

# Hippocampal volumetry in mild cognitive impairment

Akademisk avhandling

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av

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The thesis is based on the following papers:

- I. Eckerström C, Olsson E, Borga M, Ekholm S, Ribbelin S, Rolstad S, Starck G, Edman A, Wallin A, Malmgren H. **Small baseline volume of left hippocampus is associated with subsequent conversion of MCI into dementia: the Göteborg MCI study.** *J Neurol Sci.* 2008 Sep 15;272(1-2):48-59.
- II. Eckerström C, Andreasson U, Olsson E, Rolstad S, Blennow K, Zetterberg H, Malmgren H, Edman H, Wallin A. **Combining hippocampal volume and CSF biomarkers improves predictive value in MCI.** *Dement Geriatr Cogn Disord* 2010;29:294-300
- III. Eckerström C, Olsson E, Klasson N, Bjerke M, Göthlin M, Jonsson M, Rolstad S, Malmgren H, Wallin A, Edman Å. **High white matter lesion load is associated with hippocampal atrophy in MCI.** Manuscript.

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# **Hippocampal volumetry in mild cognitive impairment**

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Dementia is a syndrome with cognitive decline as a prominent feature. MCI is similarly a syndrome of cognitive decline, albeit with much subtler symptoms, and has been identified as a condition at risk for progression to dementia. A considerable clinical challenge lies in identifying MCI patients with an underlying dementia disorder. The overall aim of this thesis is to examine hippocampal volume in MCI with regard to prognostics.

Alzheimer's disease (AD) and vascular dementia are the two most important causes of dementia. Subcortical ischemic vascular dementia (SIVD), characterized by white matter lesions (WMLs), is considered the most important cause of vascular dementia in the elderly. Hippocampal atrophy has been identified as a common feature of AD and increasing evidence suggests that hippocampal atrophy is present in SIVD as well.

It was found that MCI patients subsequently converting to dementia have smaller hippocampi than stable MCI patients. Hippocampal volume seems to be a useful marker in MCI patients with different underlying disorders. It can therefore be argued that hippocampal volume may be viewed as a broad cognitive marker. Hippocampal volume was also found to supplement the prognostic ability of CSF A $\beta$ 42 and T-tau in MCI. Furthermore, measurement of WML shows that WML volume is related to hippocampal volume in patients with high WML burden, suggesting that WMLs may be involved in the development of hippocampal atrophy in SIVD. Left hippocampal volume was consistently a better prognostic marker than right hippocampal volume. When evaluating their respective association with psychometric test performance, the left hippocampus was found to be more closely related to test performance.

Key words: Mild cognitive impairment, dementia, Alzheimer's disease, vascular dementia, MRI, hippocampus, white matter lesions, CSF biomarkers, neuropsychology

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