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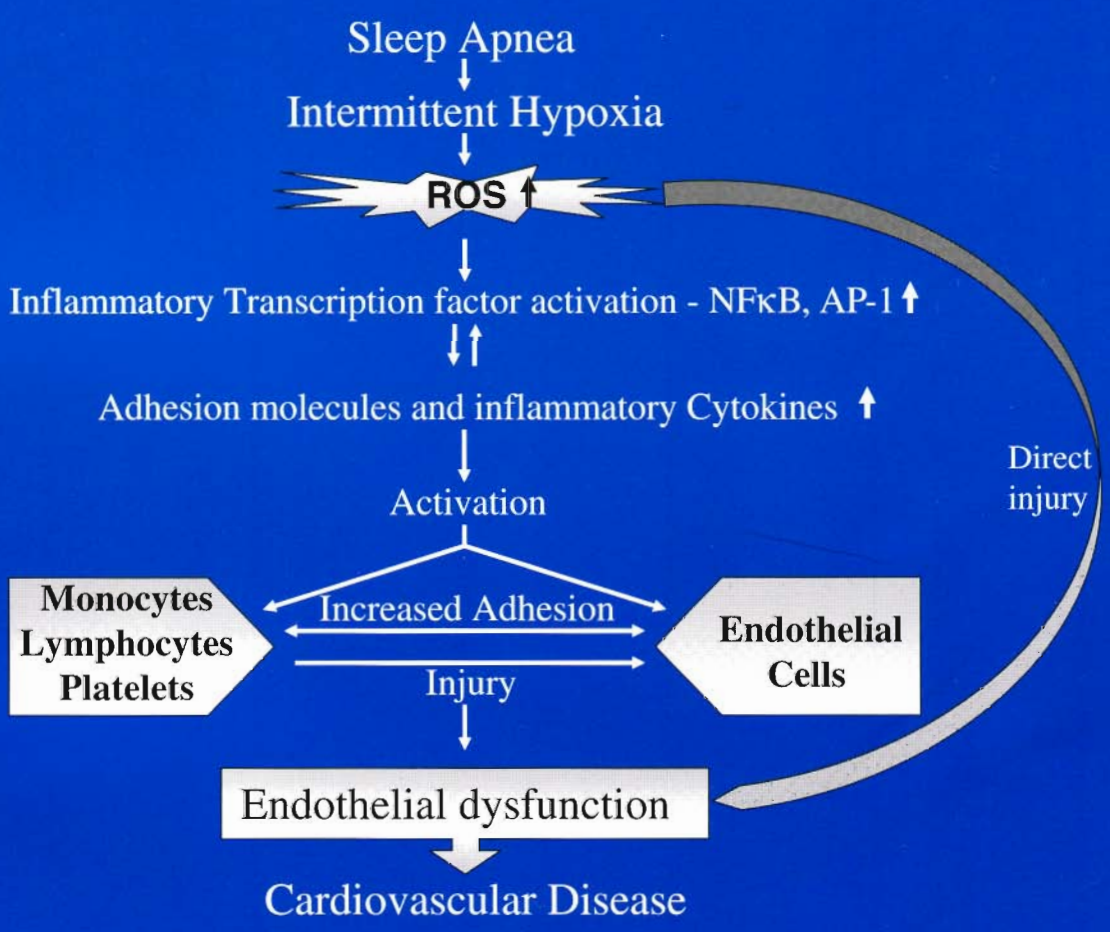
Mechanisms for oxidative stress in sleep apnoea



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2.09 ± 0.28 ($P = 0.04$). Compared to pre-treatment values, diastolic blood pressure was reduced in the morning (82 ± 10 mmHg to 76 ± 8 mmHg; $P = 0.02$). Such changes were not seen in evening measurements or in systolic blood pressure.

DISCUSSION The first results from this ongoing study show that endothelial function in OSA patients is improved with CPAP treatment. This improvement is greatest in the morning. Diurnal variations in endothelial function were not detected in these patients.

SLEEP-RELATED SWEATING, SLEEP STAGES, AND APNOEAS

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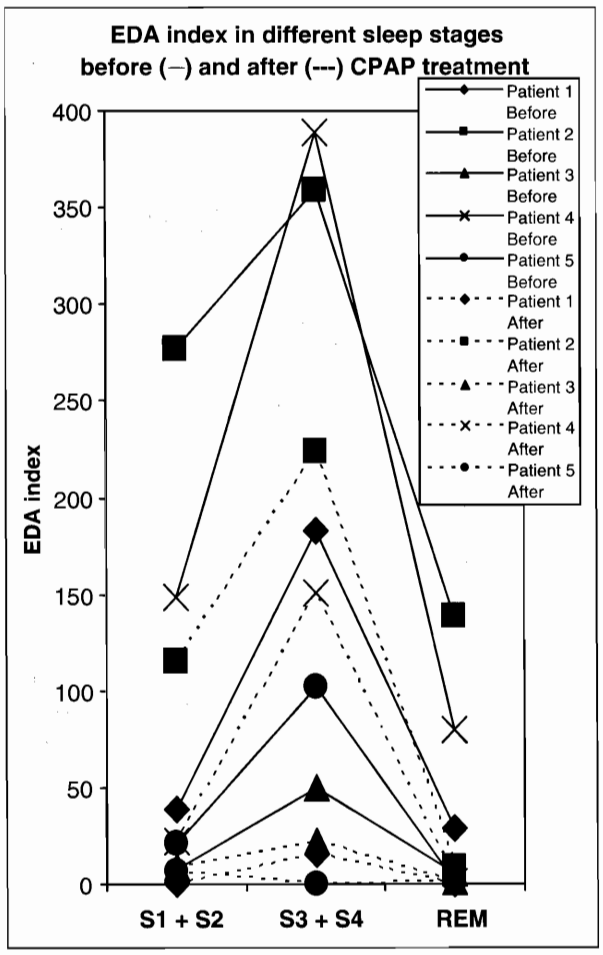
INTRODUCTION Intensive sleep-related sweating (ISRS) is a common complaint among sleep apnoea patients, often disappearing with successful CPAP treatment. However, few studies have focused on ISRS as a symptom of obstructive sleep apnoea (OSA). We report preliminary data from an ongoing study on ISRS before and after CPAP treatment.

METHODS Patients underwent full polysomnography including measurements of skin temperature, core body temperature, and electrodermal activity (EDA). Data evaluation was done in a standard manner, i.e. sleep scoring and AHI (apnoea–hypopnoea index) calculation. EDA index (EDA-I, events/h sleep) was assessed, considering an EDA event a change in skin potential of >50 μV amplitude and >1.5 s duration.

RESULTS Altogether, five otherwise healthy male OSA patients were studied before and after 3 months on CPAP treatment. The five patients (mean age 50, range: 25–61) had a mean AHI = 46 (range: 33–64) before treatment and mean AHI = 4 (range: 0.5–10) after treatment. The mean EDA-I was significantly higher ($P = 0.05$) before treatment (mean 129, range: 18–301) than after (mean 42, range: 3–131). A significant difference was found in EDA-I between sleep stages S1 + S2 versus S3 + S4 versus REM within subjects for each sleep recording ($P = 0.003$), with the highest index in S3 and S4 (see figure). EDA events were not correlated in time to the occurrence of apnoeas.



DISCUSSION These results indicate that ISRS is reduced in OSA patients with successful treatment. Sweating occurs mostly during S3 and S4 in both untreated and treated OSA patients, but reduces with treatment. More research is needed to explain the causal relationship between sweating and OSA.

LONG-TERM MONITORING OF CIRCADIAN VARIATIONS OF ACTIVITY AND ECG: CLINICAL APPLICATION OF A NEW DATA ACQUISITION SYSTEM

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INTRODUCTION Variations of circadian activity profiles and sleep patterns have proved to be altered in various neuropsychiatric disorders like insomnia, depression, or dementia as did heart rate and related parameters, and therefore they may be important for diagnosis as well as for treatment. Today, the evaluation of these parameters is still not part of the standard diagnostic and therapeutic monitoring procedure. But they can yield valuable information, e.g. for the medication adjustment during the acute phase by assessing sleep disturbances and motor activity quantitatively and objectively.

METHODS In order to show the applicability of our new data acquisition system in a clinical setting, we evaluated the course of a depressive episode in a group of inpatients. On the one hand, standard psychometric scales for sleep, mood, and quality of life were used for diagnostic assessment. On the other hand, important physiological parameters like ECG (HR, HRV, LF, HF, SDNN, etc.) and motor activity (activity index and variations) were monitored continuously by means of the new data acquisition system. It consists of a textile and an electronic module and can be attached to the waistband of standard underpants. There are three electrodes for 1-lead ECG recordings integrated into the textile. On the electronic module, a 2D accelerometer is incorporated. Furthermore, the electronic module contains an analog ECG preprocessing unit, a digital unit with a processor and 128 MB memory, two rechargeable batteries for energy supply, and a Bluetooth-based communication unit for downloading the recorded data to a PC. Sampling frequencies are 100 Hz for the ECG and 10 Hz for the activity signal.

RESULTS In order to measure long-term changes with treatment, patients are monitored during their entire stay in the hospital. As an example, we will casuistically present the preliminary results for a male patient, aged 54 years with major depression but without any concomitant heart disease. The analysis of the recorded motor activity data revealed a gradual increase in daytime activity during the 6-week evaluation period. Moreover, significant alterations of heart rate and time-domain parameters (e.g. SDNN) as well as frequency-domain parameters (e.g. HF, LF/HF) of heart rate variability were observed. In parallel to a positive therapy response and a gradual improvement of clinical psychic symptoms during the course of his hospitalization, the subjective parameters assessed by the sleep log also improved.

DISCUSSION This first pilot study demonstrates the applicability and the reliability of our new data acquisition system for long-term monitoring of ECG and motor activity in a clinical setting. Furthermore, the analysis of the recorded data shows alterations of physiological parameters relevant for e.g. depression over continuous and complete monitoring and treatment periods of several weeks up to several months. These alterations were in line with the course of standard psychometric parameters. Therefore, our additional monitoring results provide a psychobiological profile which might be also of use for optimization of therapy.

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