EEG high frequencies are increased at sleep onset in patients with RLS

Raffaele Ferri,[a] Filomena I.I. Cosentino,[a] Mauro Manconi,[b] Francesco Rundo,[a] Oliviero Bruni,[c] Marco Zucconi[d]

[a]Department of Neurology I.C., Oasi Institute for Research on Mental Retardation and Brain Aging (IRCCS), Troina, Italy; [b]Sleep and Epilepsy Center, Neurocenter of Southern Switzerland, Civic Hospital (EOC) of Lugano, Lugano, Switzerland; [c]Department of Social and Developmental Psychology, Faculty of Medicine and Psychology, Sapienza University, Rome, Italy; [d]Sleep Disorders Center, Department of Neurology, Scientific Institute and University Ospedale San Raffaele, Vita-Salute University, Institute and Ospedale San Raffaele, Milan, Italy.

Objectives: The aim of this study was to analyze the EEG spectral content in untreated patients with restless legs syndrome (RLS) during the sleep onset period (SOP) and during the quiet wakefulness preceding sleep, in order to test the hypothesis that, similarly to insomnia, a state of hyperarousal might be present at SOP in RLS.

Methods: Twenty-seven untreated consecutive RLS patients (mean age 53.6 years) were recruited, as well as 11 untreated consecutive primary insomnia subjects (mean age 58.9 years) and 14 normal controls (mean age 50.3 years).

Results: SOP was defined as the 10-min period centered with the occurrence of the first sleep spindle in the EEG, and then subdivided into SOP-1 (period of 5 min before the first spindle) and SOP-2 (period of 5 min following the first spindle). Leg movements occurring during SOP were counted and used as a covariate in the statistical analysis. Also, one period of 1 min of artifact-free quiet wakefulness after lights off was identified. EEG spectral analysis was run during these periods using the C3/A2 or C4/A1 channel.

Increased EEG alpha and beta bands and/or beta/delta ratio in RLS vs. normal controls, during both wakefulness preceding sleep and SOP (both parts SOP-1 and SOP-2) were found which were, however, smaller than the increases found in patients with insomnia.

Conclusion: The results of this study support the hypothesis of the presence of a state of hyperarousal in RLS during the SOP. Treatment for RLS might need to take into consideration these findings.