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Alterations in Rapid Eye Movement Sleep Parameters Predict for Subsequent Progression from Mild Cognitive Impairment to Alzheimer's Disease

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Abstract

Objective: Mild cognitive impairment (MCI) refers to the clinical condition between normal aging and Alzheimer's disease (AD). Heterogeneity in this entity has also been recognized, and an accelerated rate of progression to AD was documented in some individuals diagnosed with MCI. It is important for the early detection of and intervention for AD to determine the clinical subtype of MCI with a high risk of progression to AD. Studies have demonstrated

Ke d : Alzheimer's disease; Mild cognitive impairment; Polysomnography; Progression; REM sleep; Risk factor; Sleep architecture

I d c

Mild cognitive impairment (MCI) refers to the clinical condition between normal aging and Alzheimer's disease (AD) [1]. Individuals with MCI have memory impairment greater than what one would expect for their age, yet the general cognitive function is preserved. Similarly, activities of daily living are normal. Heterogeneity in this entity has also been recognized, and an accelerated rate of progression to AD was documented in some individuals diagnosed with MCI. A high percentage of patients with MCI develop clinical AD within 1 year. It is, therefore, important for the early detection of and intervention for AD to determine the clinical subtype of MCI with a high risk of progression to AD. Previous studies demonstrated that a higher risk of AD progression may be involved with an altered function in speci c regions such as the posterior cingulate, which are characteristic of AD. Subjects with MCI who developed AD had already exhibited signi cantly decreased volumes [2-6], decreased levels of regional cerebral blood ow [7,8] and glucose metabolism [5,9-12] at the posterior cingulate compared to those who remained in a non-dementia state, when they did not meet criteria for dementia.

Studies on sleep architecture in AD have demonstrated that sleep disturbance is more prevalent in subjects with AD than elderly subjects without dementia. Signi cant changes in sleep/wake patterns, particularly loss of slow wave sleep (SWS) and increased amount

with the decrease in cholinergic neuronal activity. We hypothesized that an alteration of REM sleep parameters in MCI may be associated with conversion to AD.

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is study had a prospective design to investigate whether any PSG variables at the baseline (in the stage of MCI) may be predictive of progression to AD. is study was conducted at Kagawa University Hospital. Data were collected between April 2011 and September 2015.

e local institutional review boards approved this study. All patients gave informed consent according to institutional guidelines and the tenets of the Declaration of Helsinki.

Pa e

Twenty-four patients with amnestic MCI were enrolled in this study. Patients were eligible if: (i) they had never been treated with acetylcholine esterase inhibitors (AChIs), and (ii) were able to understand the aim of this study.

Patients were excluded if: (i) they had medical illnesses that may a ect sleep quality or daytime alertness, (ii) they met criteria for any other psychiatric disorders such as schizophrenia, mood disorders, or delirium, and (iii) they were being treated with psychotropic agents or psychostimulants. To exclude the in uence of sleep-disordered breathing on the sleep architecture, the subjects who had been diagnosed with sleep apnea syndrome were excluded. Even though symptoms or manifestations of sleep apnea such as snoring and excessive daytime somnolence were

groups, respectively (p=0.043). REM density in the MDI-AD group (7.3 ± 1.4 REM/min) was reduced compared to that in the MCI-MCI group (9.1 ± 1.6 REM/min) (p

PSG variables obtained at the baseline were compared between the 2 groups (Table 3). Times spent in stage REM (% of total sleep time) were 13.1 ± 2.6 and 16.2 ± 2.6% in the MCI-AD and the MCI-MCI

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