Death to the Sliding Scale!

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The practice of sliding-scale insulin management persists even though it has been called “a relic from the past” that “should be left in the medical history books.” 1 It remains a common practice in many health care settings. And, in my opinion, it is a prime example of a diabetes treatment strategy that makes no sense but that many providers continue to employ without regard for common sense or science.

Some would say that the argument surrounding the practice of sliding-scale insulin administration is merely a matter of semantics and that, in today’s world of basal-bolus insulin regimens, “sliding scales,” “correction boluses,” “algorithms,” and “supplemental insulin” are really just the same thing. I would contend that, in some cases, correction boluses, algorithms, and supplements are actually sliding scales in disguise and, as such, are problematic.

Still, this editorial will focus on the old concept of a sliding scale—a concept that is still alive and well throughout the United States. It is still used by many physicians, and it is still taught to many of our health care students and medical residents. Sliding scales are not found in students’ textbooks, but they are still learned through observation and practice.

My impetus for writing this editorial came from a recent personal experience that left me frustrated and angry—frustrated over how my own father-in-law’s diabetes was being managed in a hospital setting, and angry because I could not protect him from the effects of an outdated insulin management strategy that remains pervasive despite numerous studies illustrating its shortcomings and editorials calling for its demise.2–5

Over the past several years, my father-in-law has been hospitalized repeatedly for treatment of complications related to diabetes. Two recent incidents involving his care illustrate yet again that sliding scales don’t work.

In the first instance, my father-in-law was given a reduced evening meal dose of regular insulin because of a low blood glucose reading just before the meal. He was then given regular insulin based on a sliding scale when he had an elevated blood glucose level at 10:00 p.m. with his usual dose of NPH. He was found with a blood glucose level of 28 mg/dl at 2:00 a.m.

My mother-in-law wanted an explanation; this doesn’t happen at home. But no one providing his care could quite figure out what had caused this. My father-in-law is an 84-year-old man who has multiple complications including coronary artery disease with congestive heart failure (CHF), renal disease, peripheral vascular disease, and neurogenic bladder.

I expressed my total exasperation to my husband after hearing about this incident. Although I have spent years trying to improve diabetes care, I still can’t even protect my own family from poor diabetes care.

My husband responded that, when given the option, humans will choose the easiest solution to any problem. And you know, I suppose he’s right. The sliding-scale approach prevents phone calls to physicians. Doctors can leave standing orders for insulin doses to match each range of blood glucose level and then never be bothered by their patients’ troublesome management issues.

Given the knowledge we have today, however, this practice is not acceptable. It is not safe. It is not evidence based. It does not make sense.

I experienced this firsthand during the second incident, which occurred as I was supporting my father- and mother-in-law through a surgical procedure in the same facility. This time, he was NPO at 8:00 a.m. for a 3:00 p.m. surgical procedure. He was given a clear liquid breakfast, and when I asked about his insulin, I was told it was being held. After I suggested that this was not the right decision, the nurse returned with his full dose of 70/30 insulin. I then suggested that this also was not the right decision and asked her to call the physician. After calling the physician, the nurse returned with 10 units of 70/30—one-third of my father-in-law’s usual dose—and indicated that the doctor had ordered a sliding scale.

Because of my father-in-law’s CHF and renal status, no fluids were ordered. At noon, his blood glucose was 194 mg/dl, and the sliding scale called for 4 units of regular insulin. At 2:30 p.m., he was becoming agitated, and his pulse had increased. I requested a blood glucose reading—64 mg/dl! The nurse was surprised. How did I know that? Again, the physician was called. This time, his order was to monitor every 30 minutes until surgery.

What was to have been a 3:00 p.m. surgery actually occurred at 9:00 p.m. I will save the editorial comments regarding why one chooses to make an 84-year-old man the last case of the day after 12 hours of fasting. However, on arrival to the pre-op holding area, the nurse anesthetist chastised us. He should not have been given insulin at all, because a blood
glucose of 94 mg/dl was unacceptable for surgery for someone with diabetes.

One could suggest this is not a common scenario. But I do not believe that. I believe that this is common practice and that, as diabetes experts, we need to give this topic more educational attention.

My mentor has taught the patterned management approach to diabetes care for more than 35 years. Its emphasis of prospective, rather than retrospective, insulin adjustment has always made sense to me. And yet, sliding scales remain the method of choice, particularly in hospital settings. This is true despite all of the studies showing that not only people with known diabetes, but also others who are critically ill, should be managed intensely with insulin while in the hospital. Doing so has been shown to reduce mortality and morbidity rates. And one simply cannot achieve the necessary intensity of glucose control when relying on a sliding scale for insulin administration.

If knowing what is best for the health of people with diabetes is not enough to change our treatment strategies, perhaps the potential to save money will be. Hospital and health plan administrators should be calling for improved glucose control strategies and diabetes management techniques, if not for our patients' well-being, then simply because decreasing mortality and morbidity will reduce costs.

One might suggest that there is no evidence to support any one insulin management method over the others. But I would contend that there are data today that support the importance of achieving normalized blood glucose levels for patients in the hospital. There are methods to achieve this level of control using basal insulin for short procedures or intravenous insulin for more prolonged procedures. But how do we change the current practice of sliding-scale insulin administration? I believe that several actions are necessary.

First, we must stop using sliding-scale terminology. It was even in the American Diabetes Association (ADA) position statement, “Hyperglycemic Crises in Patients with Diabetes Mellitus” until 2002. Lorber called for a change in a letter to the editor of Diabetes Care, and the recommendations were revised. The revisions reflect a more physiological approach. We must decide on appropriate new terminology: “insulin algorithm” versus “corrective action” versus “insulin supplementation.” We must use the chosen terminology consistently.

The ADA should take the lead in providing medical practice guidelines that will assist in the replacement of the relic sliding scale with more effective techniques. Medical and nursing textbooks should include chapters offering practice guidelines for diabetes care that include physiological insulin replacement strategies.

We must take every opportunity to inform future health care practitioners about the physiological management of diabetes and the need for prospective, rather than retrospective, treatment. We must continue to share the landmark studies that have proven the importance of optimal glucose control and the efficacy of insulin use even in traumatized, physically stressed hospitalized patients who do not have diabetes.

I have already conducted an in-service training session at the facility where my father-in-law was hospitalized. The physicians were receptive, and I have a second program scheduled. If we take every opportunity to present the data and provide new options for improved management and care, reasonable practitioners will listen.

We must change this antiquated system for the health and safety of all people with diabetes. We must truly relegate the sliding scale to the pages of medical history.

References

4 Shagan BP: Does anyone know how to make insulin work backwards? Why sliding scale insulin coverage does not work. Pract Diabetol 9:1–4, 1990

Note of disclosure: Ms. Childs has served on an advisory panel for and has received research support and honoraria for speaking engagements from Aventis, which makes insulin products for the treatment of diabetes.