Improvement in metabolic control of type 1 diabetes mellitus in a tertiary unit: 2005 *versus* 2012

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INTRODUCTION

Type 1 Diabetes Mellitus (T1DM) is one of the most common chronic diseases of childhood and adolescence. The prevalence in younger than 15 years is predicted to rise by 70% from 2005 to 2020. Treatment of T1DM targets euglycemia and hemoglobin A1c (HbA1c) under 7.5%, if achieved without severe episodes of hypoglycemia (International Society for Pediatric and Adolescent Diabetes - ISPAD). It depends on insulin replacement and educational factors. The best metabolic control in both children and adolescents with T1DM is crucial to prevent long-term complications.

PURPOSE

- To compare metabolic control at 2005 versus 2012 and to define its main predictors in children and adolescents

MATERIAL AND METHODS

We included children and adolescents with T1DM with more than two years of disease. Data were collected at 2005 and at 2012. Variables analyzed included: sex, age, severity at diagnosis, therapy in the last year, age at initiation of multiple daily insulin injections (MDII) and continuous subcutaneous insulin infusion (CSII), number of group educational sessions, insulin daily dosis (IDD) and mean hemoglobin A1c (HbA1c) through last year. Three groups were defined to evaluate metabolic control: Group 1, with HbA1c ≤ 7,5%;Group 2, with HbA1c between 7,5 and 9%; and Group 3, with HbA1c ≥ 9%. Statistical analysis was done using SPSS® 19th ($p<0,05$).

RESULTS

Demographic characterization

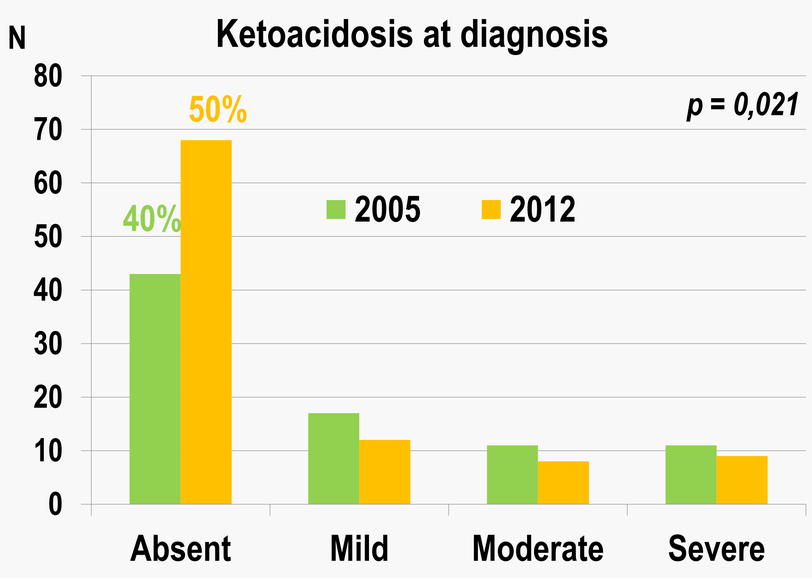
N = 243

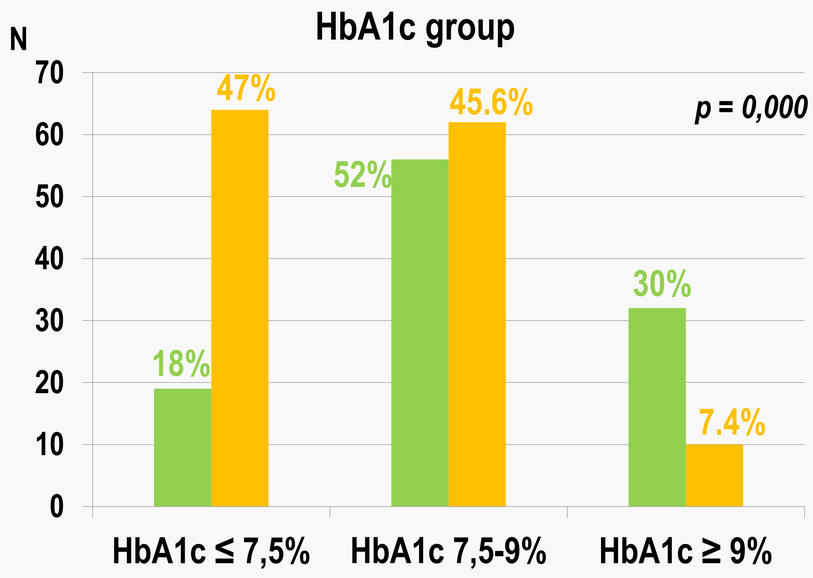
Mean age at time of study 12,8 ± 3,5Y (2,9–18,5Y)
Gender 54% male
Mean duration of T1DM 6,5 ± 3,3Y (1,8–15,4Y)

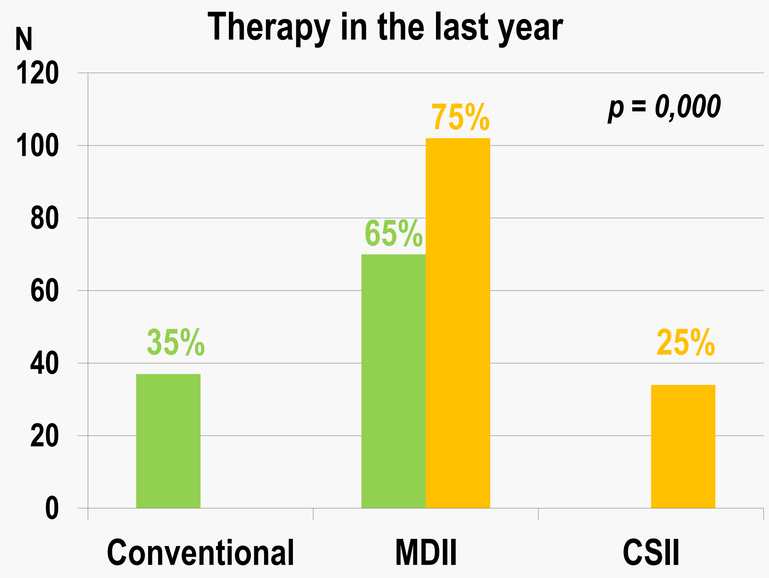
	2005 N=107	2012 N=136	*p*
Gender			
Male Female	58 (54,2%) 49 (45,8%)	73 (53,7%) 63 (46,3%)	*NS*
Time (years)			
Age at diagnosis	6,0 ± 3,3 (0,2 - 13,8)	6,6 ± 3,4 (0,2 - 14,3)	*NS*
Age at study	12,8 ± 3,6 (3,3 - 18,5)	12,8 ± 3,5 (2,9 - 17,9)	*NS*
Duration of T1DM	6,8 ± 3,3 (2,3 - 15,5)	6,2 ± 3,3 (1,8 - 14,6)	*NS*

Evolution of Therapy and Metabolic control

N=243	2005 N=107	2012 N=136	*p*
Therapy (duration in years)			
Conventional	5,0 ± 3,0 (0,02 - 12,0)	-	-
MDII	1,8 ± 2,2 (0 - 13,4)	3,5 ± 1,1 (0,7 - 5,8)	0,000
CSII	-	0,47 ± 1,1 (0 - 4,3)	-
Age at onset of intensive therapy	11,7 ± 1,9 (3,8 - 14,7)	8,8 ± 3,2 (0,9 - 14,3)	0,000
Metabolic control			
HbA1c mean (%)	8,4 ± 1,1 (5,5 - 11,9)	7,8 ± 0,9 (5,9 - 10,4)	0,000
Last year's HbA1c (%)	8,7 ± 1,3 (5,8 - 12,7)	7,7 ± 1,0 (5,7 - 12,9)	0,000
IDD (U/kg/day)	1,04 ± 0,27 (0,27 - 2,00)	0,91 ± 0,22 (0,33 - 1,46)	0,000
Educational sessions	1,6 ± 0,9 (0 - 3)	4,8 ± 2,5 (1 - 12)	0,000







DISCUSSION

In 2005 34.6% were in conventional therapy and 65.4% in MDII
Since 2008 all chilren were in intensive therapy since diagnosis
In 2012, 75% were in MDII and 25% in CSII

Children in group 1 at 2012
- had started MDII at younger age (p=0.04)
- with lower IDD (p=0.02)
- more had CSII (p<0.001)

Children in group 3 at 2012 were older (p=0.04)

Comparing 2005 to 2012
- ❑ There were no differences in sex, age at diagnosis or duration of illness
- ❑ In 2012 there was
  - Lower severity at diagnosis (p=0.021)
  - Higher number of group educational sessions
  - Higher duration of MDII
  - Lower IDD
  - Lower mean HbA1c in the last year

} p<0.001

CONCLUSION

There was a clear improvement in metabolic control from 2005 to 2012. The main predictors of better metabolic control between 2005 and 2012 were early onset of MDII and CSII and increase of educational sessions. This reinsures the advantage of intensive insulin therapy since diagnosis and the reinforcement of educational support.

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