Journal of Dementia

# Cholinergic status with quantitative EEG in healthy subjects and comparison of MMSE and CSF-biomarkers for patients suspected of dementia

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## Abstract

**Background:** Recently, a new method introduced to measure the cholinergic status with quantitative electroencephalography (qEEG) based on earlier observations of cholinergic and anticholinergic drugs EEG effects. The technique called Vigilance-index most likely could distinguish healthy from early dementia patients and to identify responders to Acetylcholinesterase inhibitor treatment.

**Objective:** To evaluate (qEEG) variables, to distinguish healthy subjects from patients suspected of dementia and evaluate at follow-up examination if Acetylcholinesterase inhibitor (AChEI) treatment influenced the qEEG and how well the Vigilance-index reflected cognition by MMSE scores compared to Cerebrospinal (Csf)-biomarkers.

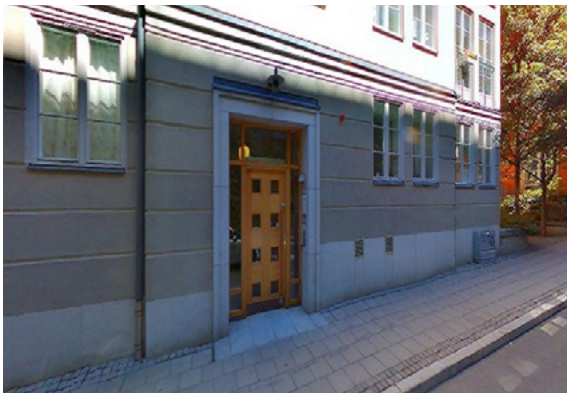
**Methods**: Average from four EEG epochs obtained with eyes closed (E.Cl.) and eyes open (E.O.), the peak frequency with eyes closed and the Vigilance index (ratio of E.O./E.Cl. power) calculated. A healthy group and a group suspected for primary dementia was compared and the suspected dementia group followed-up after approximately 12-14 months with or without acetylcholinesterase inhibitor treatment. Also, evaluation of MMSE, qEEG and Csf biomarkers of suspected dementia patients at baseline and follow-up, to assess the best biomarker to predict cognitive decline.

**Results:** When the healthy group compared with suspected dementia group at baseline, the Vigilance-index and average power of E.O. increased and the mean peak- frequency decreased (p-values < 0.001***). At the follow-up for the suspected dementia group, the Vigilance index of the untreated increased significantly (p-value <0.001 ***) but not for the untreated. The Vigilance-index were compared with MMSE and Csf biomarkers at baseline and follow-up, the Vigilance-index reflect best pathological MMSE scores.

**Conclusion:** The Vigilance-index may be used to assess cholinergic deficits in patients with dementia also early in the course of the disease and evaluate the effects of AChEI treatment. The best variable to correlate cognitive decline was the Vigilance-index compared to CSF biomarkers for early suspected dementia.

## Biography

Rolf Ekedahl then specialized in Clinical Neurophysiology after physicians basic training ( M.D.) and completed his medical thesis: NEW FUNCTIONAL AND ANATOMICAL ASPECTS OF THE ORGANISATION OF HUMAN PERIPHERAL NERVE in 1996 at Karolinska Institute (Ph.D.). The thesis based on Microneurography studies and partly on the development of digitalized analysis techniques for analysis of individual nerve fiber signals. Currently director of research and development in NeuFydi organization with the focus on the clinical application of quantitative EEG for monitoring of Electroconvulsive therapy and dementia diagnostics. He has published 20 papers in reputed journals on different subjects; Peripheral nerve organization (microneurography), Quantitative EEG monitoring at Electroconvulsive therapy and Quantitative EEG analysis in dementia diagnostics.



5th Annual Summit on Dementia and Alzheimer's Diseases | September 25, 2020

**Citation:** Rolf Ekedahl, Cholinergic status with quantitative EEG in healthy subjects and comparison of MMSE and CSF-biomarkers for patients suspected of dementia, Dementia Congress 2020, 5th Annual Summit on Dementia and Alzheimer's Diseases, September25, 2020, Page No-02