

The diagnostic value of power spectra analysis of the sleep electroencephalography in narcoleptic patients - DTU Orbit (08/11/2017)

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Objective: Manifestations of narcolepsy with cataplexy (NC) include disturbed nocturnal sleep – hereunder sleep–wake instability, decreased latency to rapid eye movement (REM) sleep, and dissociated REM sleep events. In this study, we characterized the electroencephalography (EEG) of various sleep stages in NC versus controls. **Methods:** EEG power spectral density (PSD) was computed in 136 NC patients and 510 sex- and age-matched controls. Features reflecting differences in PSD curves were computed. A Lasso-regularized regression model was used to find an optimal feature subset, which was validated on 19 NC patients and 708 non-NC patients from a sleep clinic. Reproducible features were analyzed using receiver operating characteristic (ROC) curves. **Results:** Thirteen features were selected based on the training dataset. Three were applicable in the validation dataset, indicating that NC patients show (1) increased alpha power in REM sleep, (2) decreased sigma power in wakefulness, and (3) decreased delta power in stage N1 versus wakefulness. Sensitivity of these features ranged from 4% to 10% with specificity around 98%, and it did not vary substantially with and without treatment. **Conclusions:** EEG spectral analysis of REM sleep, wake, and differences between N1 and wakefulness contain diagnostic features of NC. These traits may represent sleepiness and dissociated REM sleep in patients with NC. However, the features are not sufficient for differentiating NC from controls, and further analysis is needed to completely evaluate the diagnostic potential of these features.

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