0327 Distinct patterns of EEG-EMG-coherence in various stages of disease severity in patients with sleep-disordered breathing [Abstract]

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DISTINCT PATTERNS OF EEG-EMG-COHERENCE IN VARIOUS STAGES OF DISEASE SEVERITY IN PATIENTS WITH SLEEP-DISORDERED BREATHING

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Introduction: We investigated whether using EEG-EMG-coherence (EEC) as a feature fed to a support vector machine (SVM) algorithm may allow staging of disease severity among sleep-disordered-breathing (SDB) patients.

Methods: EEG-EMG-coherence data resulted by applying a multitaper processing for estimating the power spectrums separately and calculating the coherence on raw C3-/C4-EEG- and EMG- chin data of polysomnographic (PSG) recordings of 102 SDB patients (33 female; age: 53, ± 12,4 yrs) acquired on two consecutive nights in each patient. Four epochs (30 seconds each, classified manually by AASM 2012-criteria) of each sleep stage were marked (in total 1632 epochs / night) and were included in the analysis. After multitaper processing, EEC values were fed to a SVM algorithm to classify SDB disease severity based on respiratory disturbance index (RDI). Twenty patients had a mild (RDI ≥ 10 / h and <15 / h), 30 patients had a moderate (RDI ≥ 15 / h and <30 / h) and 27 patients had a severe OSA (RDI ≥ 30 / h). Twenty five patients had a RDI <10 / h. The AUC (area under the curve) value was calculated for each receiver operator characteristic (ROC) curve.

Results: EEG-EMG coherence values could distinguish between SDB-patients without OSA and OSA patients of the above three severity groups using an SVM algorithm. Using PSG data of the first night the AUC for mild OSA was 0.602 (p = 0.032), in moderate OSA the AUC was 0.6319 (p = 0.021), and in severe OSA the AUC was 0.823 (p <0.001). On the second night, in mild OSA the AUC was 0.616 (p = 0.024), in moderate OSA the AUC was 0.659 (p = 0.003), and in severe OSA the AUC was 0.823 (p <0.001).

Conclusion: Grading disease severity in SDB patients can be performed using PSG-based multitaper-processed EEC values processed with a SVM algorithm. No clinically relevant first night- effect was shown in EEC values. EEG-EMG-coherence appears to be a robust marker for SDB severity classification.