NOCTURNAL BLOOD PRESSURE IS RELATED TO THE DEVELOPMENT OF MICROALBUMINURIA AND ESTABLISHED HYPERTENSION IN PATIENTS WITH TYPE 1 DIABETES

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INTRODUCTION

The main objective is to evaluate the relationship between early blood pressure alterations (detected by ambulatory blood pressure monitoring – abpm-) and the development of microalbuminuria and arterial hypertension in patients with type 1 diabetes clinically normotensive.

METHODS

We designed a prospective observational study of 85 patients, clinically normotensive and without microalbuminuria, monitored over 7 years. Abpm was performed over 24 h and subclinical hypertension was considered if: 1) mean systolic pressure (sbp) was greater than 130 mmHg in the 24 hours and daytime periods and greater than 120 mmHg in the nighttime period and/or mean diastolic pressure (dbp) greater than 80 mmHg or 70 mmHg in the same periods respectively, and/or 2) more than 50% of the readings were higher than the defined previous criteria. Non dipper pattern was defined as nocturnal sbp or dbp <10% relative to the diurnal mean value. We evaluated the development of microalbuminuria and established hypertension during the following period.

RESULTS

Of the 85 patients included in the analysis, 55,3% (n:47) were women with an average age of 27,9±6.1 years and a length of disease of 12,3±6.5 years. 23.5% (n=20) were diagnosed with subclinical hypertension and 36% (n=31) with non dipper pattern as the only pathological finding. 69 patients completed the seven-year study. During this period: 1) 10.14% developed microalbuminuria, showing the mean nocturnal sbp as a risk factor (table 2) and 2) 7.24% of the normotensive patients progressed to established hypertension, showing historical hba1c and mean nocturnal dbp as related factors (table 3).

Table 1. Baseline characteristics of subjects analyzed at 7 years of follow-up (n=69)

Anthropometric and demographic variables				
	Albuminuria		Development of hypertension	
Variables	Normal	Pathologic	Normal	Pathologic
Age (years)	28.2 ± 6.0	28.7 ± 7.1	27.9 ± 5.6	31.0 ± 8.3
Duration of DM1 (years)	11.5 ± 6.1	13.8 ± 7.5	11.2 ± 6.0	11.0 ± 7.4
Body-mass index (Kg/m2)	24.2 ± 2.9	23.9 ± 3.1	24.1 ± 3.0	22.1 ± 1.1
Smokers (no. of subjects and %)	24 (38.7%)*	1 (14.3%)*	18 (38.3%)	1 (20%)
Glycosylated hemoglobin (%)	8.0 ± 1.3	8.9 ± 2.2	7.9 ± 1.3*	9.2 ± 1.4*
Baseline ambulatory blood pressure monitoring parameters				
24-h systolic blood pressure mean (mmHg)	118.2 ± 8.5*	128.0 ± 7.8*	115.9 ± 7.5*	122.8 ± 3.7*
Daytime systolic blood pressure mean (mmHg)	121.8 ± 9.1*	130.4 ± 7.2*	119.2 ± 7.6	125.2 ± 3.1
Asleep systolic blood pressure mean (mmHg)	107.4 ± 9.6*	120.4 ± 9.7*	106.3 ± 9.2*	115.2 ± 6.9*
24-h diastolic blood pressure mean (mmHg)	72.8 ± 9.2	75.8 ± 6.6	71.5 ± 10.1*	75.4 ± 5.0*
Daytime diastolic blood pressure mean (mmHg)	74.6 ± 5.5	78.5 ± 6.9	73.0 ± 5.1*	77.6 ± 4.9*
Asleep diastolic blood pressure mean (mmHg)	61.8 ± 9.6*	68.3 ± 6.4*	60.9 ± 5.4	68.6 ± 6.8*
Non-dipper (no. of subjects and %)	28 (45.2%)	4 (57.1%)	23 (48.9%)	4 (80%)
				* p<0.005

Table 2. Multiple regression analysis of patients analyzed at 7 years of follow-up using development of microalbuminuria as dependent variable

Variable	OR	95% CI	p
Initial sbp in repose period	1.129	1.03 - 1.23	0.007

Table 3. Multiple regression analysis of patients analyzed at 7 years of follow-up using development of hypertension as dependent variable

Variable	OR	95% CI	p
Initial historical glycosylated hemoglobin (*)	2.767	1.02 - 7.53	0.046
Initial dbp in rest period	1.243	1.01 - 1.53	0.042
Percentage of 24h sbp ≥130 mmHg	1.075	0.98 – 1.17	0.107

(*) To assess chronic metabolic control, the historical HbA1c was calculated as the mean of all the determinations recorded for the patient.

CONCLUSIONS

In type 1 diabetic patients clinically normotensive with normoalbuminuria, nocturnal blood pressure parameters predisposes the development of microalbuminuria and established hypertension.

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