Increasing sleep quality improves EEG markers of delirium in critically ill patients

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Introduction

Sleep disturbances in intensive care unit has been associated with a higher risk of delirium. We hypothesized that a better sleep quality would improve EEG markers of delirium.

Methods

This is an ancillary analysis of a before-after study showing an improvement of sleep quality in patients receiving nursing care guided by a sleep monitoring system, compared to usual care group.

We analysed EEG in awake patients on the morning of the 3 study nights. Using EEG spectral analysis (Hamming windowed and 50% overlap; FFT resolution: 0.12Hz), we measured the alpha-theta ratio ([7-12Hz]/[4-7Hz] on C4-A2 signal. Linear mixed model with group and nights as fixed effect variables and patients as random variable was used to compare both groups.

Results

Twenty-nine EEG segments in the usual care group and forty-height segments in the treated group have been analysed. In usual care group, the median alpha-theta ratio decreased from 3,([1,6-3,6] at day 2, to 1,4 [1,1-1,9] at day 4. In contrast, in treated group, the median alpha-theta ratio increased from 1,6 [1,1-2,5] at day 2, to 3,2 [2,5-4,4] at day 4. Linear mixed model showed no effect of group and of days, but a significant effect (p=0,013) of the interaction group*days.

Conclusion

Our study reports for the first time that improving sleep quality also decrease EEG slowing in the morning. Since EEG slowing is associated with presence of delirium, our results suggest that improving sleep might decrease the risk of delirium in ICU patients.

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