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Can we use heart-rate-turbulence to quantify changes in cardiac autonomic modulation in diabetic patients?

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Patients suffering from diabetes reveal, compared to patients with a similar ejection fraction (EF), significantly more incidences of sudden deaths and, therefore, a higher total mortality. Several parameters, e.g. heart rate variability (HRV), are currently established to quantify alterations in the autonomic cardiac modulation (ACM). Whether a reduced heart-rate turbulence (HRT) is suitable to describe changes in AM has not been investigated yet.

Methods: Prospectively, we evaluated EF, HRT, and HRV in a consecutive patient cohort in our outdoor patient department. In a total of 114 patients we performed a 24 h Holter-ECG and an echocardiography.

Results: 20 of 114 patients (mean age 59 ± 15 years, 93 men) suffered from diabetes. Mean EF in diabetic patients was significantly lower ($52 \pm 19\%$ vs. $62 \pm 15\%$, $p = 0.04$). Mean heart rate did not differ between the groups (70 vs. $72.1/\text{min}$). The table demonstrates HRV parameters in the cohort. HRT showed a significant difference in terms of turbulence slope only (3 ± 3 vs. 6.6 ± 7.4 ms per RR-interval).

HRV Parameters

	Diabetes	Non diabetes
SDNN ($p < 0.009$)	93 ± 36 ms	118 ± 52 ms
VLF ($p < 0.04$)	1225 ± 956 ms ²	1793 ± 1712 ms ²
LF ($p < 0.02$)	355 ± 374 ms ²	773 ± 1712 ms ²
HF ($p < 0.03$)	240 ± 321 ms ²	831 ± 2929 ms ²
TP ($p < 0.008$)	2000 ± 1642 ms ²	3684 ± 5501 ms ²

Discussion: In our patient cohort we clearly demonstrated a decrease of HRV in patients suffering from diabetes. In terms of HRT, only the turbulence slope was suitable to detect differences between both groups. Therefore, HRT does not seem to be sensitive enough to reliably discover changes in the autonomic cardiac modulation in diabetes patients.