P03-390

ONE NIGHT SLEEP RESTRICTION IMPAIRS THE CORTICAL OXYGENATION RESPONSES

S. Miyata[1], A. Noda[1], M. Ito[1], K. Iwamoto[2], N. Ozaki[2]
[1]Department of Biomedical Sciences, Chubu University, Kasugai, [2]Department of Psychiatry, Nagoya University Graduate School of Medicine, Nagoya, Japan

Introduction: Sleep restriction has adverse effects on performance and neurobehavioral function. However, the mechanism of impaired performance and neurobehavioral function has not been studied yet.
Objectives: We examined the effect of insufficient sleep on cerebral blood flow and cognitive function in 8 healthy adults (mean age 22.4 years).
Methods: All participants were in bed for 8 h (sufficient sleep), and for < 4 h (insufficient sleep). The oxyhemoglobin (oxyHb) level by a word fluency task was measured with a near-infrared spectroscopy recorder on the morning following sufficient and insufficient sleep periods. Wisconsin card sorting test (WCST), continuous performance test (CPT) and N-back test were evaluated on the same days.
Results: The peak oxyHb level was significantly lower in the left and right frontal lobes after insufficient sleep than after sufficient sleep (left: 0.25±0.10 vs. 0.70±0.29 mmol, $P < 0.05$; right: 0.23±0.13 vs. 0.73±0.22 mmol, $P < 0.05$). There was no significant difference in the number of words generated during the word fluency task between sufficient and insufficient sleep states. The percentage of correct responses on CPT after insufficient sleep was significantly lower than that after sufficient sleep (86.6±10.2 vs. 96.0±4.9 %, $P < 0.05$). The reaction time of WCST was significantly longer after insufficient sleep than after sufficient sleep (76.6±13.4 vs. 70.6±16.2 sec, $P < 0.05$).
Conclusions: One night sleep restriction decreased the concentration changes of oxyHb in brain tissue, leading to impaired cognitive function.

https://doi.org/10.1016/S0924-9338(11)73264-3 Published online by Cambridge University Press