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Quantitative electroencephalographic abnormalities in fibromyalgia patients.

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Abstract

There is increasing acceptance that pain in fibromyalgia (FM) is a result of dysfunctional sensory processing in the spinal cord and brain, and a number of recent imaging studies have demonstrated abnormal central mechanisms. The objective of this report is to statistically compare quantitative electroencephalogram (qEEG) measures in 85 FM patients with age and gender matched controls in a normative database. A statistically significant sample (minimum 60 seconds from each subject) of artifact-free EEG data exhibiting a minimum split-half reliability ratio of 0.95 and test-retest reliability ratio of 0.90 was used as the threshold for acceptable data inclusion. FM subject EEG data was compared to EEGs of age and gender matched healthy subjects in the Lifespan Normative Database and analyzed using NeuroGuide 2.0 software. Analyses were based on spectral absolute power, relative power and coherence. Clinical evaluations included the Fibromyalgia Impact Questionnaire (FIQ), Beck Depression Inventory and Fischer dolorimetry for pain pressure thresholds. Based on Z-statistic findings, the EEGs from FM subjects differed from matched controls in the normative database in three features: (1) reduced EEG spectral absolute power in the frontal International 10-20 EEG measurement sites, particularly in the low- to mid-frequency EEG spectral segments; (2) elevated spectral relative power of high frequency components in frontal/central EEG measurement sites; and (3) widespread hypocoherence, particularly in low- to mid-frequency EEG spectral segments, in the frontal EEG measurement sites. A consistent and significant negative correlation was found between pain severity and the magnitude of the EEG abnormalities. No relationship between EEG findings and medicine use was found. It is concluded that qEEG analysis reveals significant differences between FM patients compared to age and gender matched healthy controls in a normative database, and has the potential to be a clinically useful tool for assessing brain function in FM patients.