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Original Research

Pen Needle Preference in a Population of Canadians with Diabetes: Results from a Recent Patient Survey

Lori Berard RN, CDE *, Brett Cameron BSc, Vincent Woo MD, FRCPC

Winnipeg Regional Health Authority, Health Sciences Centre, Winnipeg Diabetes Research Group, Department of Medicine, Section of Endocrinology, University of Manitoba, Winnipeg, Manitoba, Canada

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ABSTRACT

Objective: To evaluate the safety and efficacy of insulin injections in patients using 8 mm 31 gauge vs. 5 mm 31 gauge pen needles, as determined by A1C results and to measure individual patient satisfaction and compare overall satisfaction regarding the use of the 2 needles.
Methods: The study was completed as a substudy of a single-site, open-label, randomized, 6-month comparative study consisting of 66 obese patients. Prior to the study, all individuals had treated their diabetes with either long-acting insulin glargine or insulin detemir. At the onset of the study, patients were randomized 1:1 to either insulin glargine or neutral protamine Hagedorn insulin. All patients used an 8 mm pen needle for the first 3 months and a 5 mm pen needle for the remaining 3 months. At the conclusion of the trial, patients completed a questionnaire regarding pen needle satisfaction.
Results: The 5 mm needle was preferred by 41.8% of study subjects, while the 8 mm needle was preferred by 27.9% of subjects. For other attributes (i.e. overall injection comfort, pain when inserting the needle into the skin and length of needle), the 5 mm needle scored higher than the 8 mm needle and higher also than the percentage of individuals who indicated no preference.
Conclusions: In patients with insulin-treated type 2 diabetes with a mean single-injection volume dose of basal insulin of 50.2 units, the 5 mm needle was generally preferred over the 8 mm needle. The shorter needle was more comfortable and easier to use while being equally effective in delivering insulin.

Mots clés :
enseignement sur le diabète
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RÉSUMÉ

Objectif : D'après les résultats de l'A1c, évaluer l'innocuité et l'efficacité des injections d'insuline chez les patients utilisant des aiguilles pour stylo de 8 mm à pointe de calibre 31 par rapport aux aiguilles pour stylo de 5 mm à pointe de calibre 31, puis mesurer la satisfaction personnelle des patients et comparer la satisfaction globale concernant l'utilisation des 2 aiguilles.
Méthodes : L'étude était réalisée en tant que sous-étude d'un seul site, une étude comparative de 6 mois, ouverte et à répartition aléatoire, consistant en 66 patients obèses. Avant l'étude, tous les individus avaient traité leur diabète soit par insuline glargine ou par insuline détémir à action prolongée. Au début de l'étude, les patients étaient répartis de manière aléatoire selon un ratio 1:1, soit ceux traités par insuline glargine ou ceux traités par insuline NPH (Neutral Protamin Hagedorn). Tous les patients utilisaient une aiguille pour stylo de 8 mm au cours des 3 premiers mois et une aiguille pour stylo de 5 mm au cours des 3 mois restants. À la fin de l'étude, les patients remplissaient un questionnaire évaluant leur satisfaction à propos des aiguilles pour stylo.
Résultats : Quarante et un et huit dixièmes pour cent (41,8 %) des sujets de l'étude préféraient l'aiguille de 5 mm, tandis que 27,9 % des sujets préféraient l'aiguille de 8 mm. Pour ce qui est des autres caractéristiques (c.-à-d. le confort global lors de l'injection, la douleur pendant l'insertion de l'aiguille dans la peau et la longueur de l'aiguille), l'aiguille de 5 mm a obtenu un score plus élevé que celui de l'aiguille de 8 mm, ainsi qu'un score plus élevé que le pourcentage des individus qui n'indiquaient aucune préférence.
Conclusions : Les patients diabétiques de type 2 traités par insuline selon une dose moyenne d'insuline basale en injection unique de 50,2 unités préféraient généralement l'aiguille de 5 mm à l'aiguille de 8

* Address for correspondence: Lori Berard, RN, CDE, Winnipeg Regional Health Authority, Health Sciences Centre Winnipeg, Diabetes Research Group, University of Manitoba, 838-715 McDermot Avenue, Winnipeg, Manitoba R3E 3P4, Canada.
E-mail address: ldberard@gmail.com

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mm. L'aiguille la plus courte offrait un meilleur confort lors de l'injection et était plus facile à utiliser, tout en offrant la même efficacité d'administration d'insuline.

Introduction

Despite advances in needle technology, there has been some hesitance among diabetes healthcare professionals and patients alike regarding the use of shorter needles. In a 2009 publication regarding diabetes products, the Canadian Diabetes Association (1) recommended that people who are obese or who require large doses of insulin should not use shorter pen needles. The following study was completed in 2010, at which time the standard needle lengths were 8 mm, 12 mm and 12.7 mm. Shorter and finer insulin pen needles (i.e. 5 mm and 6 mm long) had recently been introduced to the diabetes market. Today, even shorter 4 mm pen needles are available and suitable for use by all patients (2). This study was undertaken to counter the popular belief amongst healthcare providers that longer needles are more effective than shorter, finer needles. The study seeks to show that shorter, finer needles could in fact be safe and effective and perhaps improve injection quality for people with diabetes.

Recent studies have shown that regardless of age, sex and weight, skin thickness varies minimally among individuals, and the average skin thickness at injection sites is between 0.9 mm and 2.4 mm (3,4). Thus, shorter needles are long enough to penetrate through the skin and reach the subcutaneous tissue in order to administer insulin in the proper area. Moreover, a number of studies have demonstrated that shorter needles (i.e. 5 mm or 6 mm) are equally effective in maintaining glycemic control as longer needles (i.e. 8 mm or 12.7 mm) (5–8). Shorter needles have also been associated with reduced pain, no difference in insulin leakage (5,8) and improved patient satisfaction (5,6).

Methods

Study design and sample population

In conjunction with a substudy of the Action to Control Cardiovascular Risk in Diabetes (ACCORD) trial, an investigator-initiated single-site study was performed to compare 8 mm 31 gauge pen needles to 5 mm 31 gauge pen needles in an open-label nonrandomized design. The aim of the study was to determine the appropriate needle length for insulin injection in obese people with diabetes. The trial evaluated the safety and efficacy of treatment, as determined by glycated hemoglobin (A1C) results. Individual satisfaction as well as overall satisfaction regarding the use of both needles was measured and compared.

Procedures and instruments

All patients participating in the 6-month trial used an 8 mm pen needle for the first 3 months and a 5 mm pen needle for the remaining 3 months. The needles used were exactly the same, save for the difference in length. Subjects did not receive any additional counselling on injection technique at this time. At the conclusion of the trial, patients completed a questionnaire regarding pen-needle satisfaction. The questionnaire consisted of 3 parts: 8 mm pen-needle satisfaction, 5 mm pen-needle satisfaction and a comparative section. The questionnaire scored items on a scale from "not at all satisfied" to "extremely satisfied." The questionnaire also contained open-ended questions, allowing participants to state their thoughts regarding needle satisfaction. Information regarding weight, A1C and fasting plasma glucose was obtained from the switch trial.

Statistical analysis

Analysis of covariance, with treatment as a fixed effect and baseline value for the variable being analyzed, was used to analyze changes from baseline for the secondary variables.

Results

Demographics

The baseline, midpoint and endpoint clinical characteristics of the study group are presented in Table 1. As noted, the patients in the trial experienced no significant changes in weight, A1C or fasting plasma glucose.

Insulin dosage

Subjects entered into the main trial on either basal insulin alone or basal bolus. For the purpose of this article, we concentrated on basal insulin-dose volume. At study entry, single-injection volumes of basal insulin ranged from 7 to 150 units, with a mean of 50.2 units. Data obtained at the end of the trial for largest single-dose volume from the subjects indicated that 18.0% of subjects' largest doses were between 1 and 20 units of insulin; 24.6% were between 21 and 40 units; 21.3% were between 41 and 60 units; and 36.1% were more than 60 units. In the study population, the highest proportion of patients had a single-injection insulin dose above 60 units.

Preferred pen attributes

Data for the preferred pen attributes are presented in Table 2. Patients were asked to indicate their preferred pen needle for the attributes listed. If the participants found no difference between needles, the "no preference" option was selected. The 5 mm needle was preferred by 41.8% of study subjects, whereas the 8 mm needle was preferred by 27.9% of subjects. For other attributes (i.e. overall injection comfort, pain when inserting the needle into the skin and length of needle), the 5 mm needle scored higher than the 8 mm needle and also higher than the percentage of individuals who indicated no preference. Furthermore, when excluding individuals who had no preference for each attribute listed, the highest percentage of patients still preferred the 5 mm pen needle.

Table 1
Study population (n=66)*

Characteristic	Baseline	Month 3	Month 6
Weight (kg)	101.4±19.8	102.9±20.4	102.6±20.6
A1C (%)	8.1±1.2	8.0±1.03	7.9±1.0
FPG (mmol/L)	8.0±2.3	8.2±2.4	7.3±2.0

A1C, Glycated hemoglobin; *FPG*, fasting plasma glucose; *kg*, kilograms; *SD*, standard deviation.

* Data given as mean ± SD.