RELATIONSHIP BETWEEN SLEEP STRUCTURE OF PATIENTS AFTER ISCHEMIC STROKE AND DAILY MEASURES

ZUZANA ROŠŤÁKOVÁ
zuzana.rostakova@savba.sk

Institute of Measurement Science, Slovak Academy of Sciences, Bratislava, Slovakia

ROMAN ROSIPAL
roman.rosipal@savba.sk

RESULTS

• 23 patients after ischemic stroke
  – 6 women, 17 men; 57 ± 13 years; NIHSS ∈ {1,...,10} [1]
  – hospitalised at the 1st Department of Neurology, University Hospital Bratislava, Slovakia
  – cognitive tests after the sleep EEG measurement (one to 10 days after stroke)

COGNITIVE TESTS

• FINE MOTOR ACTIVITY TEST (FMAT)
  – goal: to redraw the template patterns ⇒ percentage of correctly retraced pixels

• LATERALISED ATTENTION NETWORK TEST (LANT) [5]
  – Alerting (LANT_A)
    ⇒ benefit of temporal pre-cues
  – Orienting inhibitory (LANT_OI)
    ⇒ cost of an invalid spatial cue
  – Orienting facilitatory (LANT_OF)
    ⇒ benefit of a valid spatial cue
  – Conflict resolution (LANT_C)
    ⇒ ability to overcome distracting stimuli

• WORKING MEMORY TEST (WMT) [6]
  – goal: repeat a sequence of presented digits in the same or reverse order
  1. 6 3
  2. 2 5 9
  3. 1 8 6 2
  …

• T–MENSTAT QUESTIONNAIRE [7]
  – subjective level of energy and motivation, fatigue, frustration and drowsiness before and after the cognitive tests (T–MENSTAT_A, T–MENSTAT_B)

METHODS

1. “static approach”
   • Spearman correlation coefficient between results of cognitive tests and sleep characteristics extracted from the AASM scores

2. “dynamic approach”
   • cluster analysis of the sleep probabilistic curves (t–means [4])
   • the Kruskal–Wallis test for detecting significant differences in cognitive tests

RESULTS – “STATIC APPROACH”

cognitive test  sleep variable     Spearman ρ     p-value
FMAT_4,6  eff       < −0.52     < 0.028
FMAT_5,6  sl        > 0.50      < 0.035
LANT_OF   sl_rem    0.66       0.003
LANT_RVT_OF tst_rem  0.55       0.017
RTT_2,3,4,Min tst_N1  > 0.53      < 0.014
TMENSTAT_A_2,3 wtsp  > 0.43      < 0.039
TMENSTAT_A_3 tst_REM  −0.42      0.047
TMENSTAT_B_1 tst_N3  0.61       0.006

RESULTS – “DYNAMIC APPROACH”

Figure 2: Cluster analysis of the sleep probabilistic curves of the N1, N2 and N3 sleep stages.

CONCLUSION

“Static” and “dynamic” approach have provided comprehensive insight into relationships between the sleep pattern and cognitive tests. The advantage of the sleep probabilistic curves analysis, “dynamic” approach:

• Deeper understanding of the sleep dynamics (Figure 2).
• Allows using advanced techniques of mathematical statistics.

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