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Age-Matched Attenuation of Both Autonomic Branches in Chronic Disease: II. Diabetes Mellitus

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Background: Autonomic assessment using parasympathetic and sympathetic (P&S) monitoring (see Background in: I. Hypertension) yields accurate measures of sympathetic activity (low-frequency area, or LFa), parasympathetic activity (respiratory frequency area, or RFa), and sympathovagal balance (SB = LFa/RFa ratio).

Methods: Serial P&S monitoring (ANX-3.0 Autonomic Monitor, ANSAR, Medical Technologies, Inc., Philadelphia, Pennsylvania) was performed on 511 patients diagnosed with type 2 diabetes (females = 248; age = 63.4 ± 13.1 , range 25 to 96 years) with and without comorbidities (hypertension, 56.1%; coronary artery disease, 25.2%). The data are compared with preexisting data for normal controls (ages 25–90 years) with no history of diabetes or cardiovascular or autonomic disorders. The broken horizontal line indicates the threshold for cardiovascular autonomic neuropathy (CAN). Diabetic autonomic neuropathy (DAN) is also indicated (**Figure**).

Results: Baseline P&S levels were found to be significantly reduced in patients with diabetes compared with normal controls. An age-distributed investigation reveals that P&S activity decreases with age, a trend similar to that of normal controls. However, the differences between normal controls and diabetics are much more marked in the younger population. These differences gradually decrease with age. These trends were observed

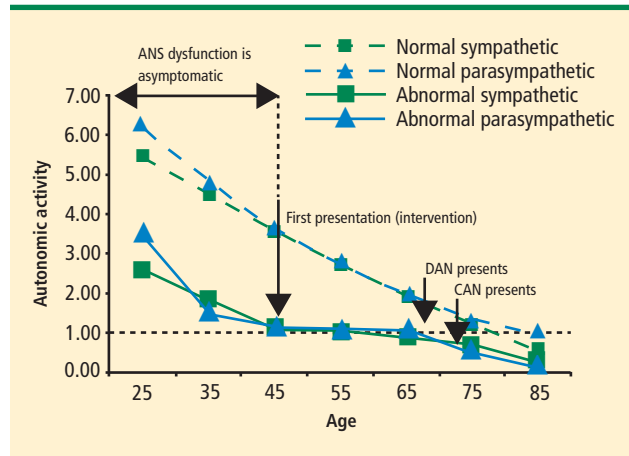


FIGURE. Autonomic nervous system (ANS) changes with age. CAN = cardiovascular autonomic neuropathy; DAN = diabetic autonomic neuropathy

regardless of comorbidities or medications. P&S values for 35-year-old patients are similar (or lower) in magnitude than those of 70-year-old normal controls.

Conclusion: Both parasympathetic and sympathetic activity appears to be significantly decreased in diabetics compared with age-matched normal controls. Whether these observations suggest autonomic decline is an effect of diabetes, or contributes to the cause of diabetes, remains to be established.