What You Need to Know

Individualization of Insulin Therapy for Type 2 Diabetes Mellitus

Overcoming Clinical Inertia

Evidence-based guidelines for the use of insulin as part of intensification of treatment for patients with type 2 diabetes mellitus who are not at their therapeutic goals are available from authoritative sources, including the American Diabetes Association, European Association for the Study of Diabetes, American Association of Clinical Endocrinologists, and American College of Endocrinology, but there is a gap between what is recommended in these guidelines and what is observed in clinical practice. Various patient- and clinician-related factors contribute to delays in initiating insulin and intensifying therapy, a phenomenon referred to as clinical inertia. Patient-related factors include reluctance to use injections, concerns about side effects from insulin (especially weight gain and hypoglycemia), and a perception that a need for insulin reflects worsening of health. Clinician-related factors include time constraints as well as fear of adverse effects. A large amount of time is needed to teach patients about insulin therapy and monitor their response. Primary-care providers have limited time to devote to the initiation of insulin therapy in complex patients with multiple comorbidities (e.g., hypertension, dyslipidemia). Some clinicians are unaware of what treatment guidelines to follow or are unfamiliar with newer guidelines, so they resort to using older guidelines or following practices learned years ago as part of their medical education.

Team-based care with input from a pharmacist who assumes responsibility for providing patient education and monitoring response to insulin therapy can be instrumental in overcoming this clinical inertia and achieving therapeutic goals. Many patients with type 2 diabetes who have not achieved their glycemic goals seek to avoid intensification of diabetes drug therapy by redoubling lifestyle modification efforts (healthy meal planning, physical activity). They view the need for intensification of drug therapy as a reflection of inadequate efforts to address lifestyle changes. The pharmacist needs to explain to such patients that failure to achieve glycemic goals probably reflects disease progression, not an inadequate effort to following weight management and exercise recommendations. Postponing intensification of drug therapy is generally not advised because earlier intervention can delay disease progression.

Strategies that pharmacists and other clinicians can use to convince patients who are reluctant to start insulin to try the drug include the following:

- Asking the patient to explain his or her concerns about insulin,
- Offering the patient a short-term trial of insulin and explaining that the need for insulin might be finite and a long-term commitment is not necessarily needed, and
- Administering a test subcutaneous injection (e.g., normal saline) in the office, clinic, or pharmacy.

Listening to the patient's concerns is an important part of the strategy for pharmacists hoping to convince a patient to start insulin therapy. Gaining an understanding of a patient's fears and motivations can enable the pharmacist to address those concerns. It is important that the patient try an injection while in the office, clinic, or pharmacy because this experience is likely to alleviate many concerns associated with the use of needles.

More information

- American Diabetes Association. Standards of medical care in diabetes—2017. *Diabetes Care.* 2017; 40(suppl 1):S1-S135.
- Khunti K, Wolden ML, Thorsted BL et al. Clinical inertia in people with type 2 diabetes: a retrospective cohort study of more than 80,000 people. *Diabetes Care.* 2013; 36:3411-7.
- Farsaei S, Radfar M, Heydari Z et al. Insulin adherence in patients with diabetes: risk factors for injection omission. *Prim Care Diabetes.* 2014; 8:338-45.

Initiative Faculty: Roots of Interest in Diabetes

An educational initiative coordinated by ASHP Advantage is under way with a series of learning opportunities focusing on individualized insulin therapy for type 2 diabetes and an emphasis on new insulin options. Curtis Triplitt and Joshua Neumiller will present a webinar, *Ask the Experts: Beyond the Basics in Managing Insulin and Other Antihyperglycemic Therapies for Type 2 Diabetes*, on Thursday, March 23, at 2:00 p.m. Eastern. The webinar will be archived for persons unable to attend. Additional information about the webinar and other components of the initiative is available at the initiative web portal.

Drs. Triplitt and Neumiller are just two of the four faculty participating in this initiative. All are experts in diabetes management, although the origins of their interest in working with patients who have this disease vary.

Curtis Triplitt began his pharmacy career at the William S. Middleton Memorial Veterans Hospital in Madison, Wisconsin, working in a clinic position half of which was devoted to diabetes and the other half to anticoagulation. The diabetes aspect of this practice captured his interest, and he later accepted a position at the Texas Diabetes Institute in San Antonio. "That was 18 years ago, and I've never looked back," said Dr. Triplitt. He works with an endocrinologist to manage patients with diabetes, and he is heavily involved in research related to type 2 diabetes. Over the years, he has published many manuscripts on the mechanism of action of new classes of medications used to manage type 2 diabetes.

Joshua Neumiller has a personal connection to diabetes because about a year after graduating from pharmacy school he was diagnosed with type 1 diabetes. Initially he was overwhelmed by the impact of receiving the diagnosis and the challenge of incorporating insulin use into daily life, and this experience prompted him to change his career path to focus on providing care to patients with diabetes. He has found that his personal experience overcoming the challenges in optimizing glycemic control is helpful to others. Dr. Neumiller currently works as a consultant pharmacist in the home care setting and is on faculty at Washington State University. He helps patients with diabetes medication management and is also involved in conducting clinical trials of medications for type 1 and 2 diabetes.

Susan Cornell has a personal connection to diabetes because her mother was diagnosed with type 2 diabetes in the mid-1990s before the release of findings from the landmark trials that form the basis for the current approach to therapy. This diagnosis spurred Dr. Cornell to become thoroughly knowledgeable about diabetes and its treatment. She quickly realized that the care provided for her mother and others with diabetes was not optimal, and she became increasingly involved professionally in providing education and pharmaceutical care to patients with diabetes. Dr. Cornell's current clinical practice is with the Bolingbrook Christian Health Clinic in Bolingbrook and Will-Grundy Medical Clinic in Joliet, Illinois. She trains, educates, and supervises students from the colleges of medicine, pharmacy, and health sciences as they provide diabetes education classes, individualized diabetes care, and medication therapy management for patients in underserved community clinics.

Initiative Faculty

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Andrew Bzowyckyj's career path was atypical. As he pursued a career in academia, a position became available with a practice site based in an endocrinology clinic. Because his residency training was in family medicine, he was initially concerned about focusing narrowly on diabetes. He soon realized, however, that diabetes is one of several common, interrelated medical conditions with broad implications, all of which require individualization of care. At the primary care and endocrinology clinics at Truman Medical Centers—Hospital Hill in Kansas City, Missouri, Dr. Bzowyckyj provides comprehensive medication management and diabetes self-management education to patients. His services are obtained by referral, and he works closely with the patient's primary care provider and other specialists to manage each patient's condition through the use of collaborative practice agreements. Dr. Bzowyckyj is able to combine his passions for teaching, clinical practice, and patient empowerment to help improve the health and wellness of his patients.

Role of New Insulin Products

Insulin therapy has changed substantially over the past 10 years with the introduction of new types and concentrations of insulins that may improve glycemic control, convenience, and adherence in patients with type 2 diabetes. New "ultra-long-acting" basal insulins with a duration of action exceeding 24 hours, concentrated insulins that allow injection of a smaller volume and cause less discomfort for patients with large insulin dosing requirements, and insulin pen devices that improve dose accuracy compared with conventional vials and syringes are among these advances.

The choice between older and newer insulin products is based primarily on efficacy, safety (especially hypoglycemia), convenience, and cost for an individual. The newer ultra-long-acting basal insulins insulin degludec and insulin glargine U-300 (300 units/mL) have been shown to be as effective for providing glycemic control as insulin glargine U-100 (100 units/mL)—the most often used basal insulin—and may reduce the risk for nocturnal hypoglycemia. These ultra-long-acting basal insulins are particularly useful for patients experiencing high intrapatient variability in insulin pharmacokinetics with other basal insulins, which may result in hypoglycemia. Although many patients can consider using these newer insulin products, use might best be reserved for patients who are experiencing hypoglycemia, especially at night, from other basal insulins. Patients with good glycemic control from older basal insulin products need not make changes to their diabetes regimen.

Recently two fixed-dose combination products containing a basal insulin plus a glucagon-like peptide (GLP)-1 receptor agonist in pens for once-daily administration were approved by the Food and Drug Administration (FDA): Soliqua (insulin glargine and lixisenatide, also known as LixiLan and formerly IGlarLixi) and Xultophy (insulin degludec and liraglutide, also known as IDegLira).

Soliqua is approved by FDA for use as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes mellitus inadequately controlled on basal insulin (less than 60 units daily) or lixisenatide. The 3-mL prefilled pen device contains insulin glargine 100 units/mL and lixisenatide 33 mcg/mL.

The other fixed-dose combination product, Xultophy, contains insulin degludec 100 units/mL and liraglutide 3.6 mg/mL in 3-mL pens. It is approved by FDA for use as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes mellitus inadequately controlled on basal insulin (less than 50 units daily) or liraglutide (1.8 mg daily or less).

These combination basal insulin and GLP-1 receptor agonist products are useful for targeting both fasting and postprandial blood glucose. The single daily injection could improve adherence by simplifying the drug regimen.

More information

» Becker RH, Dahmen R, Bergmann K et al. New insulin glargine 300 Units • mL^{-1} provides a more even activity profile and prolonged glycemic control at steady state compared with insulin glargine 100 Units • mL^{-1}. *Diabetes Care.* 2015; 38:637-43.

» Heise T, Nosek L, Bottcher SG et al. Ultra-long-acting insulin degludec has a flat and stable glucose-lowering effect in type 2 diabetes. *Diabetes Obes Metab.* 2012; 14:944-50.

Educational Opportunities in this Initiative

- Engaging the Experts faculty interview hosted by William A. Zellmer
- Discussion guide covering the role of insulin in managing type 2 diabetes (1.5 hr CPE)
- On-demand activity covering the basics of individualizing insulin therapy with a focus on new concentrated insulins (1.0 hr CPE)
- On-demand activity featuring application of concepts to clinical case vignettes (1.5 hr CPE)
- Ask the Experts webinar on March 23 addressing advanced challenges in managing type 2 diabetes (1 hr CPE)
- Additional e-newsletters

www.ashpadvantage.com/go/type2

Revised Algorithm for Combination Injectable Therapy

The American Diabetes Association (ADA) updates its standard of medical care in diabetes annually in January. The updated 2017 ADA standards include a revised algorithm for combination injectable therapy in patients with type 2 diabetes. The algorithm reflects the findings from studies demonstrating the non-inferiority for providing glycemic control of basal insulin plus a GLP-1 receptor agonist to basal insulin plus a rapid-acting insulin or two daily injections of premixed insulin.

According to the revised algorithm, combination injectable therapy should be considered for patients receiving basal insulin alone with an uncontrolled A1c despite titration to an acceptable fasting blood glucose concentration (or daily dose of basal insulin exceeding 0.5 units/kg). Adding a GLP-1 receptor agonist to basal insulin is now a recommended alternative to adding one rapid-acting insulin injection before the largest meal of the day or changing to premixed insulin twice daily to address postprandial hyperglycemia. Use of a GLP-1 receptor agonist plus basal insulin may be associated with weight loss instead of weight gain and a lower risk of hypoglycemia than combination insulin therapies, although tolerability and high cost may be issues.

The need for flexibility and convenience are considerations in choosing a therapeutic approach. The recent introduction of fixed-dose combination pen products containing a basal insulin plus a GLP-1 receptor agonist for once-daily administration facilitates use of this combination of injectable diabetes medications.

Strategies recommended by ADA for intensification of insulin therapy also are outlined in the revised algorithm.

More information

» American Diabetes Association. Pharmacologic approaches to glycemic treatment. Standards of medical care in diabetes – 2017. *Diabetes Care.* 2017; 40(suppl 1):S64-74.

» Diamant M, Nauck MA, Shaginian R et al. Glucagon-like peptide 1 receptor agonist or bolus insulin with optimized basal insulin in type 2 diabetes. *Diabetes Care.* 2014; 37:2763-73.

» Eng C, Kramer CK, Zinman B, Retnakaran R. Glucagon-like peptide-1 receptor agonist and basal insulin combination treatment for the management of type 2 diabetes: a systematic review and meta-analysis. *Lancet.* 2014; 384:2228-34.

Also in the News

» The American Association of Diabetes Educators (AADE) and WellDoc, a company with a platform for managing chronic diseases, are collaborating in the development of a software "app" for patient use on a smart phone or computer to manage type 2 diabetes mellitus. The platform is approved by FDA for this purpose. The app allows patients to enter blood glucose data and provides daily guidance, educational tips, and motivational messages. It permits the tracking of medications, healthy eating, and exercise and the transmission of data to healthcare providers. Answers from experts are provided to questions from patients. A prescription is needed to download and start using the app. AADE views the app as a complement to care provided in person by diabetes educators.

» Detailed results of the DEVOTE study in which insulin degludec or insulin glargine U-100 was used in combination with standard care in more than 7,500 patients at least 50 years of age with type 2 diabetes mellitus and a high risk for cardiovascular events will be presented at a scientific meeting and submitted for regulatory review during the first half of 2017. The primary endpoint was the time from randomization to first occurrence of a major adverse cardiovascular event (cardiovascular death, non-fatal myocardial infarction, or non-fatal stroke). The number of severe hypoglycemic episodes was a secondary endpoint. After a treatment period of approximately 2 years, insulin degludec was found non-inferior to insulin glargine U-100 with respect to the primary endpoint. A lower incidence of severe hypoglycemia and nocturnal severe hypoglycemia were associated with insulin degludec compared with insulin glargine U-100.

One Pen One Patient Website Provides Additional Resources

For resources and a tool kit for facilitating the safe and appropriate use of insulin pens in the hospital setting, go to www.onepenonepatient.org. In addition, you will find two related educational activities:

- *AJHP* supplement, "Best Practices in Ensuring the Safe Use of Insulin Pens in the Hospital" (2.5 hours CPE)
- On-demand activity focused on the emerging role of newer concentrated insulins in managing diabetes and strategies for ensuring the safe use of concentrated insulins (1 hour CPE)

Planned by ASHP Advantage

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