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Rapid eye movements sleep as a predictor of functional outcome after stroke: a translational study

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Abstract

Study Objectives

Sleep disturbances are common in acute stroke patients and are linked with a negative stroke outcome. However, it is also unclear which and how such changes may be related to stroke outcome. To explore this link, we performed a sleep electroencephalogram (EEG) study in animals and humans after ischemic stroke.

Methods

(1) Animal study: 12 male rats were assigned to two groups: ischemia (IS) and sham surgery (Sham). In both groups, sleep architecture was investigated 24 h before surgery and for the following 3 days. (2) Human study: 153 patients with ischemic stroke participating in the SAS-CARE prospective, multicenter cohort study had a polysomnography within 9 days after stroke onset. Functional stroke outcome was assessed by the modified Rankin Scale (mRS) at hospital discharge (short-term outcome) and at a 3-month follow-up (long-term outcome).

Results

(1) Animal study: rapid eye movement (REM) sleep was significantly reduced in the IS group compared to the Sham group. (2) Human study: patients with poor short-term functional outcome had a reduction of REM sleep and prolonged REM latency during the acute phase of stroke. REM latency was the only sleep EEG variable found to be significantly related to short- and long-term functional impairment in a multiple linear regression analysis.

Conclusions

Acute ischemic stroke is followed by a significant reduction of REM sleep in animals and humans. In humans, this reduction was linked with a bad stroke outcome; in addition, REM latency was found to be an independent predictor of stroke evolution. Potential explanations for this role of REM sleep in stroke are discussed.

Clinical Trial Registration

http://clinicaltrials.gov. Unique identifier: NCT01097967

sleep, stroke, functional outcome, sleep EEG, REM sleep, sleep-disordered breathing, animal model

Topic:

- cerebrovascular accident
- ischemic stroke
- electroencephalography
- eye movement
- rem sleep
- surgical procedures, operative
- sleep
- sleep electroencephalogram
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