mathematical algorithms. These systems have primarily been developed for, and studied in, patients with type 1 diabetes. There are limited prospective clinical trials investigating these devices in CFRD. The iLet® bionic pancreas (BP) uses the Dexcom G6 CGM and automates all insulin delivery after being initialized with only the user's weight, without prescribed insulin settings, and without a run-in period, and adapts autonomously and continually to each user's changing insulin needs. The system eliminates the need for quantitative carbohydrate counting; users enter meal announcements based on meal type ("breakfast," "lunch," or "dinner") and relative size for the user ("usual for me," "less" or "more").
Methods: We tested the feasibility of using the BP for the management of CFRD in an open-label, randomized, cross-over trial compared to usual diabetes care (UC). Each study arm was 2 weeks in duration. Participants were instructed to maintain similar dietary habits and exercise habits during both study arms. During the UC arm, prior CGM users wore an unblinded Dexcom G6; otherwise, they wore the blinded Dexcom G6 Pro.
Patient selection criteria: Major inclusion criteria were confirmed cystic fibrosis, age ≥10 years, and history of diabetes managed with either an insulin pump or multiple daily insulin injections. Participants were required to have a baseline A1c ≥6% or mean CGM mean glucose ≥125 mg/dL. Exclusion criteria included severe liver disease, end-stage renal disease requiring dialysis, a recent pulmonary exacerbation or current treatment with IV antibiotics, or change in CFTR modulator therapy within the prior 4 weeks.
Results: The primary outcome was the percentage of time with CGM glucose in the target range of 70–180 mg/dl. Key secondary endpoints included mean CGM glucose and the percentage of time with CGM glucose <54 mg/dl, <70 mg/dl, >180 mg/dl, and >250 mg/dL.
Conclusions: The percentage of time in the target glucose range of 70–180 mg/dl was 74.6% ± 11.3% in the BP arm versus 62.3 ± 22.2% in the usual care arm; $p = 0.001$. Mean glucose and time spent in hyperglycemic ranges were lower in the BP arm ($p < 0.05$ for all), but there were no significant differences in time spent in hypoglycemic ranges between arms ($p > 0.05$ for all). No episodes of severe hypoglycemia occurred in either arm. In conclusion, participants using the iLet bionic pancreas for glucose management had improved time in the target glucose range, a lower mean glucose, and less hyperglycemia without increases in hypoglycemia. Larger and longer studies are needed to test the effects of automated glycemic control in patients with CFRD.
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Canadian cystic fibrosis clinical practice survey: Analysis of current practices and gaps in clinical care

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Background: Cystic fibrosis (CF)-related diabetes (CFRD) is a unique form of diabetes mellitus that affects one-third of adults with CF and up to 50% of adults with CF aged 35 and older. The American Diabetes Association [1] and International Society for Pediatric and Adolescent Diabetes [2] have published guidelines for the diagnosis and treatment of CFRD. Some of the recommendations have limitations in sensitivity and prognostic significance, and new technologies such as continuous glucose monitoring (CGM) have not been established for screening or risk stratification. Insulin is the sole therapeutic agent recommended in these guidelines, but it is burdensome for individuals, who often must eat frequent meals and snacks throughout the day. The objective of this study is to identify challenges and gaps in Canadian practices in screening, diagnosis, and treatment of CFRD with the goal of informing a Canadian-specific guideline in CFRD.
Methods: An online survey (26 questions) was administered using RedCap to assess current clinical practices in CFRD screening, diagnosis, and management. Survey question types included multiple choice questions, single- and multiple-answer questions, and open-ended response questions. Intended study participants were pulmonary staff physicians, internists, pediatricians, and allied health professionals working with people with CF (PwCF) and endocrinology staff physicians and allied health professionals working in diabetes clinics who were involved in the care of PwCF or people with CFRD (PwCFRD). Data were collected but because numbers were and variability was high, standard statical methods were minimally informative. The data are mainly descriptive.
Results: There were 97 respondents (53 physicians and 44 allied health professionals). Most pediatric centers had fewer than 10 PwCFRD, whereas adult centers tended to have 10 to 40 or more. Most children and some adults with CFRD are followed in separate diabetes clinics, whereas some centers provide diabetes care for adults with CFRD within the CF clinic from respirologists, nurse practitioners, or endocrinologists. Centers with a specific CFRD clinic tend to follow PwCF with impaired glucose tolerance as well as PwCFRD. Most centers use a screening oral glucose tolerance text with only fasting and 2-hour values. A wide range of adjunctive tests (capillary blood glucose tests, glycosylated hemoglobin, CGM) are used to support a diagnosis of CFRD, particularly in adult clinics. Pediatric practitioners tend to use insulin to manage CFRD, whereas adult practitioners are more likely to use noninsulin antihyperglycemic agents, particularly repaglinide.
Conclusions: There is substantial heterogeneity in screening, treatment, and organization of care for CFRD and in health care professionals caring for PwCF and PwCFRD across Canada. Practitioners working with adults are more likely to take approaches that go beyond current guidelines. Updated, pragmatic clinical practice guidelines may help reduce unnecessary variations in care for PwCFRD across Canada.

References

[1] ADA, 2010
[2] ISPAD, 2018