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THE ROLE OF 24 HOURS AMBULATORY BLOOD PRESSURE MONITORING IN CHILDREN AND ADOLESCENTS WITH TYPE 1 DIABETES: EARLY EXPERIENCE OF A SINGLE CENTRE.

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BACKGROUND –
High values of blood pressure (BP) in children with type 1 diabetes (T1DM) are associated with an increased risk for developing cardiovascular complications later in life. The early assessment of hypertension is critical in reducing long term microvascular and macrovascular complications.
Twenty-four hour ambulatory blood pressure monitoring (24h-ABPM) allows the registration of BP values in a nonmedical environment; however, data on its usefulness in childhood are still controversial.

AIM OF THE STUDY –
1) To compare the prevalence of hypertension using both the traditional oscillometric method and the 24h-ABPM tool; **2)** To identify the link between hypertension and anthropometric features, lipid profile, kidney function, and metabolic control; **3)** To evaluate the role of 24h-ABPM in early diagnosis of hypertension in order to start early treatment.

POPULATION AND METHODS

We determined

What?	▪ auxological data (height SDS, z-score BMI) ▪ glycated hemoglobin (HbA1c), lipid profile [total cholesterol (TC), low-density lipoprotein (LDL), high-density lipoprotein (HDL), triglycerides (TG)], and renal function parameters [albumin/creatinine ratio (ACR) and glomerular filtration (GRF)] ▪ BP assessment [systolic BP (SBP) and diastolic BP (DBP)]
How BP was determined and defined?	A. Oscillometric method according to age, gender and height *(Pediatrics 2004)* → SBP >95th B. 24h-ABPM method through non-invasive portable recorder oscillometric device (A&D TM-2430) → SBP load >25%
Who?	Forty patients (52.5% males) with T1DM [age=13.6±2.56 yrs (range 8-18 yrs); T1DM time disease >2 yrs in pubertal patients and >3 yrs in prepubertal ones] were recruited in the study. We excluded children with other disease, smoking habits, and chronic therapies
When?	From Oct 2015 to Jan 2016 during a routine clinic control; BP was evaluated by both methods in the same day

RESULTS

HYPERTENSION PREVALENCE

T1DM time disease (yrs.)	7.08 ± 2.93
BP by oscillometric method (mmHg)	SBP → 115.0 ± 14.3 DBP → 64.5 ± 9.04
BP by 24h-ABPM (mean mmHg)	SBP →120.9 ± 11.5 DBP → 74.1 ± 8.69

Hypertension prevalence: SBP >95th centile *vs.* SBP load >25%
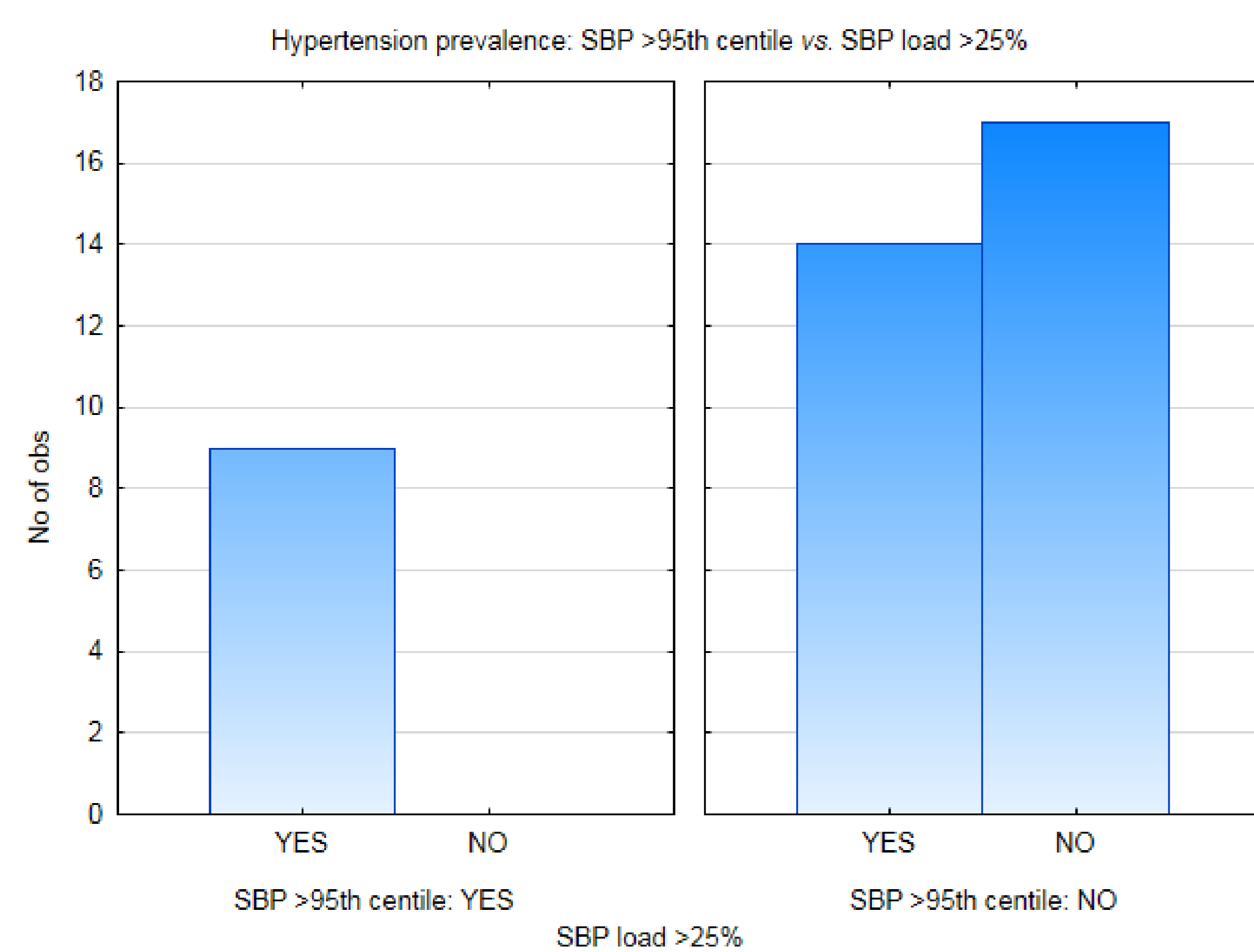
> Hypertension was found in 9 out of 40 patients (22.5%) using oscillometric method while through 24h-ABPM its prevalence significantly increased to 57.5% (23/40) (χ^2=8.58, p=0.003)

AUXOLOGICAL & LABORATORY DATA ACCORDING TO SBP LOAD

|	SBP load >25%	SBP load <25%	p
Age (yrs.)	13.5 ± 2.62	13.7 ± 2.56	0.761
T1DM time (yrs.)	**8.04 ± 3.23**	**5.76 ± 1.86**	**0.013**
Height (SDS)	0.60 ± 1.07	0.29 ± 0.89	0.331
z-score BMI (SDS)	0.26 ± 1.09	- 0.14 ± 0.87	0.219
HbA1c (mmol/mmol)	72.5 ± 15.1	66.2 ± 10.5	0.150
TC (mg/dl)	160.1 ± 23.3	160.7 ± 24.4	0.934
HDL (mg/dl)	65.5 ± 17.1	67.1 ± 12.5	0.747
LDL (mg/dl)	86.9 ± 30.6	82.7 ± 22.4	0.635
TG (mg/dl)	59.7 ± 17.1	55.1 ± 16.6	0.402
ACR (mg/g)	15.9 ± 29.3	10.7 ± 14.1	0.521
GFR (ml/min/1.73m²)	159.9 ± 30.7	152.5 ± 23.6	0.418
Visit SBP (mmHg)	**119.1 ± 16.7**	**109.5 ± 7.48**	**0.033**
Visit DBP (mmHg)	64.6 ± 9.00	64.3 ± 9.38	0.915
SBP load >95th (%)	**44.5 ± 10.5**	**13.2 ± 7.43**	**<0.0001**
DBP load >95th (%)	**33.1 ± 18.6**	**10.8 ± 6.05**	**<0.0001**
Non-dippers SBP (%)	3/23 (13.0)	3/17 (17.6)	0.686

> Non-dippers SBP subjects respect to the dippers ones had significantly higher values of age (15.9±1.8 *vs.* 13.2±2.48; p=0.01) and z-score BMI (1.27±0.97 *vs.* -0.12±0.87; p=0.001)

> SBP mean values (mmHg) were correlated with z-score BMI (r = 0.34, p = 0.034)

> Both SBP and DBP load >95th were correlated with T1DM time disease (r = 0.32, p = 0.045 and r = 0.44, p = 0.005, respectively)

> Multivariate analysis (model: gender, age, T1DM time disease, z-score BMI, HbA1c, HDL, LDL, ACR, and GFR → r = 0.62, r² = 0.38, p = 0.06) allowed us to identify T1DM time disease (β = 0.49, SE 0.17, 95%CI 0.15-0.84; p = 0.006) and z-score BMI (β = 0.41, SE 0.20, 95%CI 0.00-0.82; p = 0.049) as main predictive factors for SBP load >95th

ROC Curve: T1DM time disease for SBP load >25%
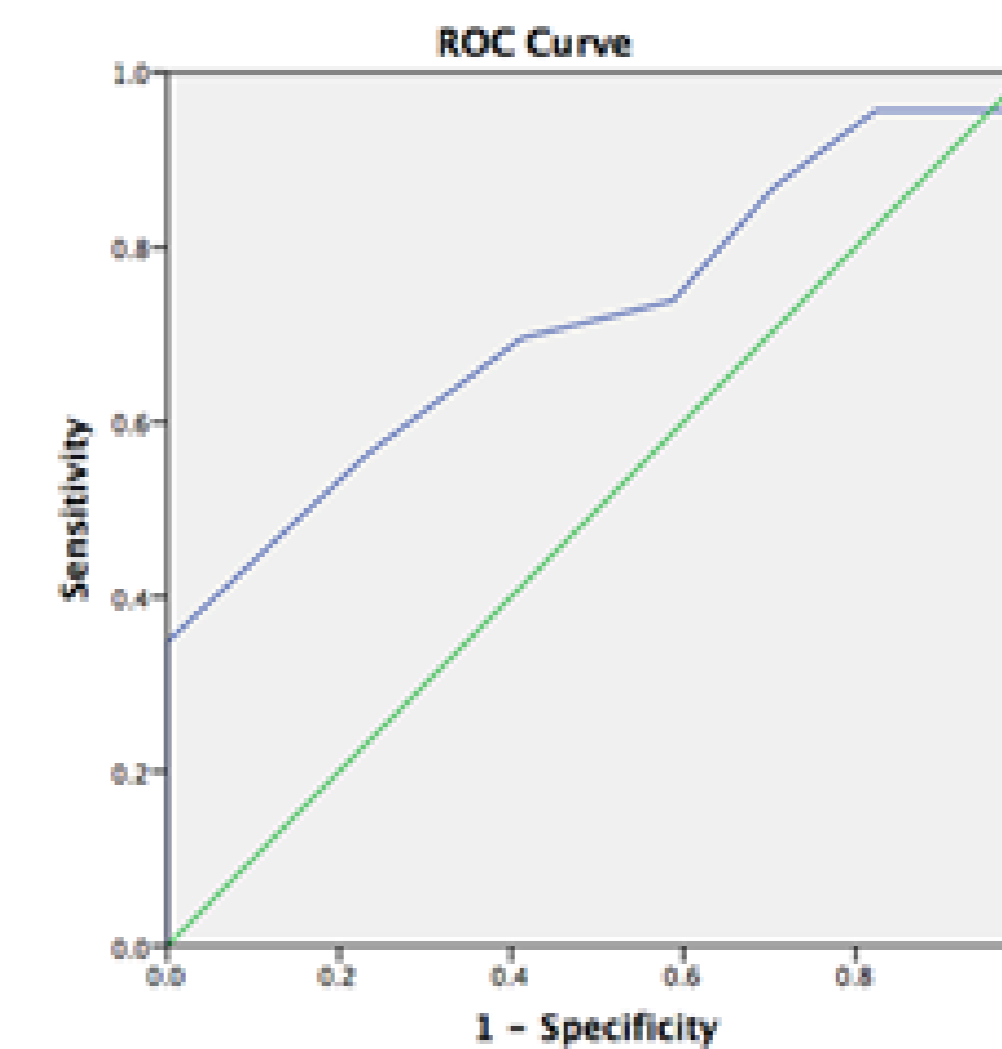
6.5 years = Cut-off value

Sensitivity 80%

Specificity 50%

AUC 0.716

CONCLUSIONS

❑ **The 24h-ABPM allowed us to identify a higher prevalence of hypertension compared to that we found using the traditional oscillometric method**

❑ **35% of our patients had masked hypertension**

❑ **Despite subjects with hypertension had T1DM for longer time, our data did not support a relationship between SBP, metabolic control, lipid profile, and renal function**

❑ **The 24h-ABPM could be introduced into each patient clinical practice 6-years after the T1DM onset**

❑ **We can considered the 24h-ABPM a useful tool to precociously identify patients which may benefit from early treatment to prevent kidney and cardiovascular complications**

In T1DM patients masked hypertension is present and it only will be identified by 24h-ABPM

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Diabetes

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