

# Circadian studies of autonomic nervous balance in patients with fibromyalgia: a heart rate variability analysis

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Martínez-Lavin M, Hermosillo AG, Rosas M, Soto ME.

**OBJECTIVE:** To determine the accumulated 24-hour cardiovascular autonomic modulation and its circadian variations in patients with fibromyalgia, by means of heart rate variability analysis.

**METHODS:** Thirty patients with fibromyalgia and 30 age- and sex-matched controls were studied prospectively. Assessments included a 24-hour ambulatory recording of heart rate variability, time-domain analysis of the accumulated 24-hour R-Rinterval variations, and power spectral analysis to determine the sympatho/ vagal balance at different hours (calculated as the power spectral density of the low-frequency [0.04-0.15-Hz] sympathetic band divided by the power of the high-frequency [0.15-0.50-Hz] parasympathetic band).

**RESULTS:** Fibromyalgia patients had diminished accumulated 24-hour heart rate variability, manifested by a decreased standard deviation of all R-Rintervals (mean +/- SD 126 +/- 35 ms, versus 150 +/- 33 ms in controls;  $P=0.008$ ) and a decreased ratio of pairs of adjacent R-Rintervals differing by >50 ms (mean +/- SD 12.0 +/- 9.0% versus 20.1 +/- 18.0%;  $P=0.031$ ). Patients lost the circadian variations of sympatho/vagal balance, with nocturnal values significantly higher than those of controls at time 0 (mean +/- SD 3.5 +/- 3.2 versus 1.2 +/- 1.0;  $P=0.027$ ) and at 3 hours (3.3 +/- 3.0 versus 1.6 +/- 1.4;  $P=0.01$ ).

**CONCLUSION:** Individuals with fibromyalgia have diminished 24-hour heart rate variability due to an increased nocturnal predominance of the low-frequency band oscillations consistent with an exaggerated sympathetic modulation of the sinus node. This abnormal chronobiology could explain the sleep disturbances and fatigue that occur in this syndrome. Spectral analysis of heart rate variability may be a useful test to identify fibromyalgia patients who have dysautonomia.