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Age-Matched Attenuation of Both Autonomic Branches in Chronic Disease: I. Hypertension

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Background: Autonomic dysfunction, as evidenced by reduced low frequency (LF) and high frequency (HF) power of baseline heart rate variability (HRV), has been implicated in chronic hypertension. However, thus far there is very little consensus on the validity of the correlation between LF power and hypertension. Moreover, LF power from traditional HRV analysis has been shown to be an inaccurate indicator of sympathetic activity. Parasympathetic and sympathetic (P&S) nervous system profiling using HRV and respiratory activity (RA) simultaneously, known as P&S monitoring, yields accurate measures of sympathetic activity (LF 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 74 hypertensive patients (females = 21; age = 66.6 ± 12.2 years) with and without comorbidities (diabetes = 43; coronary artery disease = 43). The data are compared with preexisting data for normal controls (ages 40–90 years) with no history of diabetes or cardiovascular or autonomic disorders. The broken horizontal line indicates the threshold for cardiovascular autonomic neuropathy (Figure).

Results: Baseline P&S levels were found to be significantly reduced in chronic hypertensive patients compared with normal controls. An age-distributed investigation reveals that the P&S activity decreases with age, a trend similar to that of normal controls. However, the differences between normal controls and hypertensives are much more marked, especially in the younger

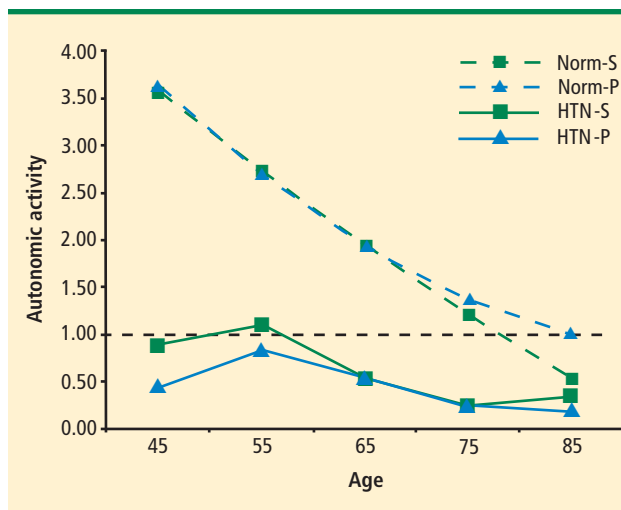


FIGURE. Serial parasympathetic (P) and sympathetic (S) monitoring in hypertension (HTN) patients compared with normal (NORM) controls.

population. The differences gradually decrease with age. These trends were observed regardless of comorbidities or medications. The P&S values for 45-year-old hypertensive patients are similar (or lower) in magnitude than those of 85-year-old normal controls.

Conclusion: Both parasympathetic and sympathetic activity appears to be significantly decreased in chronic hypertensive patients compared with age-matched normal controls. Whether these observations suggest P&S decline is an effect of hypertension, or contributes to the cause of hypertension, remains to be established.