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Achievement of metabolic control goals set by the American Diabetes Association and the International Society for Pediatric and Adolescent Diabetes in pediatric patients with type 1 diabetes from Spain

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ABSTRACT

Aim: The “T1D Exchange Clinic Registry” of 13,316 pediatric patients with type 1 diabetes (T1D) in U.S. recently revealed that most children have HbA1c values above target levels established by the American Diabetes Association (ADA) and the International Society for Pediatric and Adolescent Diabetes (ISPAD). The aim of this study is to assess the proportion of youngsters with T1D who meet the internationally accepted targets for good metabolic control of diabetes at a single, referral Pediatric Diabetes Center in Spain.

Patients and methods: Cross-sectional study of 236 children and adolescents with T1D controlled at our Pediatric Diabetes Unit. We analyzed the compliance to metabolic goals set by ADA and ISPAD and the differences between patients treated with continuous subcutaneous insulin infusion and multiple daily injections. **Statistics:** SPSS™ version 21.0. **Results:** Mean age: 12.6 ± 4.6 years old, mean age at diagnosis: 6.1 ± 4.3 years old and mean diabetes duration: 6.4 ± 4.3 years; 47% female. HbA1c average: $6.7 \pm 0.7\%$ (49.7 ± 7.6 mmol/mol). The age-specific ADA and ISPAD HbA1c targets were achieved by 93% and 91% of patients, respectively. Among pump users, 97%/97% met ADA/ISPAD HbA1c targets compared to 87%/88% of MDI users ($p = 0.04/p = 0.03$), without significant differences in the analysis by groups of age. Among participants, 95%, 62%, 95%, 98% and 89% met HDLc, LDLc, triglycerides, BP and BMI targets.

Conclusions: Most patients in our children and adolescent cohort of T1D patients correctly achieve metabolic goals established by ADA and ISPAD with low incidence of hypoglycemia.

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1. Introduction

The prevalence of type 1 diabetes (T1D) has increased worldwide in the last decades. OECD (Organization for Economic Co-operation and Development) estimates the incidence in youngsters than 14 years of age in Spain is 13/100,000 population [1]. The EURODIAB study reported annual increase of 3.9% between 1989 and 2003 [2], which is supported by other regional studies in Europe [3–5,26].

The Diabetes Control and Complications Trial (DCCT) has demonstrated, thirty years ago, that intensive diabetes management significantly reduces the risk of microvascular complications and long-term macrovascular complications [6]. The results of Epidemiology and Diabetes Interventions and Complications study (EDIC), the extension of DCCT, supported these data and introduced the concept of “metabolic memory”, which stress the need for proper glycemic control since the onset of the disease [7,8]. Subsequent trials showed that not only glycemic control, but also other factors (obesity, high blood pressure (BP) and dyslipidemia) are implicated in the risk of macrovascular complications and mortality in patients with T1D [9–12]. Therefore, the American Diabetes Association (ADA) and the International Society for Pediatric and Adolescent Diabetes (ISPAD) have established criteria of good metabolic control for HbA1c, Body Mass Index (BMI), BP and lipid levels [13–15].

The T1D Exchange Clinic Registry study, recently published and performed in the U.S. in 13,316 pediatric patients with T1D, reveals that most children and adolescents have HbA1c values above target levels set by ADA and ISPAD for glycemic control and a concerning prevalence of high BP, obesity and dyslipidemia [16].

There are no similar studies to T1D Exchange Clinic Registry in pediatric population from Spain that reflects achievement of ADA/ISPAD goals so far. Our main objective is to evaluate the quality of diabetes care by assessing the proportion of youth with T1D under the care of our Pediatric

Diabetes Unit meeting targets of HbA1c, BP, lipids and BMI set by ADA and ISPAD.

2. Patients and methods

Cross-sectional study including all patients under the age of 18 years old with Type 1 diabetes diagnosis treated in our Pediatric Diabetes Unit. Inclusion criteria were: (1) Diagnosis of T1D. (2) Diabetes duration: at least 1 year from the onset. (3) Complete scheduled visits: at least three visits per year in our unit. (4) BP, BMI and fasting high-density lipoprotein cholesterol (HDLc), low-density lipoprotein cholesterol (LDLc) and triglycerides results available in the previous year. Patients who did not meet all of these criteria were excluded from the final analysis (Fig. 1).

T1D diagnosis was confirmed in all patients with consistent clinical features and positive type 1 diabetes related antibodies. Data were collected between May and June 2013. Detail medical and personal data were obtained from all participants as part as the first visit. Then, all subjects had at least three follow up visits per year. In each visit, a complete physical examination (including BMI, BP and neurological exam), data of therapy, exercise, diet and acute complications [severe hypoglycemia (SH) and diabetic ketoacidosis (DKA)] were collected. HbA1c was measured and treatment was personally adapted to improve metabolic control. All patients and their families received diabetes education at the onset and in each visit and all of them had the chance to contact to the unit for additional counseling by phone or e-mail at any time. Once a year, screening of chronic complications (retinopathy, nephropathy, dyslipidemia) and associated risk factors was performed in pubertal patients and pre-pubertal patients with 4 years of diabetes duration, according to the National Diabetes Care Guidelines [17].

Data were categorized according to the ADA and ISPAD targets: (1) HbA1c (ADA January 2014): <8.5% (69 mmol/mol) for patients 6 years of age, <8% (64 mmol/mol) for 6–12 year-old

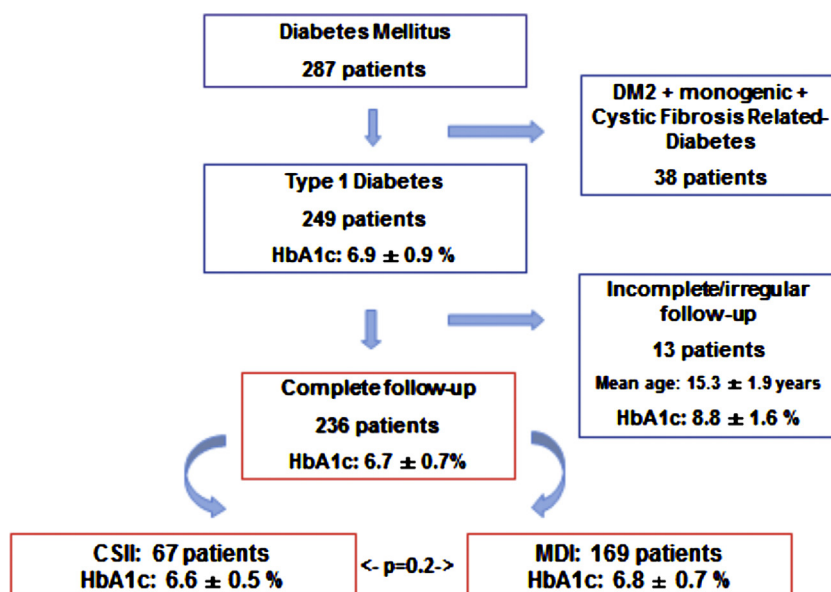


Fig. 1 – Selection of participants and HbA1c outcomes.

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