



Differential Effects of Adrenergic Antagonists (Carvedilol vs Metoprolol) on Parasympathetic & Sympathetic Activity: A Comparison of Measures 1 of 2

BACKGROUND

Cardiovascular autonomic neuropathy (CAN) is recognized as a significant health risk. Specific and sensitive measures of CAN are needed for early identification and treatment to avoid complications, preferably in the preclinical state.

OBJECTIVES

In this first of two articles, the patient cohort is described and two measures of autonomic function are reviewed: the traditional heart rate variability (HRV)-alone method and the newer parasympathetic and sympathetic (P&S) Method. These systems

are then evaluated against known effects of the alpha/beta-adrenergic blocker, Carvedilol, and the selective beta-adrenergic blocker, Metoprolol, on P&S activity.

METHODS

Serial autonomic nervous system test data from 147 type 2 diabetes mellitus patients from eight ambulatory clinics were analyzed.

Patients were grouped according to whether a beta-blocker was:

- (1) introduced,
- (2) discontinued or
- (3) continued without adjustment.

Group 3 served as the control. HRV-alone parameters are computed according to standards. The P&S Method, which is a time-frequency analyses of concurrent respiratory activity and HRV, is elucidated, as developed at MIT and Harvard Medical School (1981).

RESULTS

The HRV-alone demonstrated that introducing either medication increased low frequency (msec(2)) and standard deviation of the beat-to-beat (N-N) interval (msec), as expected. The other HRV parameter responses were not consistent with expectations. Similar inconsistencies occurred when either medication was discontinued. The P&S Method demonstrated that introducing or discontinuing either agent decreased or increased sympathetic activity, respectively, according to expectations. With ongoing treatment, resting parasympathetic activity decreased with Metoprolol but increased with Carvedilol.

CONCLUSION

Autonomic assessment fidelity was significantly higher with the P&S Method as validated by comparison with previously known physiology of the cardiovascular system.