

Reducing High Blood Glucose in the Hospital: An Inside Job



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Maintaining glucose levels as close to normal as possible is a good thing. Regular readers of this *Viewpoint* know that I am a strong advocate of tight blood sugar control because this approach leads to fewer diabetic complications. These complications, such as diabetic retinopathy (eye disease), nephropathy (kidney disease), and neuropathy (nerve damage) develop over several years of poor glucose control, and are a leading source of the morbidity and mortality associated with diabetes. There is at least one place, however, where blood sugar levels are often allowed to run high. That place is right under the doctor's nose, on the inpatient wards and intensive care units of the hospital.

Surprised? Well, there are several reasons for this situation. First, some patients are admitted to the hospital without having their blood glucose level checked at all. This is nothing short of a travesty. Given the frequency of diabetes in our society, and the fact that a large number of patients remain undiagnosed, no opportunity should be missed to identify new cases of diabetes and bring them to medical attention.

There is also a bias among health care professionals that hyperglycemia is just not that important in the hospital setting. At least part of that is due to fears that many doctors have about using insulin. Even though insulin has been around since the 1920's, a lot of physicians are still uncomfortable with its use. They worry because there are lots of different kinds of insulin, and no clear standards for dosing. Different people use different amounts and schedules of insulin, and this lack of standardization can be bewildering to doctors who don't use insulin regularly. Even among endocrinologists, there has been a bias toward "letting the patient run high" in the hospital. Clearly, we don't let blood sugar levels go off the charts, but we tolerate levels in the 180-220 mg/dl range that most of us would find unacceptable in a clinic patient. Why? Well, the mantra has been that hyperglycemia causes complications over years, which will not be

affected by a few days or even weeks of elevated sugar levels. Conversely, hypoglycemia, or low blood sugar, can happen quickly and can be lethal if not detected and treated promptly. Patients in the hospital often have irregular nutrition, perhaps because they have vomiting, or are comatose, or are getting surgery the next day, or a million other reasons. In that setting, the risk of hypoglycemia with insulin treatment is enhanced, and most diabetes specialists would argue that a blood sugar of 200 is a safe place to be.

A few new studies, however, call this approach into question. In a paper published in the *Journal of Clinical Endocrinology and Metabolism*, data are reported from an Atlanta hospital showing that almost 40% of all patients admitted to the hospital had elevated blood sugar levels. Two-thirds of those were known diabetics, while the other one third were not known to have diabetes. Those patients with new onset hyperglycemia were almost ten times more likely to die in the hospital than people with normal blood sugar. Fine, you say, those people were obviously just sicker than the people with normal sugars; we already know that many different kinds of illness, ranging from infections to cancer, can cause a transiently elevated blood sugar level.

Well, another study, published in the *New England Journal of Medicine*, has raised eyebrows among endocrinologists, intensive care unit physicians, and other docs alike. These authors looked at very ill patients in a surgical ICU in Belgium. Altogether, they looked at over 1500 patients with a wide range of medical problems. They split these people into two groups; in one group, IV insulin was used to keep blood sugar levels as close to normal as possible. The other group only got insulin if their blood glucose went over 215 mg/dl, and even then they only received enough insulin to keep the sugar between 180 and 200 mg/dl. Remember that some of these patients were known to be diabetic, some were previously undiagnosed diabetics, and some did not have diabetes at all, but had high blood sugar levels in response to the enormous stress their bodies were under. The group that got intensive insulin ended up with an average blood sugar of 103 mg/dl, which is spot on normal. The second group had an average blood sugar of 153 mg/dl, which is pretty typical for a lot of sick patients in the hospital.

So how did they do? The shocking result was that the people getting intensive insulin were half as likely to die as those getting more moderate doses. They were also about half as likely to develop a life threatening blood infection, kidney failure, or to require blood

transfusions. The unmistakable conclusion is that high blood sugar (or reduced insulin levels) is not simply a marker of how sick someone is, but is also a direct contributor to the problems that plague ICU patients.

Will this study change the way we do business? Probably, over time. Doctors will likely want to see additional data, collected over the next few years, before they begin to erase some of their long-held prejudices against tight sugar control in the hospital. In the meantime, other benefits are likely to appear. For one thing, every patient should get a blood sugar level drawn as they enter the hospital, and many people with previously undiscovered diabetes will get their diagnosis. This will hopefully allow them to develop a plan with their doctor for keeping their diabetes in check. And sooner or later, that will hopefully include a plan to keep things in check both at home and in the hospital.

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