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Assessment of nocturnal sleep architecture by actigraphy and one-channel electroencephalography in early infancy

Objective: To elucidate characteristic sleep architecture of different nocturnal sleep patterns in early infancy.

Methods: Participants were 27 infants at the same conceptional age of 3-4 months. Nocturnal sleep of these infants was monitored at home by simultaneously using actigraphy and a one-channel portable EEG device. According to the infants' activity for 6 hours from sleep onset, each night's sleep pattern was classified into three categories: sleeping through the night (STN), sleeping with weak signals (crying/fuss episodes <10 minutes or fed), and sleeping with strong signals (crying/fuss episodes≥10 minutes). Associations of sleep patterns with sleep variables (percentage of time in sleep stages, pattern of slow-wave sleep (SWS) recurrence, etc.) were investigated.

Results: Analysis was conducted in 95 nights. STN pattern (n=36) was characterized by suppressed body movements while EEG represented a state of wakefulness. Weak signal pattern (n=27) tended to indicate rich and regular distributions of SWS across the night. Strong signal pattern (n=32) was characterized by reduced sleep time, although the amount of SWS was not reduced to that degree. Exclusively breastfed infants accounted for 78% of weak signal patterns, whereas formula-feeding infants, 67% of STN patterns. In several nights with STN or strong signal pattern, SWS did not occur in >50% of the sleep cycles. Multiple regression analysis showed that exclusive breastfeeding may increase the proportion of SWS in non-REM sleep.

Conclusions: Each nocturnal sleep pattern was associated with some sleep architecture, part of which would be attributed to infant's feeding methods.

Biography

Hideya Kodama graduated from Akita university of Medicine in 1982 and promoted to a professor of the department of maternity child nursing at Akita university graduate school of medicine and faculty of medicine in 2000. Since then, he has studied about a human circadian rhyme, including a sleep-wake cycle, a melatonin rhythm and regulation of autonomic nervous system and a body thermal rhythm, with nurses who entered his Post-doctoral course. Now, he manages several research projects of the doctoral course regarding this issue, and his research subjects include early infants, pregnant women puerperant and adolescent girls.

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