Opportunities for Improving Outcomes with Insulin Injections

Medication nonadherence, which is prevalent among patients with type 2 diabetes mellitus (T2DM), is associated with increased rates of mortality and hospitalization.1 A recent survey (2008) which included 500 patients with diabetes identified that 33% of patients have some level of dread associated with daily insulin injections and 57% of patients intentionally skip insulin injections.2 Insulin administration is an essential component of diabetes management for many patients, and pharmacists may help positively impact medication adherence by providing patient counseling and guidance about the importance of needle selection and appropriate injection technique.

Impact of Needle Length
Insulin should be administered into the subcutaneous tissue without reaching the muscular layer. Intramuscular administration, which more often occurs when administering insulin in the thigh, should be avoided to prevent the risk of rapid insulin absorption, which may result in hypoglycemia.3 As illustrated in Figure 1, inadvertent injection of insulin into the muscle fascia is more likely to occur with longer (8 mm, 12.7 mm) needles.4 Thus, selection of a needle of appropriate length is clinically important.

There is no medical reason to use needles longer than 6 mm for subcutaneous insulin injections.4 In a clinical study by Gibney and colleagues, which included obese patients with diabetes, it was estimated that over 99.5% of injections with 4-mm needles would result in successful subcutaneous injection when proper injection technique was followed.5 As shown in Figure 1, the 4-mm needle length is the optimal length to achieve a subcutaneous injection yet short enough to avoid an intramuscular injection. Because of safety and tolerability advantages over longer needles, shorter needles (ie, 4-mm, 5-mm, and 6-mm) are now recommended for use in children or adults, regardless of body mass index (BMI).4

Although current recommendations support shorter needle length, an increased awareness of the advantages of using shorter needles (6 mm or less) is needed. In a recent international survey (2009) of more than 4000 patients with type 1 or 2 diabetes mellitus (Insulin Injection Technique Questionnaire), more than half of adults (56%) who administer insulin were using an 8-mm or longer needle. In this same survey, 63% of patients had been using the same needle length since the time of their initial diagnosis.6 This suggests that a unique opportunity exists for pharmacists to evaluate patient knowledge and discuss the importance of needle selection for all patients who are administering insulin. In general, 4-mm needles can be used in almost all individuals, including children/adolescents and obese patients.7

Recommendations for Injection Technique
Injection sites for insulin include the upper arm, antero-lateral upper thigh, abdomen, and buttocks.8 Shorter needles should be inserted at a 90° angle to the skin surface in adults, but pinching a skin fold may be necessary with 5-mm or 6-mm needles. In addition, needle insertion at a 45° angle may be recommended in individuals with less subcutaneous fat, such as children/adolescents, frail elderly, or cachexic adults.3,4,7 Patients should also be educated on the importance of rotating injection sites. Practical tips from the AADE for minimizing pain during injection are shown in the Table (see next page).

Meeting Patient Needs
Patients who inject insulin are concerned with comfort and ease of use. Also, patients with T2DM tend to have significantly lower hand strength versus control subjects without T2DM, regardless of age, as observed in a study by Cetinus et al.8 As discussed, selection of a pen needle of appropriate length is clinically important to help ensure proper injection of insulin into the subcutaneous layer. The BD Ultra-Fine™ Nano™ 4 mm × 32G Pen Needle is the shortest and thinnest pen needle available from BD, and it is compatible with all diabetes pens. It is covered at the preferred copay by virtually all managed health plans, including Medicare Part D, although copays vary by plan.

There are important features beyond needle length that also distinguish pen needle products. BD Nano™ 4-mm Pen Needles now feature both Pentapoint™ Comfort and EasyFlow™ Technology. BD Nano™ Pen Needles with EasyFlow™ Technology have a larger lumen that allows for a 149% higher flow rate, making it easier for patients to press the pen button.9 BD Pentapoint™
Comfort Technology features the first, patented, 5-bevel needle tip for a more comfortable injection. A study comparing 5-bevel needles with 3-bevel needles determined that 23% less penetration force was required to penetrate the skin using BD Nano™ 4-mm Pen Needles. Patient-preferred BD Nano™ 4-mm Pen Needles have also been awarded the Ease-of-Use commendation by the Arthritis Foundation.

Although the use of pen needles is growing, approximately 40% of all patients in the United States still inject with insulin syringes. BD Insulin Syringes with the BD Ultra-Fine™ 6-mm needle meet the needs of patients who use insulin syringes. It is the shortest needle available on an insulin syringe and its efficacy is equivalent to longer needles while being 53% shorter than the 12.7-mm needle (Figure 2).

Role of the Pharmacist

Pharmacists can help by letting patients know about the available options. Several features distinguish the BD Nano™ 4-mm Pen Needle from other pen needles, including PentaPoint™ Comfort and EasyFlow™ Technology; these technologies help ensure ease of use, which may improve adherence to insulin therapy. Greater treatment adherence leads to more frequent patient visits to the pharmacy, allowing additional opportunities for pharmacists to provide patient counseling and guidance. To learn more about this subject, visit http://bd.com/us/diabetes/.

References