

Introduction

The Evolving Science and Practice of Insulin Therapy

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Why was I so captivated by the practical aspect of this Congress? Irl Hirsch, MD, alluded to possible reasons himself during the 66th Annual Scientific Sessions of the American Diabetes Association, which were held earlier in the summer (June 9–13, 2006) in Washington, DC. During one discussion, he reminded the panelists and audience that 90% of patients with type 2 diabetes mellitus (DM) will be cared for by the primary care community; and in the primary care community, practicality is of extreme importance. Any new treatment to be widely accepted in primary care must be affordable, must be reasonably simple to institute, and must work with a minimum of adverse effects and problems—in short, it must be practical. The widespread adoption by many primary care physicians of the earlier use of single daily doses of basal insulin therapy is a testimony to the power of practicality. Of course, this drive for practicality must always be balanced by the need for excellence in care. The inaugural Insulin Congress faithfully supports both standards.

As might be expected, there was a 2:1 ratio of presentations and posters specifically relating to type 2 DM versus type 1 DM. The fact that ~95% of currently treated DM is of the type 2 variety naturally drives such interest. Although the information about type 1 DM treatment is valuable, it is of practical concern that physicians be informed about insulin and novel agents and how to incorporate them into regimens for patients with type 2 DM. New consensus algorithms for treatment that focus on earlier insulin use as a matter of efficacy and cost-efficiency highlight the need for physicians to grasp how insulin can best be used early in the treatment of type 2 DM.¹ Understanding the treatment armamentarium is increasingly important, and the posters and oral presentations at the Insulin Congress contributed significantly to this understanding. Much work went into these presentations, which in and of themselves are reflective of the trends and interests that will be driving new concepts and research in DM treatment.

The focus on new insulins was reflected by the initial oral presentation comparing the time–action profile of basal insulin detemir and basal insulin glargine. This study by Klein et al generated much discussion. Underscoring the intense interest in the newer insulins was a poster by Porcellati et al investigating the pharmacokinetic and pharmacodynamic characteristics of therapeutic doses of the insulin analogues glargine and detemir. A number of posters focused on comparing various insulin products and exploring aspects of initiation of therapy using different insulin regimens. These posters conveyed valuable information for all practitioners who treat patients with DM.

A significant number of posters relating to insulin (and pramlintide) included data pertaining to postprandial glucose excursion. This is intriguing in light of the excellent lectures on topics related to glycemic excursion given by Dr. Hirsch and by Michael Brownlee, MD, in the final Insulin Congress session. Several studies evaluated the effectiveness of a variety of basal-oral, basal-bolus, or biphasic insulin strategies in achieving target glycosylated hemoglobin (A1C) levels, as well as the effect of these strategies on postprandial glucose excursion. In the environment of increasing awareness of the impact of postprandial glycemic excursion on diabetic complications, these studies are of great value. This emerging research may eventually guide us to see beyond control of A1C as the sole measure of therapeutic success and lead to additional evaluation of postprandial glucose dynamics as part of a strategy to minimize diabetic complications in all patients with type 2 DM.

Hospital management of hyperglycemia and DM received considerable attention at the Congress. This is certainly an area of emerging concern for all involved in inpatient care. A recent issue of *Insulin* concentrated on inpatient strategies for

The inaugural Insulin Congress was held November 10–12, 2006, in Washington, DC. The Congress was chaired by Irl Hirsch, MD, and featured a number of pre-eminent experts in diabetes mellitus research and treatment. Cutting-edge information was provided in lectures and breakout sessions, as well as in posters and oral presentations. The forum set a consistent standard of excellence in the scientific arena, and a distinct quality of practicality characterized the meeting. Everyone in attendance left not only with new information but also with concepts that could be used to improve their daily clinical practice. For those interested in the lecture and breakout content of the Congress, access is available on the Insulin Congress Web site (<http://www.insulincongress.org/>). Most of the presentations include not only audio content but slide decks as well. This is an opportunity to hear some of the world's most renowned experts teaching the latest information about insulin therapy.

improved glycemic control. There is accumulating evidence which suggests that good control of patients' blood sugar in the hospital produces generally better outcomes. The posters at the Insulin Congress focused on methods and strategies for achievement of inpatient glycemic control, as well as on the benefits of such treatment. An interesting oral presentation by Pollom and Zhang revealed the possibility of achieving shortened length of stay and reduction of postoperative infections by using an insulin protocol in a community hospital. Sharma delivered an oral presentation showing the impact implementing a computerized patient record system (CPRS) had on glycemic control at the Indianapolis Veterans Administration Medical Center (Indianapolis, Indiana). Implementation of the CPRS led to improving glycemic control without increasing hypoglycemia and was well received by nurses and providers. These studies, which focused on methods and benefits of better inpatient glycemic control, are of significant value to those of us who practice in a community hospital setting.

Five posters and one oral presentation dealt with the incretin mimetic pramlintide. These studies assessed the use of this novel agent in both type 1 and type 2 DM. One poster examined the impact of pramlintide therapy on oxidative stress. In a similar vein, the oral presentation by Lush noted that pramlintide therapy in intensively treated type 1 DM patients results in a decrease in high-sensitivity C-reactive protein (hsCRP), a marker for cardiovascular disease. This finding was thought-provoking, as we begin to focus more attention on postprandial control and its impact on complications. The fact that lower hsCRP levels occurred in the pramlintide-treated patients, despite glycemic control similar to the comparator group, raises the question of the potential impact of postprandial control as we craft a strategy for successful treatment of DM.

As a primary care internist, I was especially glad to see several posters relating to methods for transitioning patients from oral therapy to intensive insulin management. Practitioners are often reluctant to make this advancement of therapy, despite understanding that the natural history of the disease will demand such a progression. These studies provided a wealth of practical information about real-world strategies for implementing insulin therapy in the patient whose disease is inadequately controlled using oral agents alone. The poster by Tanenberg et al included information about the actual doses of insulin glargine incorporated to achieve the targeted A1C end points in their patients. For reasons unclear to me, primary care providers all too often are reluctant to push basal insulin beyond ~30 IU/d. The study of >4000 patients by Tanenberg et al found that 60 to 80 IU of insulin glargine daily achieved targeted A1C values (with minimal hypoglycemia). These findings should encourage every provider to advance basal insulin therapy to fasting blood sugar goal levels and not stop short at artificially perceived low daily dose limits.

In keeping with the theme of the Insulin Congress, several posters reported on novel insulins—Technosphere and

Viaject. Also, King and Armstrong presented a very interesting poster on "over basaling" and "under bolusing" in type 1 DM patients using insulin pumps. Their conclusion was that current formulae overestimate basal needs and underestimate bolus needs. Although their work focused on patients using insulin pumps, this same phenomenon may be occurring in type 2 DM therapy when providers push basal insulin too persistently, attempting to achieve an A1C target instead of timely introduction of a rapid-acting prandial component. The data by Monnier et al on glucose levels contributing to A1C achievement would suggest that there comes a time in achievement of control that more basal insulin is not the right strategy in type 2 DM either.²

Several posters discussed patient management strategies. Particularly useful was the poster by Bergenstal et al, which evaluated 2 different mealtime titration methods for prandial use of the rapid-acting insulin glulisine in patients with type 2 DM who are already taking a basal dose of insulin glargine. As newer treatment paradigms orient toward early inclusion of prandial insulin in addition to basal insulin, primary care providers will benefit from safe and effective proven algorithms to accomplish the addition.

Pediatric and neonatal DM care issues were also presented. Of particular interest was the poster by Avni and Kaufman showing that early treatment of modifiable, traditional DM-related and nontraditional risk factors for cardiovascular disease in youth with type 1 DM may avert progression to atherosclerosis. This study of individuals aged ~15 years is a sobering reminder to all of us who treat patients with this disease that we should be aggressively working to reduce the risk of macrovascular disease at every stage of life with DM.

A number of other posters addressed issues such as physiology, patient satisfaction, and complications of treatment. All were exceedingly well done and reflect the breadth of interest in DM and insulin therapy. Each and every one is worth the careful attention of the reader.

This supplement is a valuable reference for all practitioners. The poster and presentation summaries present new insights into the wide world of insulin and incretin mimetic therapy. The content is an excellent overview of where we are in insulin therapy today. There are obviously many useful clinical lessons to be gleaned from the Congress. The endocrine specialist, as well as the primary care provider, faces an epidemic of patients with DM. Any information that enables us to become better informed or to deliver better care is of great practical interest. The Insulin Congress—and the scientific content it showcased—was certainly a success and contributed enormously to the understanding and implementation of insulin therapy.

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