TACSM Abstract

Reduced Muscle Sympathetic Nerve Activity Response to a Cold Pressor Test in Multiple Sclerosis

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ABSTRACT

Multiple sclerosis (MS) is a neurodegenerative autoimmune disease characterized by demyelination in the central nervous system leading to potential impairments in the autonomic control of cardiovascular function. We have previously demonstrated individuals with MS exhibit a diminished ability to increase blood pressure in response to a hypotensive stimulus compared with healthy controls likely due to impaired sympathetic modulation of the vasculature. **PURPOSE**: The aim of the current investigation was to test the hypothesis that muscle sympathetic nerve activity (MSNA) responses to a cold pressor test (CPT) are reduced in individuals with MS compared to healthy controls. **METHODS**: Four patients with relapsing-remitting MS (2 females/2 males, EDSS < 4) and 4 sex-, age- and mass-matched controls were instrumented for MSNA (peroneal nerve), mean arterial blood pressure (MAP; Finometer), and heart rate (HR). Subjects were exposed to a CPT by immersing a hand in ice water for 2 min. Mean cardiovascular and MSNA responses (burst frequency) at baseline and at 30 sec intervals during the CPT were compared between groups. **RESULTS**: Heart rate ($P<0.001$) and MAP ($P<0.001$) responses increased from baseline throughout the CPT but no group differences were observed ($P=0.10$ and $P=0.78$, respectively). At baseline, MSNA was similar between groups (MS: 2 ± 2 vs. CON: 14 ± 9 bursts/min; $P=0.239$). However, individuals with MS had blunted MSNA responses to CPT compared to healthy controls at 60 seconds (MS: 18 ± 14 vs. CON: 42 ± 10 bursts/min; $P=0.033$), at 90 seconds (MS: 16 ± 12 vs. CON: 44 ± 10 bursts/min; $P=.017$) and at 120 seconds (MS: 13 ± 12 vs. CON: 43 ± 13 bursts/min; $P=.012$). **CONCLUSION**: Individuals with MS appear to have an attenuated muscle sympathetic response to CPT. However, MAP appears to respond similarly to healthy controls potentially through other compensatory mechanisms.