Somogyi Effect VS. Dawn Phenomenom

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Have you ever gone to bed with a relatively normal glucose reading, only to wake up with a much higher value? Do you wonder why glucose numbers can swing during sleep or pre-dawn hours? This month’s column will address readers’ questions about the difference between two possibilities: the Somogyi effect and dawn phenomenon.

What is the Somogyi effect?
Also known as “rebound hyperglycemia” and named after the physician who first described it, the Somogyi effect is a pattern of undetected hypoglycemia (low blood glucose values of less than 70) followed by hyperglycemia (high blood glucose levels of more than 200). Typically, this happens in the middle of the night, but can also occur when too much insulin is circulating in the system. The cause of the Somogyi effect is said to be “man-made”—that is, a result of insulin or diabetes pills working too strongly at the wrong time.

During periods of hypoglycemia, the body releases hormones which cause a chain reaction to release stored glucose. The end result is that the glucose level can swing too high in the other direction, causing hyperglycemia.

How can you test for the Somogyi effect?
This is the fun part. Set your alarm and wake up between 2 and 3 a.m. and test your blood glucose. Low blood glucose levels could signify the Somogyi effect is in action.

Wouldn’t I know if I’m going too low?
Not always. Sometimes the body has less of a reaction to low blood sugars, especially if you have had wildly fluctuating glucose values for years and can lead to a condition called autonomic neuropathy, which blocks the body’s ability to detect lows. This is more likely to occur during sleep hours—a frightening thought. One option is to ask your doctor or endocrinologist about a 3-day continuous glucose monitoring system (CGMS) exam. About the size of a pager, you would wear the device for 3 days. A little plastic tube taped gently beneath your skin allows the CGMS to read glucose readings several times a minute and can explain exactly when lows occur. Companies are competing to have “real-time” glucose values displayed in this device. Currently, the CGMS devices have to be downloaded at the physician or diabetes educator office for interpretation.
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What can I do to correct the Somogyi effect?
The very best way is to prevent the low from happening in the first place. And that takes a little detective work to figure out what made the glucose plummet. You might try any of the following, with your physician or healthcare provider’s blessing:

• Have a snack with protein before bedtime, like a piece of toast with peanut butter, or some cottage cheese, or yogurt, or some nuts and small piece of cheese.
• Go to bed with a glucose level slightly higher than usual.
• Wake up between 2 to 3 a.m. and test your blood glucose. Bring your logbook to your physician and ask if any medication adjustments are needed (like changing the type and/or amount of insulin, oral medication, or switching to an insulin pump). Do not skip or change your medications without your physician’s input!
• Ask your doctor about having the CGMS test (see above description).

What is the dawn phenomenon?
Named after the time of day it occurs, not some high brow researcher, the dawn phenomenon is the body’s response to hormones released in the early morning hours. This occurs for everyone. When we sleep, hormones are released to help maintain and restore cells within our bodies. These counterregulatory hormones (growth hormone, cortisol and catecholamines) cause the glucose level to rise. For people with diabetes who do not have enough circulating insulin to keep this increase of glucose under control, the end result is a high glucose reading in the morning. For pregnant women, the dawn phenomenon is even more exaggerated due to additional hormones released in the night.

How can I treat the high fasting glucose readings caused by the dawn phenomenon?
Several options are worth considering:

• Exercise later in the day, which may have more of a glucose-lowering effect in the night.
• Talk with your doctor about a possible medication adjustment to control the higher fasting readings.
• Limit bedtime carbohydrates and try more of a protein/fat type of snack (nuts, peanut butter, cheese, or meat).
• Eat breakfast to limit the dawn phenomenon’s effect. By eating, your body will signal the counterregulatory hormones to turn off. This concept can be a little perplexing, as people often say, “But if I don’t eat, shouldn’t my sugar go down?” The opposite is true. By not eating, or skipping meals, it is fairly common to see higher glucose values as a result.

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No matter how we label high glucose values, whether caused by the Somogyi effect or dawn phenomenon, we must figure out their cause. Maybe we can start a dawn phenomenon chat room with everyone who will be setting their alarm clocks to awaken at 2 to 3 a.m. for blood sugar checks! One of the keys of diabetes management is identifying glucose patterns and trends over time. Monitoring is the best way to help solve these situations. Researchers are working diligently on newer systems to help unveil glucose patterns with relative ease. So in the meantime, Test! Don’t Guess – And let me know what you discover!