ASSOCIATIONS BETWEEN HEART RATE VARIABILITY AND THE SENSORY-MOTOR NERVOUS SYSTEM IN NEUROREHABILITATION PATIENTS WITH SEVERE ACQUIRED BRAIN INJURY

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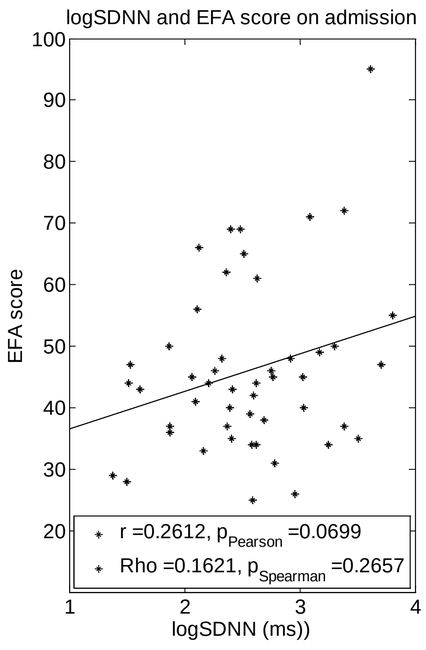
Background
- Acquired brain injury (ABI) cause motor and cognitive neural deficits but the autonomic nervous system (ANS) is also affected.
- How the development of motor and cognitive function relates to ANS function during ABI neurorehabilitation has only been investigated sporadically and only in traumatic brain injury patients [1].

Aim
- To characterise ANS function and its relation to ABI patients' clinical function

Hypothesis
- Clinical function and its development in severely injured patients is associated to autonomic nervous system function, defined as heart rate variability (HRV).

Methods
- 49 patients had admission HRV data extracted.
- Follow-up HRV extracted from 19 patients at least 28 days later.
- HRV variables extracted:
  - standard deviation of normal-to-normal intervals (SDNN)
  - low frequency (LF)
- HRV correlated to functional score, Early Functional Ability (EFA).

Results
- SDNN and LF statistically significantly correlated to EFA at follow-up but not on admission (figure 1 and 2).
- Generally, SDNN and LF development were statistically significantly correlated to EFA development (figure 3).
- Admission SDNN and LF were not prognostic regarding EFA development.



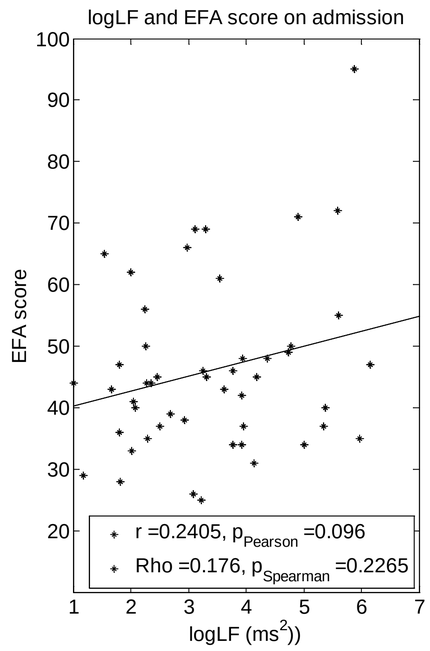
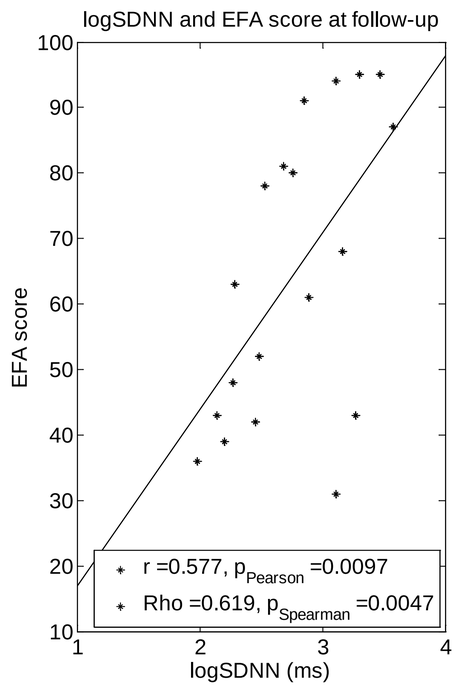


Figure 1: Scatter plots of admission EFA score and admission HRV.



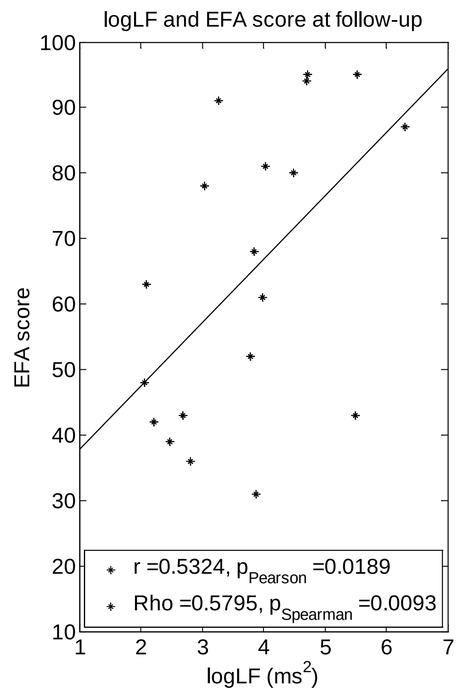
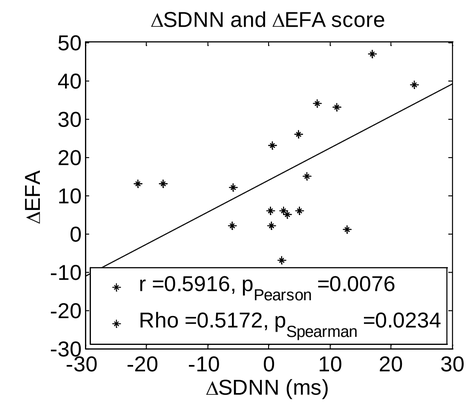
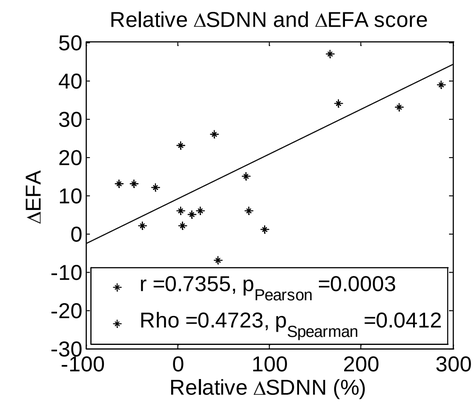
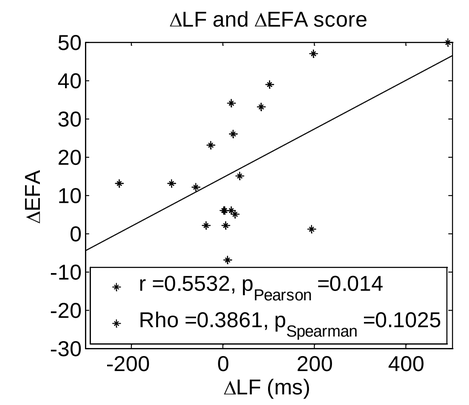


Figure 2 Scatter plots of follow-up EFA score and follow-up HRV.







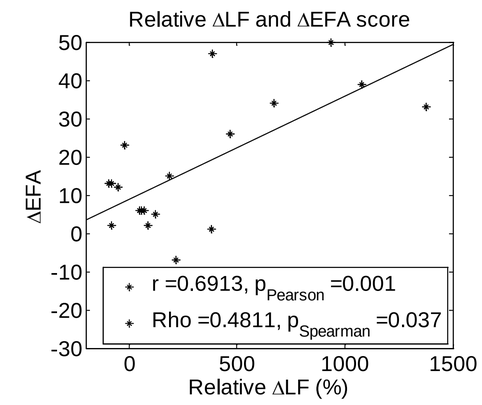


Figure 3 Scatter plots of change in EFA score (between admission and follow-up) and corresponding change (absolute and relative) in HRV.

Conclusion

HRV and its development was generally associated to EFA and its development in heterogenic acquired brain injury. Further studies are needed to clarify a number of issues and limitations arising from this hypothesis generating observational study.

References:
[1] Keren O et al. (2005) Heart rate variability (HRV) of patients with traumatic brain injury (TBI) during the post-insult sub-acute period. Brain Inj 19:605-611

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