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Poster Presentation

Sleep Disturbance and Epilepsy: an Inflammatory Pathway

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Abstract

Sleep plays a vital role in regulating physiological mechanisms in the human body. Nowadays, by the change of lifestyle and as a consequence of longer work hours and increased accessibility to media, sleep disturbance becomes a common problem in modern society. Many studies demonstrated that sleep disturbance triggers a systemic low-grade inflammation by increasing the level of several cytokines, chemokines and acute – phase proteins. Increased pro – inflammatory cytokine gene expression is reported by Irwin et al. when a night of sleep restricted to 4 hours. Sleep disturbance increases the levels of IL-6, high-sensitivity C-reactive protein (hsCRP) and IL-1b in plasma. Also, IL-1 and tumor necrosis factor (TNF) gene expression in brain (hypothalamus, hippocampus, and pre-frontal cortex) increase in response to sleep disturbance in mice. Moreover, studies showed that blood-brain barrier (BBB) disrupts by chronic REM sleep restriction in rats. These data indicates that pro-inflammatory mediators can enter the brain if sleep restriction increases the unselective transportation across the BBB. On the other hand, findings suggest that inflammatory processes can play an important role in epileptogenesis in several ways like pro-inflammatory pathways (such as IL-1β). A study on epileptic patients in 2014 showed that daily generalized motor seizures result in elevated IL-6 levels leading to increased hs-CRP. Also, in 2015, Uludag et al. found increased levels of IL-1β, IL-6, and IL-1Ra among epileptic patients and high levels of IL-1b in patients with temporal lobe epilepsy. Although findings support the idea that sleep disturbance provokes epilepsy in susceptible through inflammatory pathways, further studies is needed to make this relationship more clear. Public education on proper using of media, using herbal hypnotics with lesser side effects and paying attention to sleep hygiene in General Policies, are suggestions that help us to have a better society with healthy brains and lower epilepsy incidence.

Keywords: Sleep disturbance, Epilepsy, Inflammation

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