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PATIENTS WITH TYPE 1 OR TYPE 2 DIABETES HAVE SIMILARLY INCREASED PULSATILITY STRESS AT COMPARABLE AGE OF 50 YEARS

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Abstract:
Background and aims: Arterial pulse pressure (PP) is considered as an independent cardiovascular risk factor in both patients with type 1 (T1DM) and type 2 (T2DM) diabetes mellitus. However, patients with each type of diabetes are exposed to a quite different toxic vascular environment. We compared PP and PP x heart rate (HR) double product (PPxHR = “pulsatile stress”) during an active orthostatic test in patients with T1DM and patients with T2DM matched for age (40-60 years).
Materials and methods: 40 patients with T1DM (mean age 50 years, diabetes duration 23 years, body mass index - BMI - 23.0 kg/m², HbA1c 8.4%) were compared to 40 patients with T2DM (respectively, 50 years, 8 years, 29.7 kg/m², 7.6%). Patients taking antihypertensive agents or with renal insufficiency were excluded. All patients were evaluated with a continuous noninvasive arterial blood pressure monitoring (Finapres®) in standing (1 min), squatting (1 min) and standing position again (1 min). Patients with T1DM or T2DM were compared with two groups of 40 age- and BMI-matched healthy subjects (sex ratio 1/1 in all groups)(Figure).
Results: Despite similar mean arterial pressure (MAP), patients with T1DM and patients with T2DM showed significantly higher PP, HR and PPxHR double product levels than corresponding controls : in T1DM, 59 vs 52 mm Hg for PP (P= 0.016) and 5263 vs 4121 mmHg/min for PPxHR (P=0.0004); in T2DM, 58 vs 52 mm Hg for PP (P= 0.045) and 5359 vs 4321 mmHg/min for PPxHR (P=0.0023). However, there were no significant differences between patients with T1DM and T2DM regarding mean overall values of MAP (126 vs 128 mmHg), PP (59 vs 58 mmHg), HR (89 vs 88/min), and PPxHR product (5263 vs 5359 mmHg/min). During the transition from standing to squatting position, PP increase (+10 vs +8 mmHg) and HR reduction (-6 vs -6 beats/min) were significant but similar in both groups, resulting in a similar modest and non significant rise in PPxHR (+557 vs +449 mmHg/min).
Conclusion: Patients with T1DM have similarly increased PP, an indirect marker of arterial stiffness, and PPxHR double product, an index of pulsatile stress, as non-hypertensive patients with T2DM at similar mean age of 50 years. We hypothesize that such comparable pulsatile stress despite quite different natural history of the diabetic disease may be explained by a much longer exposure to chronic hyperglycaemia in patients with T1DM, on the one hand, and by the presence of associated risk factors such as obesity and insulin resistance in patients with T2DM, on the other hand.
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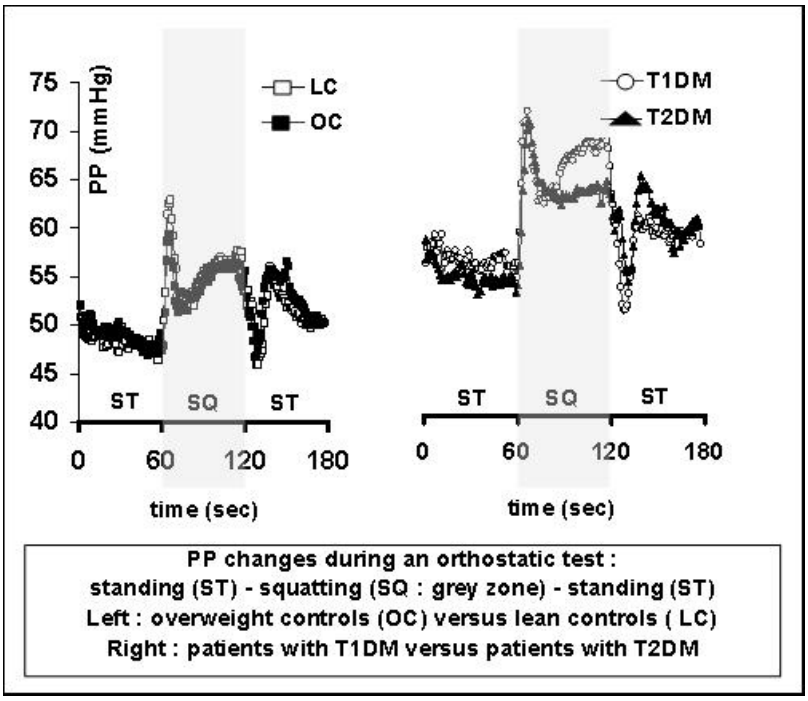

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	T1DM	T2DM	LC	OC
N (Male/Female)	20/20	20/20	20/20	20/20
Age (yrs)	50±6	50±6	50±6	50±6
BMI (kg/m^2)	23.0±2.0	29.7±2 .7	22.2±2.6	28.6±2.7
Diabetes duration (yrs)	23±11	8±7	-	-
HbA_{1c} (%)	8.4±1.1	7.6±1.2	-	-

	T1DM	T2DM	p	LC	OC	p
Overall values						
MAP (mm Hg)	84±13	88±13	0.25	85±12	86±12	0.65
SBP (mm Hg)	126±21	128±20	0.63	120±21	122±18	0.65
PP (mm Hg)	59±13 [a]	58± 16 [a]	0.79	52±5	52±13	0.96
HR (bpm)	88±3 [b]	91±10 [b]	0.23	80±9	84±13	0.20
SBPxHR (mm Hg*min^{-1})	11120 [b] ± 2947	12082 [b] ± 2521	0.16	9593 ± 1771	10195 ± 2291	0.45
Changes during Squatting						
Δ MAP (mm Hg)	8±7	10±9	0.24	5±4	7±8	0.50
Δ SBP (mm Hg)	13±11 [a]	14±14	0.83	8±7	9±11	0.61
Δ PP (mmHg)	10±8	8±11	0.43	7±6	8±11	0.31
Δ HR (/min)	-6±7	-6±7 [a]	0.94.	-6±6	-2±7	0.20
Δ SBPxHR (mmHg*min^{-1})	1136 [a] ± 1270	1236 ± 1440	0.74	601 ± 698	963 ± 1178	0.09