Cystic Fibrosis-Related Diabetes (CFRD): Daily Management

September 20, 2011

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Antoinette, Moran, MD
Professor, Pediatric Endocrinology
University of Minnesota

Carol Brunzell, RD, CDE
University of Minnesota
Monitoring CFRD

- If on insulin it is important to test blood glucose levels at least 3 times a day.
- Usually this is done before the meal dose so that you know if you need to add extra insulin to correct for a high blood glucose.
Monitoring CFRD

- Sometimes done 2 hours after a meal to check whether the meal insulin dose is enough.
- Occasionally done in the middle of the night to make sure your glucose isn’t dropping while you are sleeping.
- **Always** should be done after vigorous exercise.
Hemoglobin A1C (HbA1C)

- Blood test used in type 1 and type 2 diabetes
  - An overall measure of diabetes control
  - Helps to predict risk of diabetes eye and kidney disease
- It is not as accurate in CF
- You can look at the changes from month to month in your own HbA1C to tell you if your control is better or needs improvement
Insulin

- Insulin is the treatment of choice for all peoples with CFRD.
- Pills to treat diabetes do not work in CFRD
  - Cannot be recommended over insulin
- There are many different kinds of insulin and ways to deliver it---the best choice is whatever works best for the individual
Insulin pump

Pens
Principles of Insulin Therapy

- **Basal (background):** We all need some insulin in our bodies all the time
  - Long acting or, with an insulin pump, rapid-acting that gives a low dose all time

- **Meal coverage:** When we eat we need extra insulin for the carbohydrates in food
  - Rapid acting insulin

- **Correction:** When more insulin is needed if the blood glucose is too high
  - Rapid acting insulin
What a Person with CFRD Should Know about Insulin

• The more you test and match your insulin to your food…
  – The better your blood glucose control
  – The better you’ll feel (improved energy and concentration)
  – The better you’ll be to keep up your weight and muscle mass
What a Person with CFRD Should Know about Insulin

• The amount of insulin you need from day to day can change depending on your…
  – Health and
  – Activity

• Blood glucose levels aren’t “good” or “bad”
  – Highs are a sign that something different needs to be done with the insulin dose
  – Don’t get discouraged when things aren’t perfect
Nutrition for CFRD

- The nutrition recommendations for people with CFRD are not the same as for people with type 1 or type 2 diabetes
- Your usual CF diet does not change. You still need to eat a balanced high calorie, high salt, high protein, high fat diet
- Getting to and keeping a healthy body weight remains an important priority
How Food Affects Blood Glucose

• All foods have calories
• Calories come from the nutrients in foods: carbohydrate, protein and fat
• Only carbohydrate-containing foods raise blood glucose
• Protein and fat do not affect blood glucose
Sources of Carbohydrates ("Carbs")

- All **grains** and grain products: breads, rice, cereal, pasta, etc…use whole grains if possible
- **Fruits**: fresh, canned, dried, fruit juice
- **Starchy vegetables**: corn, peas, potatoes, winter squash
- **Milk** and **yogurt**
- **Legumes**: dried peas and beans
- **Desserts, sweetened beverages, snack foods**
Reading a Food Label for Carbs

• Look at the **serving size**
• Look at the carbohydrates & the **grams of total carbohydrates** in one serving
• ½ cup = 13 grams of total carbohydrates
Using Carbohydrate “grams” versus “units/choices/exchanges”

• Food labels and general nutrition information will always list carbohydrate in grams
• Diabetes education materials may also use carbohydrate units, choices, exchanges
• 1 carbohydrate unit/choice/exchange = about 12-15 grams total carbohydrate in a food item
Using Insulin with Carb Counting

• Using what is called an “Insulin to carbohydrate ratio” when taking rapid-acting insulin for meals and snacks
  – Novolog®, Humalog®, Apidra®

• Insulin dose is based on the amount of carbohydrates a person is about to eat

• A common dose is 1 unit of insulin/15 grams of carbohydrate
## Meal Example for Insulin and Carb Counting

<table>
<thead>
<tr>
<th>Food</th>
<th>Carbohydrate grams</th>
<th>Carbohydrate Units</th>
<th>Units of Rapid Acting Insulin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cup whole milk</td>
<td>13 grams carb</td>
<td>1 carb unit</td>
<td></td>
</tr>
<tr>
<td>1 cup dry cereal</td>
<td>28 grams carb</td>
<td>2 Carb units</td>
<td></td>
</tr>
<tr>
<td>1 large banana</td>
<td>27 grams carb</td>
<td>2 Carb units</td>
<td></td>
</tr>
<tr>
<td>2 slices toast</td>
<td>32 grams carb</td>
<td>2 Carb units</td>
<td></td>
</tr>
<tr>
<td>Margarine or butter</td>
<td>0 grams carb</td>
<td>0 carb units</td>
<td></td>
</tr>
<tr>
<td>2 fried eggs</td>
<td>0 grams carb</td>
<td>0 carb units</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td><strong>100 grams carb</strong></td>
<td><strong>7 carb units</strong></td>
<td><strong>7 units Insulin</strong></td>
</tr>
</tbody>
</table>
# Food Records

## Diabetes Self-Care Record

<table>
<thead>
<tr>
<th>Time</th>
<th>Diabetes Medication Or Insulin</th>
<th>Blood Sugar Results</th>
<th>Food Intake</th>
<th>Carbohydrate Information</th>
<th>Physical Activity</th>
<th>Other Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type</td>
<td>Amount</td>
<td>Amount</td>
<td>Type of food/ drink</td>
<td>Units</td>
<td>Grams</td>
</tr>
<tr>
<td>Breakfast</td>
<td>Before</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 hrs After</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch</td>
<td>Before</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 hrs After</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dinner</td>
<td>Before</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 hrs After</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snack</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Low Blood Glucose (Hypoglycemia)

• Caused by…
  – Too much insulin
  – Not enough carbohydrates
  – Drinking alcohol on an empty stomach
  – More exercise than usual
  – Waiting too long to eat after the meal dose of insulin is given
Hypoglycemia Prevention

• Eat extra carbs with or after physical activity
• Do not drink alcoholic beverages without food
• Treat hypoglycemia right away, do not delay
• Never leave home without your meter and a source of carbohydrates
• Too many episodes may require an insulin change
• Test blood glucose before bedtime
Symptoms of Hypoglycemia

- headache
- sweating
- Impaired vision
- dizziness
- fast heartbeat
- hunger
- shaking
- irritability
- anxiety
- weakness/fatigue
Hypoglycemia – Treatment

Test blood glucose if possible:

- If less than 70mg/dl, eat or drink 15 grams of carbs (simple carbs that do not require enzymes)
- If BG less than 50 mg/dl, eat or drink 30 grams of carbs
- Wait 15 minutes, retest blood glucose
- If still low, eat another 15 grams of carb until BG is above 70 mg/dl
- Need to have a glucagon emergency kit
Alcohol, CFRD and Hypoglycemia

• Limit to 1 drink/day for women, 2 for men
  – 1 drink = 12 oz beer or 5 oz wine or 1.5 oz hard liquor
• Drink alcohol with food
• Don’t take insulin for alcohol carbs
• Wear diabetes ID
• Check blood glucose to see how it affects you
• Check with your doctor to make sure alcohol is safe for you
Exercise and CFRD

- Exercise is a good thing!
- Blood glucose will vary depending on the type, intensity, and length of activity
- Check blood glucose before, during and after starting a new exercise regimen
- Always carry simple carbs to eat before and during activity
- You may also need additional “free” carbs later in day
### Carbs During Exercise

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Duration (minutes)</th>
<th>Carbs</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild-Moderate</td>
<td>Less than 30</td>
<td>May be unnecessary</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>30-60</td>
<td>15 grams</td>
<td>Each hour</td>
</tr>
<tr>
<td>High</td>
<td>60 or more</td>
<td>30-50 grams</td>
<td>Each hour</td>
</tr>
</tbody>
</table>
Advice for People with CF:

- CFRD is just part of CF
- It is a deficiency in something
- It can be managed, like digestive enzymes or vitamins
What is Cystic Fibrosis-Related Diabetes?

Cystic Fibrosis-Related Diabetes (CFRD) is a unique type of diabetes. It is not the same as diabetes in people without CF. The diagnosis and treatment are not exactly the same. CFRD is extremely common in people with CF especially as they get older. CFRD is found in 35 percent of adults aged 20 to 29 and 43 percent for those over 30 years old.

Causes of CFRD

There are two types of diabetes in the non-CF population - **Type I diabetes** (known as “insulin-dependent diabetes”) and **Type II diabetes** (known as “non-insulin-dependent diabetes”).
CF Care Guidelines - Nutrition/GI

Because nutrition is so important to a long and high-quality life for people with cystic fibrosis, the CF Foundation has created several care guidelines related to nutritional and GI (gastrointestinal) issues.

On this page:

- Nutrition in Children and Adults
- Pancreatic Enzyme Replacement
- Cystic Fibrosis-Related Diabetes
- Liver Disease
- Pediatric Nutrition

Nutrition in Children and Adults

Good nutrition is very important for people with cystic fibrosis. To help ensure proper nutrition in people with CF, the CF Foundation Subcommittee on Growth and Nutrition combined recent nutritional studies with an analysis of results from the Patient Registry Report to create guidelines on the management of CF nutrition. Recommendations include:
Diabetes Basics

Diabetes mellitus (MEL-in-tus), or simply, diabetes, is a group of diseases characterized by high blood glucose levels that result from defects in the body's ability to produce and/or use insulin.

Not sure what that means? **This is the place to find out.** We've covered all the basics here—and you'll find plenty of links to more in-depth information on a variety of topics and issues.
Thank You

• …for watching
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