tortellini: 1 unit over 8 hours per carb
Tuna sub (12" Subway): 6 units over 8 hours