

## **Pulse pressure and pulse wave velocity as markers of arterial stiffness in patients with type 1 diabetes**

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### **Keyword:**

Complications - cardiovascular disease

### **ABSTRACT**

#### **Aims :**

Type 1 diabetes is associated with an acceleration of arterial stiffness with age and an increased cardiovascular risk as compared to nondiabetic controls. The aim of the study was to compare two markers of arterial stiffness, arterial Pulse Pressure (PP) and Pulse Wave Velocity (PWV), in type 1 diabetes patients and in age-matched controls.

Methods : 59 (20-55 years) type 1 diabetic patients (24 women/35 men, 41±9 years, 20±9 years of diabetes, HbA1c 8.5±1.6 %) and 31 age-matched control subjects were evaluated with a continuous noninvasive arterial blood pressure monitoring (Finapres®). Recordings were performed in standing position (1 min), in squatting position (1 min), and again in standing position (1 min), but most presented data correspond to average PP (systolic - diastolic pressure) values calculated during the overall period. PWV was measured in supine position between the carotid and femoral peripheral artery sites with a SphygmoCor Vx®. Twenty-two diabetic patients were treated with a renin-angiotensin inhibitor, mainly because of microalbuminuria.

**Results :** PP was significantly higher in diabetic than in nondiabetic subjects (58±14 vs 50±10 mm Hg; p<0.002). The relative PP increase from standing to squatting tended to be higher in diabetic than in nondiabetic individuals (+6±9 vs +4±4 mmHg; p= 0.185). This posture difference was amplified in diabetic individuals above 40 years (+8±9 vs +4±10 mmHg; p= 0.141). PWV was also significantly increased in the diabetic group when compared with the control group (5.2±1.5 vs 4.4±1.5 m/sec; p=0.026). No differences were detected according to gender (5.2±1.6 m/sec in diabetic women vs 5.2±1.4 m/sec in diabetic men, NS; 4.6±1.6 m/sec in nondiabetic women vs 4.1±1.4 m/sec in nondiabetic men, NS). No significant differences in PP and PWV were observed in patients receiving (62 ± 19 mm Hg; 5.5±1.6 m/sec) or not receiving (55 ± 10 mm Hg; 4.9±1.3 m/sec) a renin-angiotensin blocker (p=0.11 and p=0.12, respectively). In the diabetic population, positive correlations were observed between PWV and PP (r=0.3127; p=0.0179), PWV and age (r=0.3460; p=0.0073), PWV and diabetes duration (r=0.3009; p=0.0206), PP and age (r=0.4339; p<0.0001), and PP and diabetes duration (r=0.1761; p=0.2240). In contrast, no such correlations were observed in the nondiabetic controls, neither between PWV and PP (r=-0.09; NS) nor between each of these two indices and age (r=-0.2129, NS, for PWV and r= -0.08, NS, for PP).

**Conclusion :** Type 1 diabetes was associated with an increase in both PP and PWV as compared to a nondiabetic population. In the diabetic population, a close correlation between the two indirect markers of arterial stiffness was found and also between each of them and age (or diabetes duration), but not in controls. These observations support the concept of an earlier arterial stiffness in type 1 diabetes with rather poor glycemic control