

EVAPORATIVE WATER LOSS AND SLEEP STAGES IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

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INTRODUCTION Evaporative water loss (EWL) or sweating is one of the most important physiological mechanisms of thermoregulation. During NON REM 3, 4, the highest values of waterloss can be measured.

In correlation with the disturbed sleep architecture in sleep apnea syndrome (SAS), EWL is reduced to a low level without relevant changes during sleep. We could show, that EWL increase parallels the improvement of sleep architecture on CPAP. The aim of our study was to evaluate the correspondence between sleep stage 3/4 determined after Rechtschaffen and Kales and the increase of EWL .

METHODS 10 male patients, 7 during CPAP therapy and 3 during a diagnostic PSG, age 49 +/-11 years, BMI 33,5 +/- 5,2 with an AHI of 16 +/-11 were studied. A capsule with a diameter of 5,5 cm was fixed at the abdomen, the capsule was ventilated with a flow of 80 ml/min of dry oxygen (relative humidity 0 %). The flow was measured by a pneumotachograph to detect leakages between the capsule and the skin. Relative humidity (rH) was measured in the down-stream tube by a hygrometer (type GHTV-1-R-Ho). Every 5 seconds the registered values are displayed on a computer-screen. Hypnogram and EWL could be compared using the same time-base. We selected 2 different thresholds of rH to find the best correlation between NON-REM 3/4 and EWL. Threshold of rH was defined by different percentages of the maximal amplitude of rH during sleep. Sleep stage 3/4 served as gold Standard and was compared with the time during which the increase of rH was >25% and >50 %.

RESULTS Sleep-stages 1, 2, 3/4 and REM represented 9.8 +/-6.9 %,48.6 +/-7.9%, 21.4 +/-10.1% and 20.2 +/- 6.8 of total sleep time. Sleep stage 3/4 corresponded in 70.9+/- 15.2 % of time with an increase of >25 % relative humidity and in 51.2 +/- 15.6 of time with an increase of >50 % relative humidity.

Vice versa an increase of >25 % relative humidity corresponded in 69 +/- 22.2 % and an increase of >50 % in 74.5 +/-20.2 % of time with sleep stage 3/4.

DISCUSSION EWL is a well suited method to recognize delta-sleep. In combination with the registration of core body temperature the method could give more insights into thermoregulatory mechanisms in patients with sleep disordered breathing.