Maryland Endocrine PA

HYPOGLYCEMIA (LOW BLOOD SUGAR) TREATMENT AND PREVENTION FOR PATIENTS ON INSULIN

Hypoglycemia means your blood sugar is below 70 milligrams per deciliter (mg/dL). A severe hypoglycemia reaction would be if the blood sugar was below 50-55 mg/dL. Most people get symptoms from hypoglycemia that come from 2 principal factors:

- The body makes adrenaline to try to raise the blood sugar (resulting in sweating, feeling hot, shaking, heart pounding.
- The brain is not getting enough blood sugar to work well (resulting in headache, difficulty concentrating, slurred speech, confusion, excessive fatigue).

If not treated, a low blood sugar reaction can worsen and cause you to pass out. Severe low blood sugar reactions that are not treated can even cause seizures, brain damage and death. Having frequent low blood sugar reactions makes it harder for you to tell that your blood sugar is low, and harder for your body to defend you from hypoglycemia, a condition called **hypoglycemia unawareness**. Hypoglycemia needs to be treated right away. Even if you are busy or tired, hypoglycemia can't wait! Here are some simple guidelines to help you reduce the risk of hypoglycemia, and especially severe hypoglycemia.

If you have problems with hypoglycemia with exercise, a great resource is a website from Dr. Sheri Colberg, one of the leading experts in exercise and hypoglycemia in people with diabetes: www.shericolberg.com.

- **Think Ahead:** Many hypoglycemic reactions happen when meals are delayed or with exercise or increased activity.
    - It is better to exercise before a meal, not after- exercise slows down the food coming in, speeds up the insulin absorption, and increases the need for sugar overall.
    - Before meals, there is usually less insulin 'on board' (No meal bolus or meal shot present) to speed up, and little or no food waiting to get in, so you are

less likely to get low with exercise before meals, compared to exercising after meals.

- If on an open loop pump (one not changing its dose based on a continuous glucose monitor reading), consider decreasing your basal rate by 50% for 1-2 hours (suing a temporary basal rate) before starting exercise, so that you are less likely to get a blood sugar drop with exercise.
- If you must exercise after meals, eat light carbs and take less insulin than you normally would for that meal.
- If low before or while exercising, use rapid sugar to treat it- 3-4 glucose tablets, dex-4 15-gram glucose liquid, or 4-6 ounces of regular soda or fruit juice are good choices.
- If on a pump, do not try to treat lows by only putting the pump on suspend, because it will take 1-2 hours for the blood sugar to come up. If the pump is suspended for longer than 2 hours, the blood sugar can rebound too much, and up extremely high later.
- Drinking alcohol can increase the chance you will have a low blood sugar reaction several hours later- so if you drink alcohol, don't exceed 2 ounces of alcohol (meaning 1-2 mixed drinks, 1-2 12 ounces of light beer, or 1-2 6-ounce glasses of wine). Avoid regular beer, hard cider, sweet mixed drinks like daiquiris, and sweet wines, because these will all tend to raise the blood sugar.

- **Be Patient:** Humalog / Lyumjev / Novolog / Fiasp /Apidra all take 2-3 hours to reach their peak blood sugar lowering effect.
  - When taking extra insulin to correct a high blood sugar, wait at least 2 hours before taking any more insulin.
  - If on a pump, use the insulin on board function of the pump to see how much insulin is still around.

    - Taking more insulin when the blood sugar is still higher than wanted for 1 hour leads to **staking**- insulin doses piling on top of each other- which causes more hypoglycemia.
- **Be Prepared:** Always have some sugar source available, especially at night, in a car or with exercise.
    - Glucose tablets, gel or liquid, or small juice boxes (4-6 ounces) are quick and portable.
    - If you are driving and your blood sugar is low, pull over! Having low blood sugar can cause you to have a serious car accident. You should not resume driving until your blood sugar is above 75 mg/dL.
    - A severe reaction where you can't wake up or cannot drink or eat something can be treated with a glucagon shot by a family member. If you are on insulin, you should have glucagon available: Gvoke, Zegaloge, and Baqsimi nasal insulins are all great ways to easily increase blood sugar quickly.
- **Be Reasonable:** Do not overtreat low blood sugars. It feels bad to be hypoglycemic, but try to follow these guidelines when treating low blood sugar:
    - If you have low blood sugar and you treat it with rapid sugar, then you need to wait 15 minutes before taking anything else. Your sugar will take a few minutes to come up.
    - If your blood sugar is still low after 15-20 minutes, then it is fine to re-treat.
    - If you keep eating until you feel better, you will usually over correct the low and usually end up with high blood sugar. **By eating more, you do not get better any quicker, you just have higher blood sugar later.**
    - You want a quick correction, some good choices would be glucose tablets or liquid, 4-6 ounces of fruit juice, regular soda or hard candy.
    - Some things to treat a low that are slow and tend to rebound too high later are: Milk, cookies, cake, ice cream, chocolate, brownies, granola bars, etc. All these things taste good, but the high fat content slows down the rise in your blood sugar and tends to make it go a lot higher for 1-2 hours.

If you are getting frequent low blood sugar reactions, then using a continuous glucose monitor can help immensely, or even an insulin pump connected to a monitor. If you are having trouble telling when you are low (**Hypoglycemia unawareness**) or have had reactions that required someone else to treat you (**severe reactions**), then talk to your doctor about continuous glucose monitoring (CGM) with or without an insulin pump.

Glossary

CGM - A continuous glucose monitoring device. Typically worn on the skin using an adhesive patch integrated with the device. The device connects with a receiver or a smart phone application to actively monitor your blood sugar. Poling rates of the device can vary and may update only every five minutes in the app, but these readings are ten to fifteen minutes behind the current blood glucose. Some devices must be manually scanned to give a reading.

Insulin Pump - A relatively small wearable device that delivers insulin continuously or when commanded to help manage diabetes. An insulin pump is computerized and designed to mimic the natural function of a pancreas. Insulin pumps use cannulas for insulin delivery which is inserted subcutaneously. Insulin pumps have an internal or removable reservoir to store insulin for the effective life of the reservoir.

Closed Loop Insulin Pump - Insulin pumps that integrate with a CGM for automated insulin delivery. While the delivery is automated, users should still inform the insulin pump about meals and exercise.

Open Loop Insulin Pump - Insulin pumps that require the user to calculate and administer insulin doses for meals, corrections or basal needs.

Hypoglycemia - Hypoglycemia means your blood sugar is below 70 milligrams per deciliter (mg/dL). This measurement is monitored by either fingerstick tests or a CGM.

Hypoglycemia unawareness - A condition where the usual warning signs of low blood sugar are diminished or absent, increasing the risk of severe hypoglycemia.

Severe Hypoglycemia - Sometimes referred to as insulin reaction or insulin shock, severe hypoglycemia is when blood glucose (blood sugar) drops dangerously low. This can still occur in people who do not use insulin. You may become confused, lose consciousness (pass out), or treatments for low blood sugar may be less effective. It is often defined by blood glucose less than 54 mg/dL.

Glucose Monitor - A medical device is used to measure and track blood sugar (blood glucose) levels. This may be referred to as a blood glucose meter, or glucometer. Traditional monitors require a small sample of blood usually obtained by pricking a fingertip with a lancet.

Blood Sugar – Blood sugar, also known as blood glucose, is the amount of glucose circulating in your bloodstream, serving as the primary source of energy for the body's cells. Blood sugar comes from the food you eat, particularly carbohydrates, which breaks down into glucose and releases into your blood stream.