



Albany Medical Center

Goodman Diabetes Service



Severe Hypoglycemia & Hypoglycemia Unawareness

Definitions

"Severe hypoglycemia" (SH) is a low blood sugar event resulting in stupor, seizure, or unconsciousness, during which someone else's help is **required**.

"Hypoglycemia unawareness" (HU) is when people with diabetes have a low blood sugar and do not recognize it as such. People who have HU may get warning signs some of the time, but not every time their BG is too low.

Who Gets HU or Has a Severe Low BG Episode?

You can have a severe hypoglycemic episode whether or not you have HU. Anyone who has diabetes and takes a blood sugar lowering medicine can have a severe low BG. If you have HU, you are more likely to have severe episodes of hypoglycemia. People with long-standing type 1 diabetes are most likely to have HU, but it also occurs in people with type 2 diabetes who have reached the stage of making little or no insulin. People who have autonomic neuropathy, a chronic complication of diabetes, and men, are at greater risk for HU.

What Causes HU?

When your BG falls too low, your body releases epinephrine and this gives you the signs and symptoms of a low BG. Frequent low BG shifts the body's release of epinephrine during hypoglycemia to a lower BG level. It's believed that HU is related to having frequent low blood glucose (BG) levels over a few weeks or months, as well as BG's of 70 or lower in the 24 hours just prior to HU episodes. Epinephrine response is also reduced in those who have autonomic neuropathy.

What BG Level is Considered "Hypoglycemic"?

People who don't have diabetes start to feel hypoglycemic when their BG reaches 50-55 mg/dl. **In people who have diabetes, hypoglycemia can't be defined as a specific BG level, because the point at which they feel "low" changes, depending on their usual BG level.** So, people with poorly-controlled diabetes can "feel low" at normal or high BG levels. And, people whose BG runs consistently in the low-normal range and have frequent hypoglycemia may not "feel low" until their BG falls to a dangerously low level.

Symptoms of Low BG

- Are related to how low your BG gets, not how quickly or slowly it falls;
- Are unique to each person and may mimic other things, like being anxious or frightened;
- May affect your ability to think clearly enough to treat your hypoglycemia;
- May be more difficult to notice when your attention is focused on something else;
- May get more subtle after years of diabetes.

Unrecognized low BG is dangerous and frightening for you, and for family and friends. You may worry about getting hurt, harming someone else, or losing your job or driver's license. This can lead to conflict with family, friends, or coworkers and can make it difficult to deal with others who are trying to help.

People who have had severe low BG episodes or have HU deal with it in a variety of ways. Some let their BG run very high, some eat constantly, and others lead a very rigid lifestyle. These ways of coping aren't that successful and can harm your long-term health. There are things that **can** help.

Management of SH and HU Involves:

- Monitoring your low BG episodes...how often they occur and how severe they are....so you can identify and predict high risk times;
- Taking actions each day to prevent hypoglycemia; and
- Training yourself to become more aware of your BG may also be helpful if you have HU.

Monitor Low BG and Identify High Risk Times

After one (even mild) low BG, you have a 50% chance of having a repeat low BG episode within the next 24 hours. You will typically have fewer symptoms with the repeat low BG. Be alert.

If more than 15% of your BG results are 70 or lower over a period of about a month, you are at higher risk of having SH. (For example, if you test 4 times a day for a month, 18 readings of 70 or less would put you in the high risk category.) Take action to make fewer of your readings below 70.

If your A_{1c} is near-normal, you probably have periods of nighttime hypoglycemia, whether you realize it or not. Consider getting up during the night to assess this by checking your BG, or talk to your provider about wearing a continuous glucose

monitor for a few days.

Carefully review the situations when you have had SH, looking for the common elements. Keep careful records of food, insulin, and exercise to help identify problem times and circumstances.

Review what times your insulin doses are peaking, when you are most active, and when you have less food in your system. When these occur during the same time period, this is when you have the most BG lowering going on and are at highest risk for low BG...a "perfect storm". If you use an insulin pump, consider using the active insulin feature (e.g. insulin on board).

If your A_{1c} is near-normal and you have HU or if you have an episode of SH, your provider may recommend that you increase your BG targets, either for a few weeks, or for a longer period of time. This has been shown to reverse HU and improve the epinephrine response. In other words, the BG level at which you have symptoms can go back up and your symptoms can return.

Take Actions Each Day to Prevent Severe Hypoglycemia

- Test your BG frequently (at least 4 times a day).
- Consider increasing your caffeine intake. Moderate caffeine intake (3-4 cups of brewed coffee/day) may decrease nighttime hypoglycemia and improve recognition of symptoms.
- Use only your finger tips for testing. Don't use alternative sites, which are not quite as up-to-the-minute as your finger tips.
- Keep your BG meter and easily-consumable glucose with you at all times.
- Always test your BG before a high risk situation, such as driving a car or operating heavy machinery.
- Don't delay in treating low BG. Subtle symptoms may occur and then get better temporarily. If you have any subtle or possible symptoms, test your BG. If you can't test, treat it like a low BG.
- Your body produces less glucose after you drink alcohol, so be sure to test and eat during and after consuming alcohol.
- Strenuous or prolonged exercise may continue to lower BG for up to 24 hours afterwards. Test more often, and consider less insulin and more food.

If You Have HU, Increase Your Awareness of Hypoglycemia

- Talk to family, coworkers, or friends who can tell when you are getting "low". Ask what they notice, specifically.
- Keep a BG awareness diary, as follows. Estimate your BG before each BG test, using your internal cues (how you feel, physically and emotionally) and external cues (what you know about your insulin, food, and activity). Record the signs and symptoms and your estimated and actual BG. You will probably need to do this for several weeks. Look for information such as when you are best and worst at estimating your BG.
- Go to the website www.study.bgathome.com to read a brief description of a 7-week interactive Web-based training program, developed by the University of Virginia, and designed to improve people's ability to recognize, prevent and treat low blood sugar. Unfortunately, the study is closed for new enrollment, but you can submit an interest form if you would like them to contact you for possible future studies or when the program is available for general use.
- Attend the Joslin Diabetes Center's one-day small group program, Blood Glucose Awareness Training. Family members are encouraged to participate too. The program will be offered three times in 2006, at the Joslin Diabetes Center in Boston: Friday June 2, Friday August 4, and Friday November 17. Call 617/732-2594 or email bgat@joslin.harvard.edu for more information.

Too much insulin (absolute or relative) can occur when:

- Insulin doses are too high, at the wrong times, or the wrong type;
- Not enough glucose is delivered, such as missed meals and snacks or overnight;
- The body produces less glucose, such as after drinking alcohol;
- The body uses more glucose, such as during and after exercise;
- The body becomes more sensitive to insulin, such as hours after exercise, after weight loss, with improved physical fitness or improved glycemic control or after starting an insulin-sensitizing drug;
- The body clears insulin out of the system more slowly, such as in chronic kidney disease.