Baroreflex Sensitivity during Laboratory Stress and Relaxation Induction in Fibromyalgia Patients and their Healthy Acquaintances

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Background. Animal and human studies show an inverse relationship between blood pressure and sensitivity to painful stimuli. Baroreceptors within the aortic arch and carotid sinus pressure regulation systems provide an important link between cardiovascular and pain regulatory systems.

Aims. In this study we examined blood pressure (BP), baroreflex sensitivity (BRS) and heart rate variability (HRV) in fibromyalgia (FM) patients and in their healthy acquaintances as controls (HC).

Methods. 34 FM patients and 36 HC participated in a 30 minutes psychophysiological session with baseline, alternating mental and physical stress, and three relaxation phases. Phase duration was 5 minutes each. Subjects rated subjective pain and stress levels after each phase. BP, BRS and HRV were recorded continuously.

Result 1 – Pain & Stress. FM patients reported significantly higher subjective pain in all phases (all p<0.01) and higher stress in all phases except baseline (all p<0.05) than HC. Both groups reported elevated stress in reaction to stress and pain induction and elevated pain in reaction to pain induction (all p<0.001).

Result 2 – BRS. FM showed a significant lower BRS compared to HC (all p<0.01). While HC show significantly higher BRS in stress than in relaxation phases, this pattern is reversed in patients (all p<0.01).

Result 3 – Blood Pressure. Systolic and diastolic blood pressure levels did not differ significantly between groups during all phases. Both FM and HC showed higher systolic and diastolic blood pressure in both stress phases compared to baseline and relaxation phases (all p<0.001).

Result 4 – HRV. FM showed lower HRV, both LF and HF than HC during mental stress phases (all p<0.05). Whereas HC showed no significant differences between phases, FM showed lower ln_HFms² in MA and higher ln_HFms² in PP compared to baseline.

Conclusion. The decreased BRS and HRV suggest a dysfunctional NTS-reflex arc in fibromyalgia that may mediate the underlying etiology and maintenance in a hypertensive subgroup of FM and suggest a new treatment approach for this subgroup.

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