Decreased baroreflex gain more strongly predicts microalbuminuria and increased pulsatile stress than decreased RR E/I ratio in patients with type 1 diabetes

A.J.L. Scheen, M. Marchand, J.-C. Philips
Division of Diabetes, Nutrition and Metabolic Disorders, CHU Sart Tilman, Liege, Belgium.

BACKGROUND AND AIMS
Long-lasting type 1 diabetes (T1DM) may be associated with cardiac autonomic neuropathy (CAN), increased pulse pressure (PP) or pulsatile stress, and microalbuminuria (µA), all cardiovascular risk factors. We compared the relationships of two markers of CAN, RR E/I (Expiratory/Inspiratory) ratio and baroreflex gain (BRG), with µA and pulsatile stress during an active orthostatic test in patients with T1DM.

MATERIALS AND METHODS
We compared the relationships of two markers of CAN, RR E/I (Expiratory/Inspiratory) ratio and baroreflex gain (BRG), with µA and pulsatile stress during an active orthostatic test in patients with T1DM.

RESULTS
Compared to T1DM patients with high BRG, patients with low BRG tended to be slightly older and to have a slightly longer duration of diabetes, lower RR E/I ratio, but had similar recent HbA1c levels.

Pulsatile stress was defined as the product of PP and heart rate, both during the whole test and during the squatting position only.

The mirror changes in heart rate and systolic BP during the squat-stand transition allows the calculation of BRG (msec.mm Hg⁻¹), by plotting the pulse intervals (RR) against systolic BP values, as classically assessed during a pharmacological test using the infusion of a vasodilator and a vasoconstrictor agent.

Increased pulsatile stress index (specially in squatting position) and even more strongly patients with µA than the classical RR E/I ratio CAN index.

Decreased BRG may be used to detect T1DM patients at high risk of cardioenal complications.

CONCLUSIONS:

- Compared to T1DM patients with high BRG, patients with low BRG tended to be slightly older and to have a slightly longer duration of diabetes, lower RR E/I ratio, but had similar recent HbA1c levels.
- T1DM patients with low BRG had an increased pulsatile stress index (specially in squatting position). Similarly, µA was higher in T1DM patients with low BRG, being expressed by the mean level or by its logarithm to adjust for a non-Gaussian distribution.
- All together, 26.9% of T1DM patients with low BRG had abnormal µA (>30 mg/l) versus only 5.3% of patients with high BRG (p<0.001).
- There was an inverse correlation between BRG and log µA (r=0.28; p=0.0006), but not between RR E/I ratio and log µA (r=0.09; p=0.12).
- The correlation between BRG and pulsatile stress (r =0.28; p=0.003) was stronger than that between RR E/I ratio and pulsatile stress (r =0.19; p=0.0153).