Article: 1161
Topic: 57 - Others

GENERALIZED PARTIAL DIRECTED COHERENCE PROVIDES A NEW DESCRIPTION OF THE BRAIN FUNCTIONAL CONNECTIVITY ACROSS SLEEP STAGES

L. Van Wettere[1], *D. Marinazzo*[2], *J.-P. Lanquart*[1], *P. Linkowski*[1], *F. Jurysta*[1]

[1]Department of Psychiatry, ULB-Erasme Academic Hospital, Brussels, [2]Department of Data Analysis, Faculty of Psychology and Pedagogical Sciences, University of Gent, Gent, Belgium

Objectives: Cerebral activity during can be approached by the measurement of functional activity in healthy young people. Functional activity reflects the statistical dependencies among near and distant brain regions by generalized partial directed coherence (GPDC).
Methods: Sleep stages of 9 healthy young subjects without somatic, psychiatric and sleep disorders were defined in accordance with the Rechtschaffen and Kales criteria (Wake, stages 1 to 4 and REM sleep). In regard of specific sleep EEG frequencies (delta, theta, alpha, sigma and beta), the first 20 epochs of each sleep stage were used for analysis. GPDC was applied between each electrode and each other of the 19 EEG electrodes.
Results: In comparison to wake and REM sleep, GPDC showed increased interdependencies across each NREM sleep stage. Lower sleep EEG frequencies increased these changes. Moreover, during slow EEG rhythms, differences observed across stages were more pronounced. In addition, differences between bands were more marked during wake and sleep stages 1 and 2. None differences were observed for GPDC values between both sides of human brain. In the right hemisphere as well as in the left one, GPDC is similar between sleep stages in delta frequency while GPDC differed from wake to other sleep stages in theta, alpha, sigma and beta EEG frequencies.
Conclusions: A different mapping in the three classical sleep states (Wake, NREM and REM sleep) is showed by generalized partial directed coherence in sleep EEG frequencies. Additional studies investigating the directional information flow should be performed to complete our results.

https://doi.org/10.1016/S0924-9338(13)76251-5 Published online by Cambridge University Press