

THE PREVALENCE OF DIABETIC KETOACIDOSIS IN CHILDREN WITH NEW-ONSET TYPE 1 DIABETES MELLITUS

E. Niechciał, A. Gertig-Kolasa, B. Skowrońska, I. Krzyśko-Pieczka, W. Stankiewicz, M. Michalak*, P. Fichna

Department of Pediatric Diabetes and Obesity, Poznan University of Medical Sciences, Poland
*Department of Informatics and Statistics, Poznan University of Medical Sciences, Poland

55th Annual Meeting of ESPE , Paris, France, 10-12 September 2016

Background

- Ketoacidosis (DKA) is a life-threatening complication of type 1 diabetes (T1DM) frequently present at its diagnosis.
- Younger children are at greater risk of developing ketoacidosis.
- The prevalence of ketoacidosis at diagnosis in children aged <5 years varies between 17.3-54.5 %.
- This trend is alarming due to worldwide rise in type 1 diabetes incidence with the greatest increase in children aged < 5 years.

Aims and Objectives

- We studied the prevalence of DKA at T1DM diagnosis and the frequency of partial remission (PR) in children.

Method

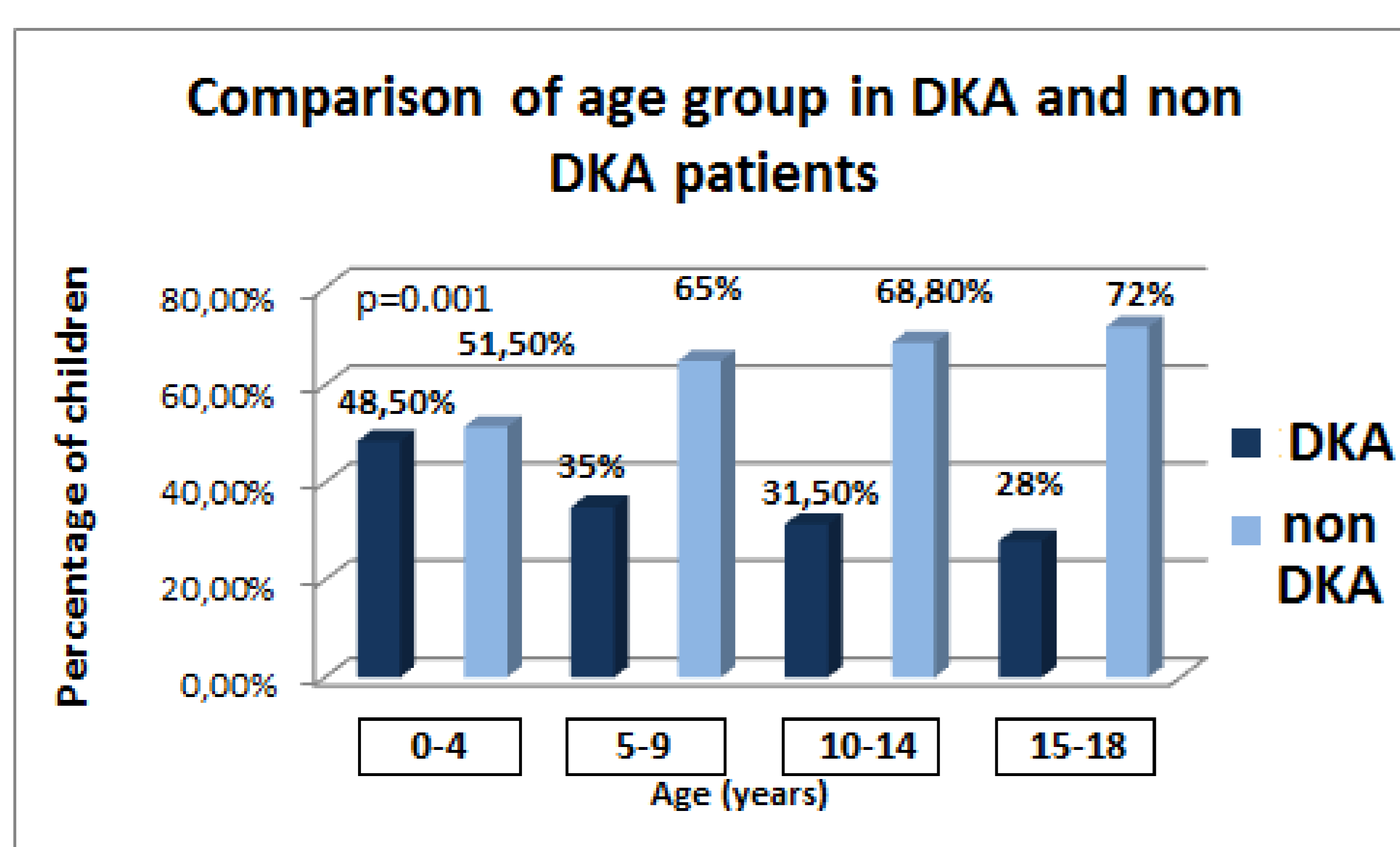
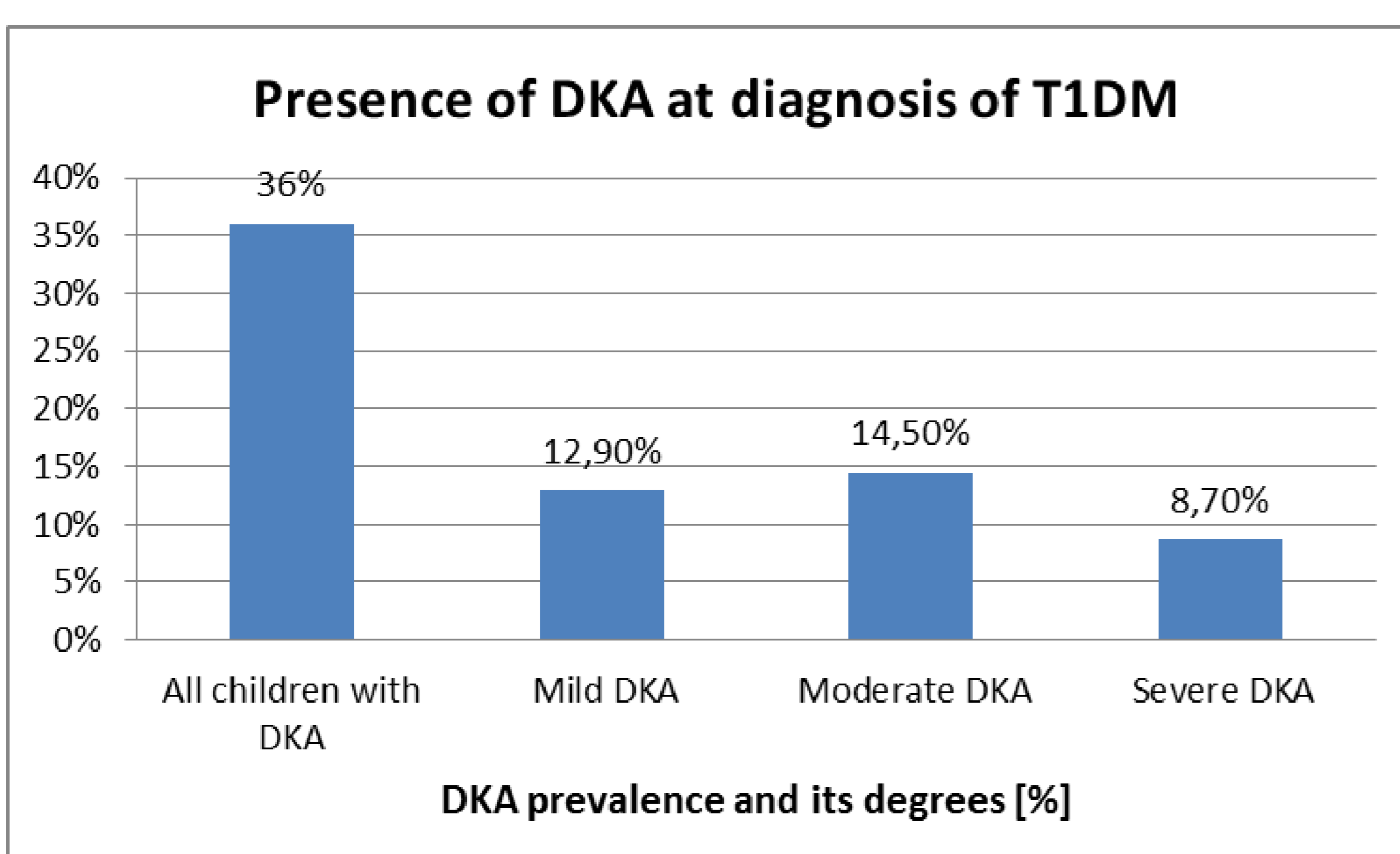
- The cohort comprised 735 children ((girls: 329; boys: 406) aged 0-18 years with newly diagnosed T1DM.
- Clinical and biological features were collected at diagnosis and during follow-up.
- DKA was defined as blood pH < 7.30 and considered mild, moderate, severe if pH was < 7.3, <7.2 and <7.1, respectively.
- To confirm autoimmune diabetes origin typical autoantibodies were tested (IAA, GAD-ab, IA2-ab, ZnT8).
- A questionnaire on diabetes from first symptom(s) to diagnosis was completed by children's caregivers.
- PR was defined as IDAA1C ≤ 9, according to definition: A1C (%) + [4 × insulin dose (U/kg/day)].
- The unpaired Student t-test was used to compare continuous variables, and the chi-square test was used to compare percentages among different patients subgroups.
- A P-value <0.05 was considered significant.

Results

- DKA was diagnosed in 36.0% of patients: 12.9% had mild form, while 14.5% and 8.7% moderate and severe, respectively.
- In children aged 0-4, 5-9, 10-14 and 15-18 years DKA was present in 48.5, 35, 31.5 and 28 %, respectively.
- In individuals aged <4 years DKA occurred significantly often (p=0.001).
- The highest severe DKA frequency was associated with symptoms' duration (>28 days) (p=0.014) and diabetes misdiagnosis (p=0.001).
- ZnT8 autoantibody was detected significantly often in children with DKA (p=0.44).
- Children with DKA had higher levels of blood ketones (p=0.0001), HbA1C (p=0.0004), blood glucose (p=0.00001) and lower levels of insulin (p=0.0001), c-peptide (0.0001).
- In the first year after diagnosis PR occurred in 62 % patients. Individuals with DKA had lower PR incidence (24% versus 76% without DKA).

Comments

- The prevalence of DKA is high in children from Wielkopolska.
- Children aged < 4 years have the greatest risk of developing ketoacidosis.
- The highest frequency of severe DKA is related to symptoms' duration and diabetes misdiagnosis.
- ZnT8 autoantibodies are associated with the worst general condition at the time of diagnosis.



Clinical features of T1DM children at the onset of disease with and without DKA

Variable	Children without DKA (n=470)	Children with DKA (n=265)	P-value
Blood glucose [mg/dl]	407 ± 178	474 ± 218	0,00001
Blood ketones [mmol/L]	2,3 ± 1,7	4,8 ± 1,3	0,0001
A1C [%]	11,1 ± 2,2	11,6 ± 1,8	0,0004
Insulin [uIU/mL]	2,8 ± 1,8	1,8 ± 1,4	0,0001
C-peptide [pmol/ml]	0,57 ± 2,3	0,3 ± 0,16	0,0001
GAD U/ml positive [%]	72	70	0,59
IAA % positive [%]	51	52	0,8
IA2-AB U/ml positive [%]	78	79	0,7
ZnT8 U/ml positive [%]	79	93	0,044
Symptoms' duration [days]	< 28	> 28	0,014
Diabetes misdiagnosis	GP visit < 3	GP visit > 3	0,001
Partial remission [IDAA1C ≤ 9]	76%	24%	

c-peptide normal range 0,59-1,54 pmol/ml

