Microalbuminuria In Children And Adolescents With Type 1 Diabetes Mellitus: Predictive Factors

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OBJECTIVES

- Type 1 diabetes mellitus (T1DM) is **increasing** worldwide and is the **most common** chronic endocrine disease in children.
- **Microalbuminuria (MA)** is usually the **first microvascular complication** of T1DM. According to the latest consensus report of the International Society for Pediatric and Adolescent Diabetes (ISPAD), it is recommended to **screen annually for microvascular complications from age 10-years or at the onset of puberty if earlier and after two to five years' diabetes duration.**
- **We aimed to identify MA frequency, time of occurrence and related risk factors and if there is a relationship between nephropathy and obesity in our cohort of T1DM.**

METHODS

- Clinical reports of **201** children with **T1DM** diagnosed at least >1 year ago followed in our institution were retrospectively analysed.
- Statistical analysis was performed with SPSS® version 21 for Windows®.
- Results are expressed in frequencies and means ± standard deviations and statistical significance was considered as *p* value < 0.05.
- **MA** was defined as ACR > 30mg/g in at least two consecutive spot urine samples collected in the same year.

RESULTS

PATIENTS' CHARACTERISTICS

	TOTAL	FEMALE	MALE	P VALUE
Number (nr)	**201**	102	99	NS
Actual age (y)	**12.4 ± 3.9**	12.6 ± 3.8	12.2 ± 4.0	NS
Age at T1DM diagnosis (y)	**8.1 ± 3.7**	7.9 ± 3.5	8.3 ± 3.8	NS
< 10 (nr)	**147**	77	70	
10-15 (nr)	**47**	23	24	
> 15 (nr)	**7**	2	5	
T1DM duration (y)	**3.8 ± 3.6**	4.3 ± 3.6	3.4 ± 3.5	NS
HbA1c (%)	**9.0 ± 1.8**	9.0 ± 1.9	8.9 ± 1.7	NS
BMI (Kg/m²)	**20.6 ± 4.3**	21.4 ± 4.6	19.7 ± 3.7	**0.004**
No Hypertension	**201 (100%)**	-	-	-
Dyslipidemia	**84 (41.8%)**	50 (49.0%)	34 (34.3%)	**0.045**
MA	**17**	10 (58.8%)	7 (41.2%)	NS
TC (mg/dL)	**161.2 ± 34.8**	**168.3 ± 40.3**	**153.4 ± 25.6**	**0.04**
< 170 (nr)	116	54	62	
170-199 (nr)	41	25	16	
≥ 200 (nr)	18	13	5	
LDL-c (mg/dL)	**112.4 ± 26.3**	**117.0 ± 28.0**	**107.3 ± 23.4**	**0.01**
< 100 (nr)	92	42	50	
100-129 (nr)	48	24	24	
≥ 130 (nr)	36	26	10	
HDL-c (mg/dL)	**53.2 ± 12.1**	54.2 ± 13.7	52.2 ± 10.1	NS
< 35 (nr)	9	6	3	
35-44 (nr)	35	15	20	
≥ 45 (nr)	132	71	61	
TG (mg/dL)	**83.9 ± 58.0**	**94.5 ± 74.0**	**72.2 ± 29.0**	**0.009**
< 100 (nr)	138	67	71	
100-150 (nr)	28	17	11	
≥ 150 (nr)	10	8	2	

PATIENTS WITH MA - CHARACTERISTICS

CHARACTERISTICS	RESULTS
Number (nr)	**17 (8.5%)**
Gender	Female: 10 Male: 7
Age at MA diagnosis (y)	**11.1 ± 3.3** [6.4 ; 14.5]
Δt to MA after T1DM onset (y)	**5.5 ± 3.8 [0.75 ; 14.0]**
MA present within the first 5 y of T1DM duration	**9 children (52.9%)** 5 during puberty; 4 befor puberty
MA present within the first 2 y of T1DM duration	**5 children (29.4%)** 3 during puberty; 2 before puberty
Age at T1DM diagnosis (y)	**8.4 ± 3.7**
< 10 (nr)	12 (70.6%)
10-15 (nr)	5 (29.4%)
> 15 (nr)	0 (0%)
Hypertension	0 (0%)

LOGISTIC REGRESSION ANALYSIS

VARIABLE	OR	P VALUE	CI 95%
Actual age	**1.09***	**0.037**	[1.02; 1.17]
Age at diagnosis	0.98	NS	[0.85; 1.12]
T1DM duration	**1.38**	**0.005**	[1.11; 1.59]
Gender	1.34	NS	[0.74; 1.11]
BMI	**1.13**	**0.026**	[1.04; 1.26]
HbA1c	**1.88**	**0.021**	[1.45; 2.19]
TC	**1.26**	**0.033**	[1.07; 1.44]
LDL-c	**1.44**	**0.042**	[1.22; 1.63]
HDL-c	1.03	NS	[0.95; 1.09]
TG	**1.63**	**0.006**	[1.31; 1.78]

* Adjusted for T1DM duration

Abbreviations: TC = total cholesterol; TG = triglycerides; NS = non-significant

CONCLUSIONS

- In children, **nephropathy can occur soon after T1DM onset**.
- Our results have provided important data on prevalence, predictive factors and screening of nephropathy in a young population of T1DM patients
- Besides the well-described risk factors for MA (namely **poor metabolic control and longer diabetes duration**), **we also found obesity and dyslipidemia to increase the risk of nephropathy.**
- According to our results, **we suggest yearly screening of MA after T1DM onset and early treatment of dyslipidemia and obesity**.

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