Endocrinol Diabetes Nutr. 2018;65(1):45–51

Endocrinología, Diabetes y Nutrición

www.elsevier.es/endo

ORIGINAL ARTICLE

Oral glucose tolerance test and continuous glucose monitoring to assess diabetes development in cystic fibrosis patients

María Clemente León[a,*,1], **Laura Bilbao Gassó**[b,1], **Antonio Moreno-Galdó**[c], **Ariadna Campos Martorrell**[d], **Silvia Gartner Tizzano**[c], **Diego Yeste Fernández**[a], **Antonio Carrascosa Lezcano**[a]

[a] *Unidad de Endocrinología, Servicio de Pediatría, Hospital Vall d'Hebron, Grupo de Investigación Crecimiento y Desarrollo, Instituto Investigación Vall d'Hebron (VHIR), CIBER de Enfermedades Raras, Instituto Salud Carlos III, Universitat Autònoma de Barcelona, Spain*

[b] *Unidad de Endocrinología, Servicio de Pediatría, Hospital Vall d'Hebron, Spain*

[c] *Sección de Alergia Pediátrica, Neumología Pediátrica y Fibrosis quística, Hospital Vall d'Hebron, Grupo de Investigación Crecimiento y Desarrollo, Instituto Investigación Vall d'Hebron (VHIR), Universitat Autònoma de Barcelona, Spain*

[d] *Unidad de Endocrinología, Servicio de Pediatría, Hospital Vall d'Hebron, Grupo de Investigación Crecimiento y Desarrollo, Instituto Investigación Vall d'Hebron (VHIR), Universitat Autònoma de Barcelona, Spain*

Received 19 June 2017; accepted 29 August 2017

KEYWORDS
Cystic fibrosis;
Cystic fibrosis-related diabetes;
Continuous glucose monitoring;
Diabetes

Abstract
Introduction: Patients with cystic fibrosis (CF) undergo a slow and progressive process toward diabetes. Oral glucose tolerance test (OGTT) is recommended to diagnose impaired glucose levels in these patients. Continuous glucose monitoring (CGM) measures glucose profiles under real-life conditions.
Objective: To compare OGTT and CGM results in CF patients.
Methods: Paired OGTT and 6-day CGM profiles (146.2 ± 9.1 h/patient) were performed in 30 CF patients aged 10–18 years.

* Corresponding author.
E-mail address: mclement@vhebron.net (M. Clemente León).
[1] María Clemente and Laura Bilbao have contributed equally to the elaboration of the manuscript.

Results: According to OGTT, 14 patients had normal glucose tolerance (NGT), 14 abnormal glucose tolerance (AGT), and two cystic fibrosis-related diabetes (CFRD). In 27 patients (13 NGT, 13 AGT, 1 CFRD), CGM showed glucose values ranging from 140 to 200 mg/dL during similar monitoring times (2%–14% with NGT, 1%–16.9% with AGT, and 3% with CFRD). Glucose peak levels ≥200 mg/dL were seen in seven patients (3 NGT, 3 AGT, 1 CFRD).

According to CGM, two patients had all glucose values under 140 mg/dL (1 NGT, 1 AGT). Seventeen patients had glucose levels ranging from 140 to 200 mg/dL (10 NGT, 6 AGT, 1 CFRD). Ten patients (3 NGT, 7 AGT) had glucose values ≥200 mg/dL for ≤1% of the monitoring time and one (CFRD) for >1% of the monitoring time.

Conclusions: OGTT results did not agree with those of the CGM. CGM allows for diagnosis of glucose changes not detected by OGTT. Such changes may contribute to optimize pre-diabetes management in CF patients.

PALABRAS CLAVE
Fibrosis quística;
Diabetes relacionada con la fibrosis quística;
Monitorización continua de glucosa;
Diabetes

Test de tolerancia oral a la glucosa y monitorización continua de glucosa para evaluar el desarrollo de diabetes en pacientes con fibrosis quística

Resumen

Introducción: Los pacientes con fibrosis quística (FQ) evolucionan lenta y progresivamente hacia la diabetes, siendo el test de tolerancia oral a la glucosa (TTOG) el método utilizado para diagnosticar sus alteraciones glucémicas. La monitorización continua de glucosa (MCG) proporciona perfiles de glucosa en condiciones de vida habituales del paciente.

Objetivo: Comparar los resultados del TTOG y de la MCG en pacientes con FQ.

Métodos: TTOG seguido de MCG (146,2 ± 9,1 h/paciente) en 30 pacientes con FQ (10-18 años de edad).

Resultados: Según el TTOG, 14 pacientes presentaron tolerancia normal a la glucosa (TNG), 14 tolerancia anormal a la glucosa (TAG) y 2 diabetes relacionada con la fibrosis quística (DRFQ). En 27 pacientes (13 con TNG, 13 con TAG, uno con DRFQ) la MCG mostró valores de glucosa 140-200 mg/dL durante periodos similares de tiempo (2-14%, 1-16,9% y 3%, respectivamente). Picos de glucosa ≥ 200 mg/dL se observaron en 7 pacientes (3 con TNG, 3 con TAG y uno con DRFQ).

Según la MCG, 2 pacientes tuvieron todos los valores de glucosa <140 mg/dL (uno con TNG y otro con TAG); 17 pacientes entre 140-200 mg/dL (10 con TNG, 6 con TAG y uno con DRFQ); 10 pacientes ≥ 200 mg/dL durante ≤ 1% del tiempo valorado (3 con NGT, 7 con TAG) y uno ≥ 200 mg/dL durante > 1% del tiempo valorado (con DRFQ).

Conclusiones: Los resultados del TTOG no concuerdan con los de la MCG. La MCG permite el diagnóstico de anomalías de la glucosa no detectadas mediante el TTOG y sus resultados podrían contribuir a optimizar el tratamiento de la prediabetes en estos pacientes.

Introduction

Cystic fibrosis (CF) patients undergo a slow and progressive process toward diabetes.[1] Cystic fibrosis-related diabetes (CFRD) is associated with impaired lung function and nutritional status and, consequently, higher mortality rates.[1,2] Moreover, decreased insulin secretion contributes to weight loss and lung function deterioration, even before CFRD is diagnosed.[3–5] Thus, it is of the utmost importance to establish the right time to start insulin therapy.[6–9]

CFRD is usually diagnosed by the oral glucose tolerance test (OGTT). The International Society of Pediatric and Adolescent Diabetes (ISPAD)[10] and the American Diabetes Association[11] recommend annual OGTT screening in CF patients over 10 years of age.

Continuous glucose monitoring (CGM) provides glucose profiles under real-life conditions and has proved to be a useful clinical tool for evaluating changes in these profiles in CF patients[12–14] even before CFRD is diagnosed by the OGTT.[15–18] However, since the OGTT followed immediately by CGM maintained under real-life conditions for six days has not been reported to date, we aimed to compare OGTT and CGM profiles in this setting.

Patients and methods

Patients

Prospective study (November 2012–May 2015) to evaluate OGTT and CGM profiles in 30 CF children treated at the Cystic