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“Sympathetic nerve activity and arterial baroreflex sensitivity in rheumatoid arthritis”

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**Background** Rheumatoid Arthritis (RA) is a chronic, systemic inflammatory disorder associated with elevated cardiovascular mortality. Heightened sympathetic nerve activity (SNA) and/or arterial baroreflex dysfunction remain as potentially important contributory factors. Experimental elevations in pro-inflammatory cytokine concentration robustly increase SNA and reduce cardiac baroreflex sensitivity in rats, while many of the established pathological consequences of chronic elevations in SNA are prevalent in RA (e.g., cardiac arrhythmias).

**Purpose** We sought to determine whether heightened SNA and arterial baroreflex dysfunction are present in patients with RA.

**Methods** Thirteen normotensive RA patients (RA, 8 women, mean age ± standard deviation 56± 12 yr), 17 RA patients with hypertension (RA-HTN, 12 women, 61±10 yr), 16 patients with hypertension (HTN, 11 women, 60±10 yrs) and 17 healthy normotensive control subjects (HC, 10 women, 54±13 yr) were studied. Efferent SNA to the skeletal muscle vasculature (MSNA, peroneal microneurography) was recorded with blood pressure (BP) and heart rate (HR) while subjects rested supine. Arterial baroreflex control of HR (slope of systolic BP vs. R-R Interval) and MSNA (slope of diastolic BP vs. MSNA) was determined from sequential infusion of sodium nitroprusside (100 μg) and phenylephrine (150 μg; modified Oxford technique).

**Results** Mean BP was elevated in RA-HTN and HTN groups (geometric mean 109, 95 % confidence interval 104-114 vs. 105, 98-112 mmHg, respectively) compared to RA (95, 91-100 mmHg, p<0.05) and HC (89, 82-95 mmHg; P<0.001). HR was also higher in the RA and RA-HTN (66±10 vs. 65±10 b.min-1, respectively) than HTN and HC (60±7, HC 57±7 b.min-1; p<0.001). MSNA was higher in the RA, RA-HTN and HTN groups compared to HC (32±9, 35±14, 37±8 vs 22±8 bursts/min, respectively; p=0.004). Arterial baroreflex control of MSNA was not different between groups (p=0.927), whereas cardiac baroreflex sensitivity was higher in HC (5.3, 3.4-8.3 ms/mmHg) than RA, RA-HTN and HTN (5.3, 3.4-8.3; 4.0, 2.4-6.9; and 6.0, 4.0-8.9 ms/mmHg respectively; p=0.002).

**Conclusion** These findings provide the first evidence that MSNA is elevated in RA patients, despite the sensitivity of arterial baroreflex control of MSNA being preserved. Furthermore, cardiac baroreflex sensitivity is reduced in RA and heart rate is elevated. This apparent imbalance in the autonomic neural control of the heart and peripheral vasculature in patients with RA, appears independent of hypertension, and may partly explain the elevated cardiovascular mortality and occurrence of cardiac arrhythmias.

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