Nocturnal ventricular arrhythmias are associated with the severity of cardiovascular autonomic neuropathy in type 2 diabetes

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Abstract

Background

Cardiovascular autonomic neuropathy (CAN) is a risk factor for arrhythmias and adverse cardiovascular events, but the relationship between CAN severity and nocturnal arrhythmias needs to be clarified. This study evaluated the association between nocturnal arrhythmias and CAN severity in patients with type 2 diabetes (T2D).

Methods

In all, 219 T2D patients were recruited from January 2017 to May 2018. Subjects were classified into no CAN (NCAN), early CAN (ECAN), definite CAN (DCAN), or advanced CAN (ACAN) based on cardiovascular autonomic reflex tests (CARTs). A 24‐hour electrocardiogram was recorded and daytime (0700‐2300 hours) and night‐time (2300‐0700 hours) heartbeats were analyzed separately.

Results

After adjusting for age, the incidence of ventricular arrhythmias increased with CAN severity at night‐time (18.6%, 29.9%, 36.2%, and 60.0% in the NCAN, ECAN, DCAN, and ACAN groups, respectively; P_{trend} = 0.034). Patients with nocturnal ventricular arrhythmias (NVAs) had higher CART scores (2.0 ± 1.0 vs 1.5 ± 0.9; $P < 0.001$) and lower heart rate variability (HRV) during deep breathing (9.5 ± 5.7 vs 11.6 ± 6.6 b. p. m; $P = 0.021$), HRV during the Valsalva maneuver (1.2 ± 0.1 vs 1.2 ± 0.2; $P = 0.006$), and postural blood pressure change (−8.8 ± 15.5 vs −4.1 ± 11.2 mmHg; $P = 0.023$). Multivariate regression analysis revealed that CAN stage (odds ratio 1.765; 95% confidence interval 1.184‐2.632; $P = 0.005$) was independently associated with NVAs.

Conclusions

In T2D, CAN stage was independently associated with the presence of NVAs. Early detection, diagnosis, and treatment of CAN may help predict and prevent adverse cardiovascular events and cardiovascular mortality in diabetes.

Supporting Information

Early View
Online Version of Record before inclusion in an issue

Related Information

Metrics

Details

Keywords

cardiovascular autonomic neuropathy

nocturnal arrhythmias

risk factors