

## Physicians' Corner

### Is Diabetes Mellitus Ready for the "Do It Yourself" Approach?

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More than 40 years ago, I helped my father build a brick walkway. It was my first "do it yourself" (DIY) project (actually, it was more like "watch it myself"), and I still feel a sense of pride and achievement whenever I use that walkway at my parents' house. Since then, "DIY" has become a routine part of most of our lives.

For decades, Americans have embraced and, at times, been forced into the DIY mode. The idea of being our own plumber or electrician is quite appealing to some. Tackling repair jobs can produce a real sense of accomplishment as well as cost savings. On the other hand, pumping your own gas on a wintry, rainy night is probably undertaken more from the necessity thrust upon us than a sense of pride that we can fill the tank unassisted.

Whatever the motivation, the DIY phenomenon has become deeply rooted in our culture. Whole industries have arisen to support our passion for DIY. We are now doing everything from assembling our own furniture to becoming our own grocery store checkout clerks. At some point, people realized they like to be participants, especially if that participation would impact the cost or simplicity of a project. The idea that "you can do this" seems to appeal to most of us at a powerful level.

An article published in 1997 about glycosylated hemoglobin (A1C) control in patients with type 2 diabetes mellitus (DM) hinted at this very same notion.<sup>1</sup> The study analyzed factors related to poor disease control in patients with type 2 DM who were being treated by Michigan primary care physicians. The authors determined that poor self-care ability was associated with A1C values in the highest quartile. They suggested that improving this self-care ability might be a useful strategy for enhancing A1C control. Although the term "self-care ability" encompasses a broad spectrum of DM care skills (eg, diet, self-monitoring of blood glucose, healthy lifestyle), it clearly highlights the fact that DIY may contribute to better DM care. But how far does this DIY concept extend? While everyone can change a light bulb, only a very few can wire a house! Exercising, watching one's weight, monitoring diet, and even self-monitoring of blood glucose are mainstays of self-care. But can the DIY concept go even further than this in DM care?

I have written often in this column about the increasing number of patients with type 2 DM and the expanding role of the primary care community as surrogate diabetologists. To meet the present and future needs of our diabetic patients, primary care providers must constantly explore safe, effective, and efficient paradigms to institute and advance care so that our patients can achieve target levels of A1C. Questioning whether patients can be served as well as or better if they "do it themselves" when it comes to insulin therapy is therefore no idle inquiry.

Simplified basal insulin titration algorithms have been available for years and are now readily accepted into practice. Studies using insulin glargine have looked at an algorithm of weekly insulin titration (2-4-6-8 algorithm)<sup>2</sup> and at a 3-day adjustment algorithm (3-2-1 algorithm).<sup>3</sup> With insulin detemir, a 3-day adjustment algorithm (3-0-3 algorithm) is available.<sup>4</sup> These represent well-designed, easily applied algorithms for basal insulin adjustment (**Table**). Can patients safely

**Table.** Basal insulin titration algorithms.

Algorithm Name	Algorithm Function (all start at 10 U/d of basal insulin)*†	Reference
"2-4-6-8"	Add 2, 4, 6, or 8 U of insulin glargine weekly until the mean FBG is 100 mg/dL	2
"3-2-1"	Add 2 U of insulin glargine every 3 days until the mean FBG is 100 mg/dL	3
"3-0-3"	Add 3 U of insulin detemir every 3 days until the mean FBG is 100 mg/dL‡	4
"1-1-100"	Add 1 U of insulin glargine each day until FBG is 100 mg/dL	5

FBG = fasting blood glucose.

\*See reference citations for full details of these functions.

†See reference citations for low FBG actions.

‡See reference citation for possible twice-daily dosing information.

and effectively institute these titration regimens on their own, with minimal provider interaction? Would doing so improve patient satisfaction?

Each of the studies cited in the **table** demonstrates that the use of a forced titration algorithm is both safe and effective. According to results of these studies, there were no episodes of serious hypoglycemia or other adverse events. Safety is clearly not a problem when using a forced-titration algorithm for basal insulin. Additionally, the use of a forced-titration algorithm controlled by the patient appeared to enhance the ability to achieve desired A1C end points.<sup>3,5</sup>

Interestingly, the study by Davies et al<sup>3</sup> showed that the safety end points were the same for physician-driven titration algorithms as they were for patient-driven algorithms. However, the patient-directed algorithm resulted in lower A1C values and lower fasting blood glucose levels. All this occurred with no significant increase in serious hypoglycemia. Obviously, patient-driven titration algorithms are both effective and safe. These findings suggest that delivering titration instructions to the patient for DIY adjustment may lead to better A1C values without any significant safety issues.

But what do patients think of assuming the responsibility of titrating their own basal insulin dose from a low starting point to an effective level? It is one thing to transfer the responsibility of titrating insulin to the patient, and another thing altogether to assume that our patients are pleased by the DIY approach. Historically, physicians have conducted all therapeutic interventions, so a DIY approach is something of a departure from the status quo.

Will patients be satisfied determining their own therapeutic future when it comes to basal insulin dose adjustments? In an intriguing article by Gerstein et al,<sup>5</sup> the answer to this question is a resounding "yes." In this study, 405 patients who were failing to reach goal A1C levels with the use of 0, 1, or 2 oral agents were assigned to receive an oral agent or a basal insulin (glargine). The insulin-treated group was asked to advance their dosage by 1 U every day until the fasting blood glucose declined to 100 mg/dL (1-1-100 algorithm). Patient satisfaction was assessed using a survey to determine if they liked the DIY approach. There were several important findings. First, the insulin-treated group was 1.7 times more likely to achieve the A1C target (ie, 2 consecutive A1C readings <6.5%) compared with the group receiving multiple oral agents. Clearly, the patients who used an algorithm to make daily adjustments in basal insulin dosage achieved better A1C scores than the patients who took up to 3 oral agents. But what did patients think of this approach? In the study by Gerstein et al, patients who were allocated to insulin glargine with self-adjusting dosing had greater increases in treatment satisfaction than patients receiving dose adjustments of oral agents by a physician.

What does all of this mean for those of us in primary care? First and foremost, it appears that it is safe to assign the titration of basal insulin dosages to our patients. All 4 studies<sup>2-5</sup> referenced in the **table** found no compromise in safety. The availability of a peakless, 24-hour basal insulin has simplified the administration of basal insulin to such a degree that this therapy can be safely advanced by the patient. Second, these patient-driven, forced-titration algorithms are effective in terms of lowering A1C. Again, the studies cited in the **table** all suggest that A1C target achievement is improved by self-directed, forced-titration algorithms. The outcome A1C of patient-driven algorithmic adjustment is often even better than that achieved by physician-directed changes.<sup>3,5</sup>

Finally, turning over the task of titrating the basal insulin dose to the patient is not only an efficient technique for the primary care provider, but it is a strategy that is well received by our patients. Based on literature sources and my 25 years of practice experience, it appears to me that patients like to be in control of their diabetic care. By involving the individual in the treatment process from the beginning—especially as the one who determines basal insulin dose—our patients become engaged in a positive sense. Self-management is associated with improved outcomes and more satisfied patients.

Any strategy that simplifies the initiation and advancement of effective DM therapy is good. Any strategy for advancing therapy that improves patient satisfaction is equally good. And a strategy such as DIY basal insulin titration that accomplishes both these end points is even better.

Clinicians must strive to make the diabetic treatment experience as simple and as effective as possible. Such a strategy benefits both the patient and the clinician. Self-titration algorithms are a great leap toward these ends. For example, the "1-1-100" algorithm by Gerstein et al<sup>5</sup> is easy to teach and to execute. Almost all patients will have the ability and confidence to make the very small, daily incremental adjustments that take them closer and closer to goal levels of fasting blood glucose. Such a simplified approach makes institution and advancement of therapy easier for everyone. In a recent editorial in the *New England Journal of Medicine*, McMahon and Dluhy<sup>6</sup> commented that "the dosing and titration algorithm for insulin is just as important as the type of insulin chosen." They go on to state that "many patients can titrate their own insulin doses according to simple rules with minimal oversight from practitioners." Indeed, it appears the time has come for a DIY approach to basal insulin adjustment.

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