

SUBCLINICAL BLOOD PRESSURE ALTERATIONS ARE RELATED TO PROINFLAMMATORY MARKERS IN TYPE 1 DIABETES MELLITUS

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INTRODUCTION

The main objective is to evaluate the relationship between precocious subclinical hypertension and inflammatory and endothelial dysfunction markers in normotensive and normoalbuminuric patients with type 1 diabetes.

METHODS

We designed an observational transversal study of 85 patients, clinically normotensive and without microalbuminuria. Ambulatory blood pressure monitoring (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 analyzed the relationship between the blood pressure alterations detected by abpm and inflammatory cytokines (IL-6, TNF- α , VEGF) and markers of endothelial damage (VCAM, ICAM and PAI).

RESULTS

Of the 85 patients included in the analysis, 55,3% (n:47) were women with an average age of 27,9 \pm 6.1 years and a length of disease of 12,3 \pm 6.5 years. 31.8% presented pathological mean blood pressure parameters in some of the periods. VEGF levels were significantly higher in patients with diurnal blood pressure alterations relative to normotensive patients (table 1). In addition, VEGF levels showed a significant correlation with mean daytime and 24h blood pressure parameters (figure 1 and 2). IL6 levels showed as a risk factor in patients diagnosed with subclinical hypertension (table 2). There were no modifications in the level of markers of endothelial damage.

Table 1. Cytokines and markers of endothelial function damage measured

Variable	SBP or DBP 24h			SBP or DBP active period			SBP or DBP repose period		
	Pathologic (n=16)	Normal (n=69)	p	Pathologic (n=27)	Normal (n=58)	p	Pathologic (n=19)	Normal (n=66)	p
Serum IL-6; pg/mL	3.18 (1.82-5.43)	2.68 (1.58-3.53)	0.196	3.48 (2.07-5.64)	2.29 (1.54-3.29)	0.016	2.07 (1.52-3.56)	2.81 (1.66-3.95)	0.501
Serum TNF- α ; pg/mL	2.61 (0.43-5.82)	2.57 (1.72-4.9)	0.836	2.45 (0.37-6.37)	2.61 (1.72-5.11)	0.759	2.16 (0.31-4.66)	2.61 (1.72-5.82)	0.405
Serum VEGF; pg/mL	112.33 (73.83-219.86)	74.57 (40.90-128.14)	0.105	112.33 (72.87-213.53)	71.03 (37.71-107.92)	0.007	85.25 (64.56-140.81)	75.34 (39.69-132.68)	0.439
Plasma sICAM-1; ng/mL	40.65 (28.07-96.12)	56.63 (38.53-78.65)	0.256	51.45 (37.49-100.29)	56.41 (35.71-72.83)	0.600	64.12 (41.41-92.22)	53.51 (33.96-79.21)	0.390
Plasma sVCAM-1; ng/mL	68.66 (24.48-111.01)	58.41 (37.17-77.86)	0.617	67.83 (41.25-112.22)	52.36 (35.16-73.59)	0.073	67.83 (36.27-112.22)	55.88 (37.39-80.64)	0.359
Plasma PAI-1; ng/mL	46.22 (26.82-190.86)	73.53 (42.33-150.19)	0.415	92.58 (39.11-26.77)	65.42 (41.39-101.81)	0.162	83.53 (39.11-214.78)	66.99 (40.98-142.45)	0.480

Table 2. Binary logistic regression model for the dependent variable BP pathological in the active period

Variable	OR	95% CI	p
HDL-cholesterol	0.951	0.909-0.994	0.022
IL-6	1.406	1.050-1.884	0.027
Triglycerides	1.015	1.000-1.030	0.050

Table 3. Multiple linear regression model with the dependent variable VEGF

Variable	β	β standardized	95% CI	p
Mean sbp in active period	2.254	0.280	0.144-0.870	0.008
Triglycerides	0.507	0.286	0.607-3.902	0.007

β : coefficient of regression; β standardized: standard coefficient of regression; 95%CI for β : confidence interval for the coefficient of regression.

Figure 1. Correlation between diurnal activity systolic blood pressure and VEGF level

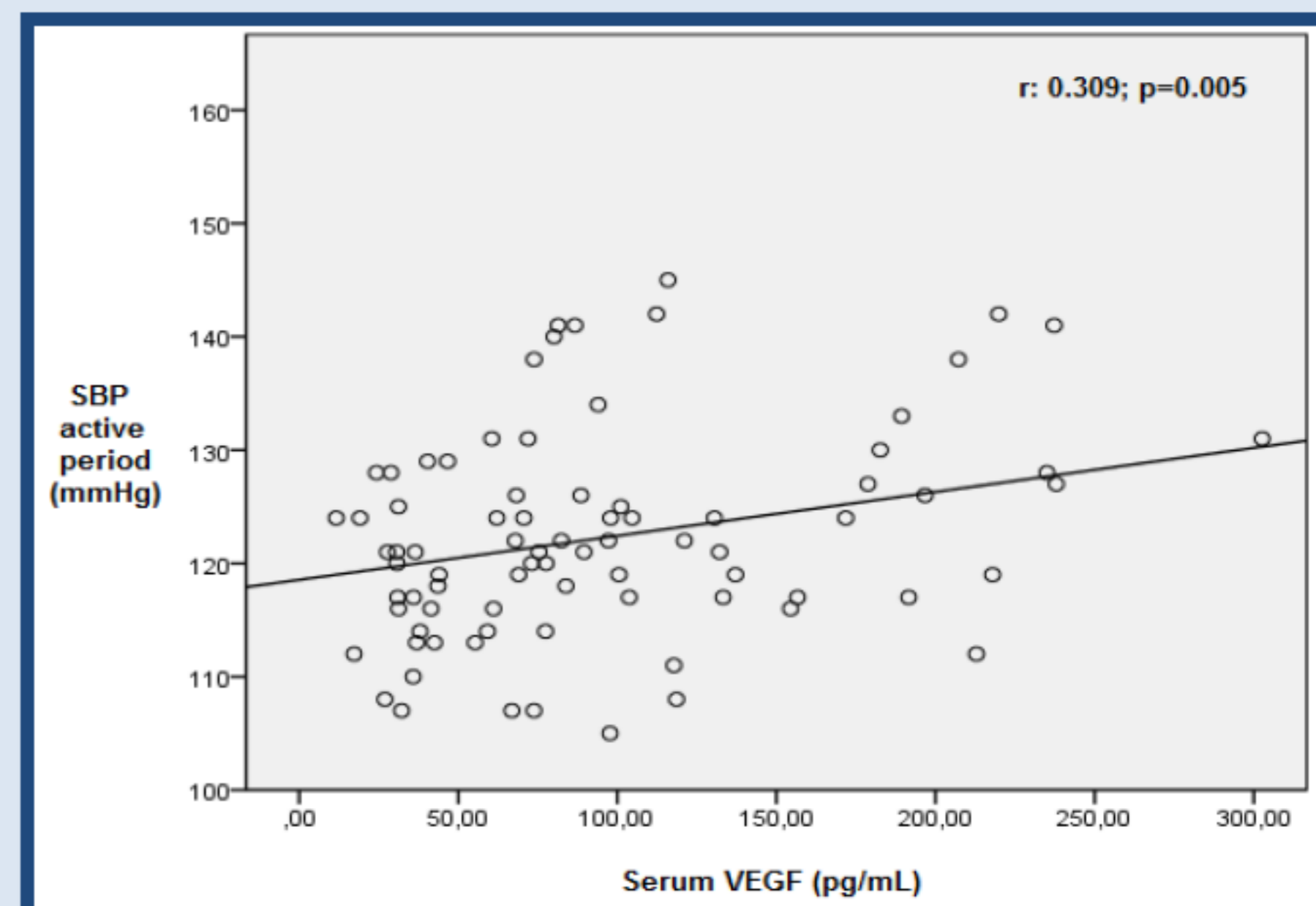
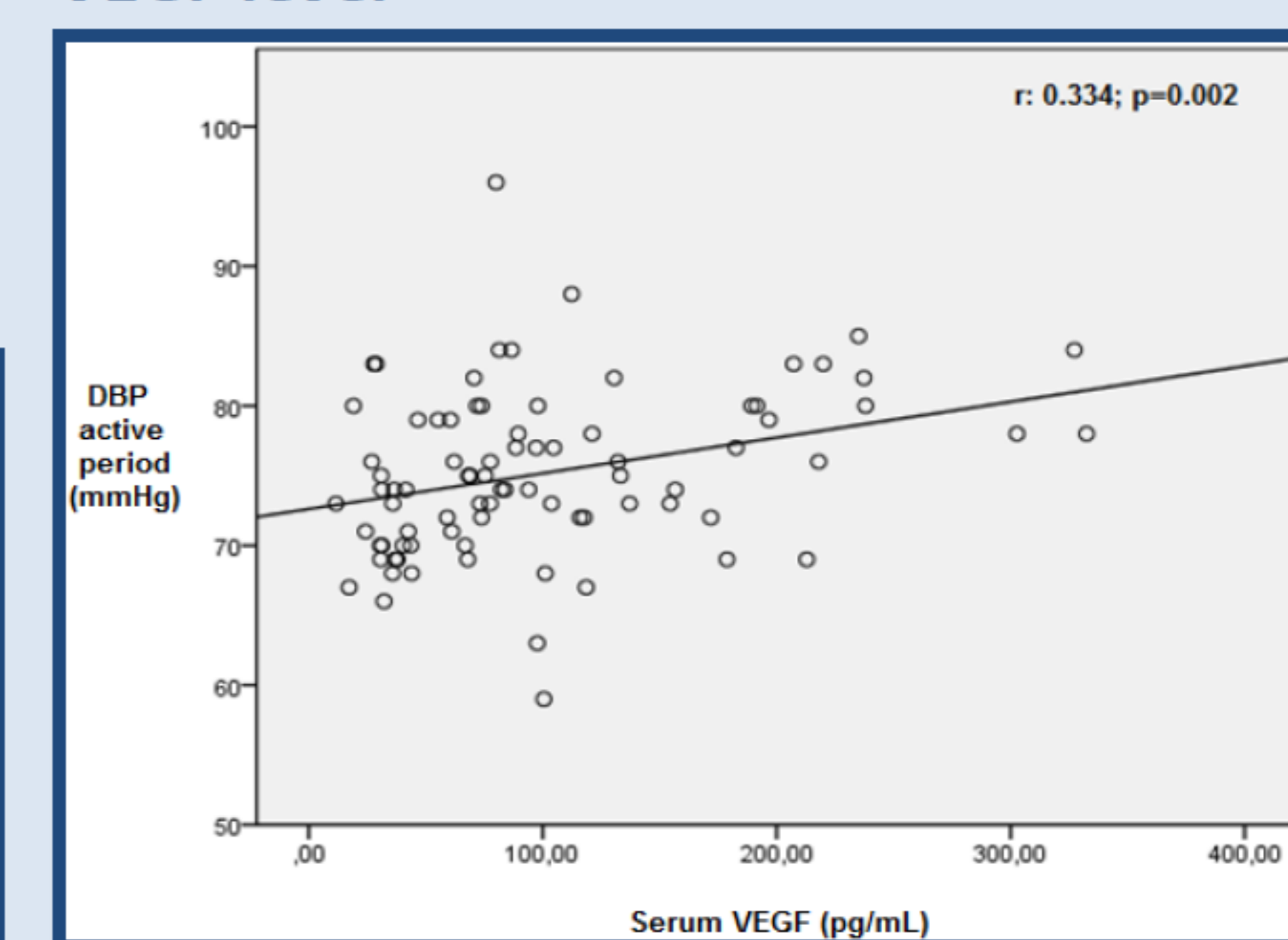


Figure 2. Correlation between diurnal activity diastolic blood pressure and VEGF level



CONCLUSIONS

An increase in proinflammatory cytokines, although not markers of endothelial damage, exists in precocious stages of hypertension in type 1 diabetic patients.

