Insulin Therapy for Diabetes: Is the Future Now?

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On a recent consultation for the inpatient endocrine service, we were asked to see a 38-year-old woman with a 22-year history of type 1 diabetes. Her admission had nothing to do with diabetes, but she was on dialysis for end-stage renal disease, and she was blind from retinopathy. She was receiving a fixed-mixed ratio of twice-daily insulin but noted that for most of her life with diabetes she was prescribed once-daily insulin.

Are these stories ever going to go away, or will they continue until there is a "cure"? My concern is that this all-too-common scenario will not disappear for many years.

At a recent meeting with more than 100 endocrinology fellows in the audience, I asked the group how many of them received formal training in the use of insulin therapy. To my surprise, fewer than 10 raised their hands. Several years ago, another endocrine fellow told me that during his 2-year fellowship, he did not manage even one patient with diabetes. These diabetes experts of the future are not receiving the critical training or learning about the "clinical pearls" they must know in order to make the best use of insulin to help patients achieve HbA_{1c} targets while minimizing the risk for hypoglycemia.

I have thought for many years that most endocrinologists do not really learn how to manage insulin therapy until their formal training is completed and they are out in the "real world." This, of course, includes insulin pump therapy. By the same token, it is safe to say we need to take a long, hard look at the way we

train primary care residents in the use of insulin.

One problem with insulin therapy is that there is no standard for how best to use this medication. This is very different from, say, the treatment of hypertension in patients with diabetes. For the latter, there is not only consensus for treatment target goals, but also agreement about which agents to use first and which combinations work best. A similar situation exists for the treatment of hypercholesterolemia in patients with diabetes. However, with insulin therapy, it almost seems that there are as many different strategies as there are experts.

To me, the confusion and lack of consensus is quite understandable. Truly understanding issues such as when to use regular insulin, when it would be better to use insulin lispro (Humalog) or aspart (Novolog), when it would be reasonable to use morning NPH without lunchtime insulin, and what the differences are between ultralente insulin and insulin glargine (Lantus) simply requires a great deal of experience. Perhaps that is why many endocrinology fellows note that their best opportunity for learning insulin use is to work at camps for children with diabetes. This "real-world" scenario vastly differs from the often sterile clinics of their training programs.

The problem of teaching students and young physicians about insulin therapy is not new, but it seems magnified now because of the recent introduction of two new insulin preparations into the United States. And what about physicians who are already in practice and have been so for perhaps several decades? How do these doctors learn about emerging strategies for insulin therapy?

The answer is that many of them don't. At one recent conference, an internist mentioned that this was the first diabetes-related program he had attended in more than 10 years. Ten years with no continuing medical education (CME) related to diabetes—think of all of the changes we have seen in diabetes treatment in the past decade! The Diabetes Control and Complications Trial; the United Kingdom Prospective Diabetes Study; the effects of angiotensin-converting enzyme inhibitors, aspirin, and statins; the elimination of animal-species insulin; and the introduction of metformin, insulin lispro, thiazolidinediones, alpha-glucosidase inhibitors, minimally invasive glucose monitoring, insulin aspart, and insulin glargine are only a few of the recent advances in diabetes care. With no formal training for the past 10 years, how can physicians keep up? They can't.

More training is required, and I believe that, of all of the areas of diabetes, the need for further education about insulin therapy should be a priority. In my experience, very few physicians feel comfortable with insulin therapy, especially those who have recently completed their training. This is particularly concerning because it has been predicted that an estimated 26% increase in insulin use among type 2 diabetic patients in the United States will occur over the next 5 years.[1] Given the epidemic proportion of type 2 diabetes in younger patients, especially women of child-bearing age, I wonder if this is actually an underestimate.

So how do we go about improving this situation? One obvious answer is to place more emphasis on insulin therapy in both graduate and postgraduate medical education. The 45-min medical student lecture or 30-min dinner lecture before a baseball game or Broadway show has not worked. More time is needed because no matter how simple we try to make it, insulin therapy is more complicated than most other treatments in medicine. Half-day or day-long CME seminars are required, perhaps as part of a national program.

Furthermore, it would be ideal if there were more standardization in how to best use insulin. This may be more difficult to accomplish. Still, the new insulin analogs that are specifically designed for prandial needs and basal replacement may do more toward building a consensus on how best to use insulin than anything else since its discovery.

One concern already described since the introduction of insulin glargine is the inappropriate use of this basal insulin for prandial replacement. It needs to be emphasized that patients with type 2 diabetes already doing well on twice-daily injections of NPH and regular (or NPH and insulin lispro) should not be switched to once-daily insulin glargine. Patients already requiring both prandial and basal insulin rarely are able to alter the natural progression of β-cell deficiency so that only basal insulin will be required. The more likely scenario is that maintaining target HbA_{1c} concentrations over time will require a multi-component insulin regimen with both prandial and basal elements. The concept of switching patients from two injections to one shot, or from three injections to two is a message many patients would like to hear. But it is not consistent with our current understanding of the pathogenesis and natural history of type 2 diabetes. Again, this is all remediable with better education.

During the next few years, we will likely see the introduction of more new basal and prandial insulin analogs, including different preparations of pulmonary inhaled insulin. Perhaps this will remove some of the stigma of insulin therapy in the minds of both physicians and patients.

The potential future of insulin therapy in this country should be quite bright. We now need to better train ourselves and our patients to use this important peptide in the best possible ways.

REFERENCE

[1]Sylvester CJ: *UBS Warburg Research Note.* Generex Biotechnology, July 9, 2001