Sleep analysis with a novel, integrated sleep and vigilance monitoring device (Somno-Art) as compared to a full PSG solution in apneic patients and healthy controls – an applicable alternative?

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Methodological Question Being Addressed

Can the Somno-Art approach (sleep staging based on heart rate and body movement) discriminate sleep modulations observed in obstructive sleep apnea patients as compared to healthy participants similarly as the gold standard, Polysomnography?

Introduction

It has been shown that the analysis of heart rate and body movements during sleep using an integrated system (Somno-Art—"SA", Muzet et al., 2016) provides similar results to the evaluation of sleep architecture performed with the gold standard polysomnography (PSG) in healthy subjects. The aim of the current analysis was to confirm that this approach could discriminate sleep modulations observed in obstructive sleep apnea (OSA) patients as compared to healthy participants likewise.

Methods

Full PSG and recordings of heart rate and body movements in 77 nights, 40 from young healthy participants (mean ± SD age= 25 ± 12 years), and 37 from OSA patients (mean ± SD age=52 ± 1 years) were analysed. PSG data were processed according to the American Academy of Sleep Medicine (AASM) rules using a validated scoring solution (Somnolyzer – “SL”, Anderer et. al 2010). For sleep analysis based on heart rate and body movements, the SA algorithm was used. The extracted sleep parameters were compared between healthy young and OSA patients using unpaired Mann-Whitney U test for each scoring method.

Results

Both approaches characterized the specific sleep modulation due to apnea pathology similarly: total sleep time (SL: p<0.0001, SA: p<0.05), sleep efficiency (SL: p<0.0001, SA: p<0.001) and REM sleep duration (SL: p≤0.0001, SA: p<0.0001) decreased significantly in OSA patients as compared to healthy participants. The differences observed for wake after sleep onset (SL: p<0.0001; SA: p<0.001), sleep onset latency (SL: p<0.0001; SA: p<0.05) and REM sleep latency (SL: p≤0.01; SA: p≤0.01) in OSA patients were revealed by both methods likewise.

Conclusions

In conclusion, this work provides evidence that, this new sleep and vigilance monitoring device using integrated analysis of heart rate and body movements (SA) delivers promising results with respect to the calculated sleep parameters. At least in a between-group design the results obtained are similar to those of standard PSG. Thus,
it is a new sleep scoring solution which proposes an applicable alternative to PSG in OSA patients and healthy controls.

**Disclosures**

Georg Dorffner, Manuel Kemethofer, Silvia Parapatics, Erna Loretz, Sebastian Friedrich and Georg Gruber are employees of The Siesta Group. Laurie Thiesse, Bruno Muller, Gil Fuchs and Antoine Viola are employees of PPRS.
