Unawareness of impairment is common in patients with Alzheimer’s disease (AD), and it is of clinical importance because it results in increased risk of suffering serious accidents and conflict with caregivers. It may also delay diagnosis and result in a failure to initiate therapy. However, little effort has been made to manage unawareness of impairment. Unawareness of impairment may not be an impairment of unimodal function; rather, it might have a multifactorial etiology, including impairment of cognitive domains and psychiatric symptoms. Thus, it might be possible to manage it through controlling the underlying factors. Previous studies of the cognitive factors associated with unawareness of impairment in patients with AD have reported greatly varying results. Some studies found that unawareness of impairment was associated with memory impairment, while others did not; some studies found that unawareness of impairment was associated with frontal-executive dysfunction, while others did not; some studies found that unawareness of impairment was associated with language deficit, while others did not. In addition, visuoconstructive dysfunction has been shown to be associated with unawareness of impairment in some of the studies. The psy-
chiatric factors associated with unawareness of impairment in patients with AD have been evaluated in some studies, and the results have also varied. Some studies found that unawareness of impairment was associated with depression, anxiety, irritability, apathy, and mania, while others did not; and some studies found that unawareness of impairment was associated with delusions, while another did not. In addition, among patients with AD, the degree of unawareness of impairment of AD patient has been shown to vary according to the target impairment, cognitive and psychiatric factors associated with unawareness of impairment also vary according to the target impairment. Some of the studies did not control for the subjects’ severity of dementia, which has been shown to affect the manifest cognitive and psychiatric symptoms shown in AD patients. Some of the studies did not limit the target impairment, of which the patient is unaware. The degree of awareness of impairment of AD patient has been shown to vary by the target impairment, and cognitive and psychiatric factors associated with unawareness of impairment also vary according to the target impairment. Some of the studies did not widely assess the cognitive impairment or psychiatric symptoms whose associations with unawareness of impairment were to be evaluated. Some of the studies did not control the effects of sex, age, and educational attainment on performance of cognitive and psychiatric measures or the effects of multiple comparisons on the statistical significance level in statistical analyses.

We conducted this study, in which the above-mentioned 5 methodological problems were controlled, to determine the factors underlying unawareness of limited memory impairment in patients with AD. Future studies will then be able to test the effectiveness of managing unawareness through controlling these factors. In this study, we examined a large sample of patients with limited to mild AD by using validated measures of unawareness of memory impairment (UMI), cognitive impairment, and a wide range of measures of psychiatric status. We then evaluated the associations between the UMI and cognitive and psychiatric status with appropriate statistical methods.

**METHODS**

**Patients**

Full ethical approval was obtained for the project. After a complete description of the study to the subjects and their relatives, written informed consent was obtained from all subjects and their relatives. The subjects were selected from those who were given short-term admission for investigation of cognitive impairment to the Institute for Aging Brain and Cognitive Disorders (IABCD), a research-oriented hospital for dementia, from December 1, 1998, to June 30, 2001. In the institute, all patients were examined comprehensively by both geriatric psychiatrists and neurologists, and they underwent standard neuropsychological examinations, routine laboratory tests, electroencephalography, cranial magnetic resonance (MR) imaging, cerebral MR angiography, and radionuclear neuroimaging studies. We recruited patients who met the NINCDS/ADRDA (National Institute of Neurological and Communicative Disorders and Stroke/Alzheimer’s Disease and Related Disorders Association) criteria for probable AD and whose dementia severities were determined as 0.5 or 1 by the Clinical Dementia Rating (CDR). Patients were excluded from the study if they (1) had the complication of other neurological diseases, (2) had any evidence of focal brain lesions on MR images or of cerebral arterial occlusive lesions on MR angiography, or (3) did not have a caregiving family member familiar with their everyday life. There were 103 patients (77 women and 26 men); their mean age was 70.4 (SD = 7.4) years, their mean level of education was 10.0 (SD = 2.7) years, and their mean Mini-Mental State Examination (MMSE) score was 22.8 (SD = 3.2). The CDR scores were 0.5 for 18 patients and 1 for 85 patients. The caregivers in this study had daily contact with the patients, were the ones who took care of the patients most frequently, and were familiar with the patients’ behavior. The subjects’ caregivers were their sons or daughters (47 subjects), their spouses (45 subjects), or others, such as brother, sister, grandchild, niece, or nephew (11 subjects).

**Evaluation of Unawareness of Memory Impairment**

We focused on the disabilities in daily life caused by memory impairment (everyday memory impairment) because memory impairment is almost always the central and most significant symptom in patients with mild AD. The unawareness of memory impairment (UMI) was evaluated with a standardized questionnaire system based on the Everyday Memory Checklist (EMC) of Wilson et al.. The EMC was adapted from the Everyday Memory Questionnaire (EMQ), which has been used to assess unawareness of impairment and has items limited to the disabilities in daily life caused by memory impairment. The EMC was translated into Japanese and slightly modified to fit Japanese culture. In the EMC, subjects were asked whether a memory failure had occurred in each of 13 areas of daily life (eg, “Do you forget things you were told yesterday or a few days ago and have to be reminded of them?”). Each question had 4 possible answers: never (0 points), sometimes (1 point), usually (2 points), or always (3 points). Thus, higher scores indicate more severe impairment. The EMC was prepared in 2 forms, A and B, which were designed to be answered by the patient and the caregiver, respectively. The unawareness score was defined as the score of the B form minus the score of the A form. Higher scores indicated more severe unawareness. The reliability and validity of the present version of the EMC in
amnestic patients, including AD, have been demonstrated to be acceptable.24

**Neuropsychological and Psychiatric Examination**

In the present study, we investigated the ways in which unawareness was associated with neuropsychological functions and psychiatric symptoms in patients with AD. Neuropsychologically, memory, attention, language, visuospatial/constructive perception, and executive function were assessed. These cognitive functions are often damaged in patients with AD and were previously reported to have possible associations with unawareness of impairment. The weighted sum score of the delayed recall and attention/concentration subscores in the Wechsler Memory Scale–Revised (WMS-R)25,26 were used as indices of memory and attention. The abilities of language, visuospatial/constructive perception, and executive function were assessed with the Western Aphasia Battery (WAB).27,28 Because overall language function is expressed as the aphasia quotient (AQ) in the WAB, we used the AQ as an index of language function. The WAB also has drawing and block design subtests, which test visuospatial/constructive abilities, and Raven’s colored progressive matrices (RCPM),29 which tests executive functions. The raw scores of the drawing and block design subtests of the WAB were used as indices of visuospatial/constructive perception in a previous study.30 In the conventional scoring method of the WAB, the raw scores of the drawing and block design subtests are simply added, without calculating weighted scores, to make a composite score for constructional ability. In the present study, the combined raw score of the drawing and block design subtests was used as an index of visuospatial/constructive functions, and the raw score of the RCPM was used as an index of the executive function because age-, sex-, and education-controlled standardized data of the tests were not published.28 The WMS-R was carried out by a neuropsychologist, and the WAB was carried out by a speech pathologist, both of whom were blind to the psychiatric data and unawareness score.

The psychiatric symptoms were assessed with the Neuropsychiatric Inventory (NPI).31,32 The NPI assesses a various and wide range of psychiatric symptoms and behavioral disturbances occurring in dementia patients: delusions, hallucination, agitation/aggression, dysphoria, anxiety, euphoria, disinhibition, irritability/lability, apathy, and aberrant motor behavior. Information needed for scoring the NPI was gathered from the caregiver. The caregiver was asked whether the patient’s behavior changed after the onset of the dementia and if the altered behavior was present during the past month or other specific period. In this study, the subitem of aberrant motor behavior in the NPI was not evaluated because it was not a psychiatric symptom but an abnormal behavior resulting from psychiatric symptoms. The product of the severity of behavior and the frequency of its occurrence was used as an overall measure of the magnitude of the elemental psychiatric symptoms. In this study, if a subject had delusions, the kinds of delusions were recorded according to the NPI classification of delusions. The NPI was administered by a neuropsychiatrist who was blind to the neuropsychological data and unawareness score.

**Statistical Analyses**

The EMC scores on questions answered by patients themselves were compared with those answered by the patient’s caregivers by Wilcoxon signed-rank test. The EMC scores answered by patients themselves, those answered by the patient’s caregivers, and unawareness scores were compared among patients with each kind of caregiver (spouse, son or daughter, and others) by Kruskal-Wallis test. Some factors that may affect these scores were also compared among patients with each kind of caregiver by Fisher exact test, 1-way analysis of variance (ANOVA), or Kruskal-Wallis test as described in Table 1. The AQ and combined raw score of the drawing and block design subtests of the WAB of patients in the present study were compared with those of 16 healthy elderly subjects (11 women and 5 men; mean age, 68.5 [SD, 6.7] years; mean level of education, 9.9 [SD, 2.1] years) in our previous study33 with the Mann-Whitney U test. The Spearman rank correlation coefficient (r) was used to quantify the relationship between the scores of the EMC and the weighted sum score of the delayed recall. We also used Spearman rank correlation coefficients to analyze the correlations between the unawareness score and demographic, cognitive, and psychiatric variables. If a significant correlation between unawareness score and delusions was found, the unawareness score was compared among patients with each kind of delusion. There were close associations between the performance of cognitive tests and age, between the performance of cognitive tests and educational attainment, and between sex and neuropsychiatric symptoms such as delusions.34 A partial correlation measures the strength of association between the 2 variables while controlling the effect of other variables. As a secondary analysis, specific effects of the cognitive and psychiatric variables on the unawareness score were tested by using partial Spearman rank correlation coefficients, in which possible effects of age, sex, and education were partialled out. The statistical significance level was set at P < .05. Bonferroni adjustments were used for multiple comparisons where appropriate. All statistical analyses were carried out with SAS release 6.10 (SAS Institute Inc, Cary, NC).

**RESULTS**

The patients tended to rate themselves with lower EMC scores (indicating lower memory impairment) than the caregivers did (Figure 1a). This was also reflected in the distribution histograms of the EMC scores (Figure 1b). The EMC self-rating (form A) score (mean ± SD, 7.4 ± 4.4; range, 0-21) was significantly lower than the caregiver rat-
ing (form B) score (mean ± SD, 18.1 ± 7.2; range, 4-39) (T = 53.5, Z = 8.5, P < .001). The EMC score of the patient’s caregiver (H (2, N = 103) = 7.4, P = .024) and unawareness score (H (2, N = 103) = 8.4, P = .015) varied depending on the type of caregiver (Table 1). A post hoc test revealed that the EMC scores answered by a son or daughter were significantly higher than those answered by a spouse, and unawareness scales were higher in patients whose caregiver was a son or daughter than in patients whose caregiver was a spouse. The 3 groups were significantly different in the NPI delusions score (H (2, N = 103) = 8.01, P = .018) and marginally different in the delayed recall score (F2,100 = 2.47, P = .090). The NPI delusions scores in the patients whose caregiver was a son or daughter were higher than those in the patients whose caregiver was a spouse, and delayed recall scores in patients whose caregiver was a son or daughter were lower than those in patients whose caregiver was a spouse. However, the differences were not statistically significant.

The means and ranges of scores for unawareness and for the tests of cognition are shown in Table 2. In the WMS-R, the patients’ delayed recall score was severely impaired, but the attention/concentration score was within the normal range for their age.26 The delayed recall score of the WMS-R correlated significantly with the EMC–form B score (r = −0.35, P < .0005) but not with the EMC–form A score (r = −0.17, P = .867). The AQ (U = 85, P < .0001) and the score from the drawing and block design task (U = 441.5, P = .003) of the WAB were significantly more impaired in the patients than in healthy elderly subjects, although the impairment of the patients was relatively mild.33 Although the RCPM score of the patients was lower than that of healthy elderly subjects, the difference between the patients’ and normal subjects’ scores was small.20

The patients showed various psychiatric symptoms, with apathy being the most common (Table 3). None of the patients experienced hallucinations. Twenty-nine patients (28.2%) experienced delusions. Of the 29 patients with delusions, 22 had delusions of theft, 8 had delusions of suspicion, 2 had misidentification delusions (eg, “Someone is in the house”), and 1 had delusions of being abandoned. Some patients had more than 1 type of delusion. Because the numbers of patients with delusions other than those of theft were small, we compared demographic and psychometric characteristics between patients with and without delusions of theft (Table 4). There were no significant differences between patients with and without delusions of theft in the unawareness score, EMC–form A score, or EMC–form B score. In 22 patients with delusions of theft, the delayed recall score was not significantly correlated with severity of delusions of theft (r = 0.0018, P = .99).

Among the cognitive features measured by the WMS-R and the WAB, delayed recall was significantly correlated with the unawareness score (Table 5). Even when the effects of age, sex, and education were partialled out, the results remained unchanged. Among the psychiatric features, the severity of delusions was positively correlated with the unawareness score, and the correlation remained unchanged when the effects of age, sex, and education were partialled out.

DISCUSSION

Before discussing the main findings, we consider the validity of the UMI in this study. Unawareness of impairment has been assessed by 2 main methods: (1) the discrepancy between the patient and the caregiver on judgments in questionnaires assessing cognitive impairment, and (2) the experimenter’s evaluation that the patient is unable to correctly report his own impairment. However, the number of AD patients with unawareness of impairment and the severity of the patients’ unawareness of impairment were judged in different ways in these methods, and no close relationship was found between the results obtained by the 2 methods.12 It is often difficult to draw a clear distinction between patients with and without unawareness of impairment by using a method that depends on the experimenter’s evaluation. The discrepancy between the patient’s and caregiver’s judgments on questionnaires is more objective and quantitative than an evaluation by the experimenter. In addition, difference scores may be effective in assessing the association between unawareness and cognitive impairment and psychiatric symptoms if dementia is held constant.35 Thus, in our opinion, the approach involving difference scores was better than the evaluation by the experimenter, although the method involving difference scores has been criticized because the caregiver’s perception of the patient’s level of functioning was dependent on the level of the caregiver’s burden and depression, and the caregiver could have underestimated the patient’s performance.36,37

In this study, patients’ memory impairment was self-evaluated and evaluated by their caregivers by using the EMC, a validated questionnaire system. Then, the unawareness of limited memory impairment was evaluated by the discrepancy of patient-caregiver judgments on the EMC in a fairly large number of patients with mild AD. Moreover, the ways in which various cognitive functions and psychiatric symptoms were associated with UMI were assessed with correlational analyses, controlling for some confounding factors such as age, sex, and educational attainment, as well as the effect of multiple comparisons. The patients’ own evaluations of memory impairment were lower than the caregivers’ evaluations. The caregiver-rated EMC score was significantly correlated with the WMS-R delayed recall score. On the other hand, the self-rated EMC score was not significantly correlated with the WMS-R delayed recall score. These
results suggested that patients with AD, even in the early stage, were generally unaware of and underrated their memory impairment in daily life. The correlational analysis clearly demonstrated that memory impairment and delusions were significantly associated with UMI in patients during the early stage of AD, suggesting that memory impairment and delusions would be major causative factors of unawareness.

Because memory impairment would result in a lack of information that is essential to be aware of and to estimate
the degree of memory impairment, we expected to see a significant association between memory impairment and UMI. However, the results of previous studies on the relation between UMI and memory impairment are mixed; some studies found such a relation, but most did not. Various reasons for failing to demonstrate the association between memory impairment and UMI were considered. The application of the delayed recall score of the WMS-R, which represents remote memory function in this study, would be suitable to detect the association. Although recent memory function was associated with remote memory function, these functions are not identical. Starkstein et al demonstrated an association between memory impairment and unawareness of cognitive impairment, including memory impairment, by using a delayed recall score, as in our study. The fact that the present study was limited to AD subjects with a mild stage of dementia would also make the association between UMI and mem-
Symptoms Underlying Unawareness in Patients With Mild AD / Kazui et al

Memory impairment is the earliest clinical symptom in AD. In mild AD patients, the degree of memory impairment varies among patients, and the scores of delayed memory tests also vary, although memory impairment is so severe that scores of delayed memory tests of the patients in the moderate stage of AD often show a floor effect. The association between UMI and memory impairment is understandable and appears to be supported by the neuropathological finding that amyloid plaque density in the prosubiculum (a medial temporal lobe structure that is intrinsically connected to the hippocampal formation) was associated with unawareness of impairment in patients with AD.41

As in previous studies, the present study demonstrated that delusions were significantly associated with UMI in patients with AD.4,5,11 The delusions could distort a patient's perception of his memory impairment in everyday life, resulting in a lack of accurate information. Delusions in AD are reportedly associated with memory impairment, executive dysfunction, and receptive language dysfunction,42,43 as is the unawareness of impairment; in addition, delusions in AD are reportedly neuroanatomically associated with the temporal lobes,44,45 frontal cortex,46 and right parietal cortex,47 as is the unawareness of impairment. Thus, another possible explanation of the association between unawareness and delusions is that both unawareness and delusions share common anatomical bases. To simultaneously be unaware of impairment and have delusions in AD might require malfunctions of the network system involving limbic and cortical areas. The network is involved in making correct perception and cognition of stimuli from the external world.

Table 4. Demographic and Psychometric Characteristics of Patients With and Without Delusions of Theft

<table>
<thead>
<tr>
<th></th>
<th>Delusions of Theft</th>
<th>No Delusions of Theft</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex, female:male</td>
<td>20:2</td>
<td>3:4</td>
<td>.074*</td>
</tr>
<tr>
<td>Age, y</td>
<td>72.6 ± 6.8</td>
<td>70.0 ± 5.7</td>
<td>.36</td>
</tr>
<tr>
<td>MMSE score</td>
<td>21.9 ± 2.8</td>
<td>20.4 ± 2.6</td>
<td>.23</td>
</tr>
<tr>
<td>Unawareness score</td>
<td>15.7 ± 8.6</td>
<td>12.7 ± 7.1</td>
<td>.36</td>
</tr>
<tr>
<td>EMC score by caregiver</td>
<td>22.9 ± 7.8</td>
<td>19.4 ± 5.7</td>
<td>.29</td>
</tr>
<tr>
<td>EMC score by patient</td>
<td>7.1 ± 4.9</td>
<td>6.7 ± 2.2</td>
<td>.90</td>
</tr>
<tr>
<td>Delayed recall score</td>
<td>6.5 ± 5.4</td>
<td>7.7 ± 5.6</td>
<td>.63</td>
</tr>
<tr>
<td>NPI delusions score</td>
<td>5.1 ± 4.0</td>
<td>4.6 ± 3.2</td>
<td>.86</td>
</tr>
</tbody>
</table>

Note: Values except for sex are given as means ± SDs. MMSE = Mini-Mental State Examination; EMC = Everyday Memory Checklist; NPI = Neuropsychiatric Inventory.

Table 5. Correlations Between Unawareness Score and Demographic, Cognitive, and Psychiatric Variables

<table>
<thead>
<tr>
<th></th>
<th>r_s</th>
<th>P</th>
<th>Partial r_s^*</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.19</td>
<td>.051</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>0.21</td>
<td>.029</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational attainment</td>
<td>−0.11</td>
<td>.285</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WMS-R</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attention/concentration</td>
<td>−0.07</td>
<td>.504</td>
<td>−0.07</td>
<td>.465</td>
</tr>
<tr>
<td>Delayed recall</td>
<td>−0.31</td>
<td>.0016b</td>
<td>−0.29</td>
<td>.0029c</td>
</tr>
<tr>
<td>WAB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQ</td>
<td>−0.14</td>
<td>.152</td>
<td>−0.12</td>
<td>.232</td>
</tr>
<tr>
<td>Drawing and block design</td>
<td>0.02</td>
<td>.864</td>
<td>0.06</td>
<td>.563</td>
</tr>
<tr>
<td>RCPM</td>
<td>−0.03</td>
<td>.798</td>
<td>0.02</td>
<td>.827</td>
</tr>
<tr>
<td>NPI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delusions</td>
<td>0.35</td>
<td>.0002b</td>
<td>0.32</td>
<td>.0012c</td>
</tr>
<tr>
<td>Agitation/aggression</td>
<td>0.05</td>
<td>.646</td>
<td>0.07</td>
<td>.501</td>
</tr>
<tr>
<td>Dysphoria</td>
<td>0.15</td>
<td>.136</td>
<td>0.19</td>
<td>.057</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0.24</td>
<td>.016</td>
<td>0.20</td>
<td>.047</td>
</tr>
<tr>
<td>Euphoria</td>
<td>−0.06</td>
<td>.560</td>
<td>−0.09</td>
<td>.400</td>
</tr>
<tr>
<td>Apathy</td>
<td>0.17</td>
<td>.081</td>
<td>0.21</td>
<td>.038</td>
</tr>
<tr>
<td>Disinhibition</td>
<td>0.03</td>
<td>.783</td>
<td>0.02</td>
<td>.873</td>
</tr>
<tr>
<td>Irritability/liability</td>
<td>−0.05</td>
<td>.619</td>
<td>0.02</td>
<td>.832</td>
</tr>
</tbody>
</table>

Note: r_s = Spearman correlation coefficient; WMS-R = Wechsler Memory Scale–Revised; WAB = Western Aphasia Battery; AQ = aphasia quotient; RCPM = Raven’s colored progressive matrices; NPI = Neuropsychiatric Inventory.

a. Effects of age, sex, and education being partialled out.

b. 0.05/16 = 0.003125

c. 0.05/13 = 0.003846.
world, integrating and evaluating the stimuli, monitoring the reality of the evaluation, and preventing consolidation of inaccurate beliefs.

In a previous study, delusions of theft were the most common type of delusion in Japanese patients with AD. \(^6\) This was also the case in the present study. Memory impairment seems to be one of the causes of such delusions. Thus, we should exclude the possibility that the association between UMI and delusions documented in the present study is due to an association between memory impairment and delusions of theft. However, the WMS-R delayed recall score and unawareness score were comparable between the patients with delusions of theft and those with other types of delusions. In addition, in patients with delusions of theft, the severity of delusions was not correlated with severity of memory impairment. Thus, the present results indicated that memory impairment and delusions were independently associated with unawareness.

Based on measurements of impairment, self-monitoring and judgment functions have been proposed to involve the frontal lobe and the right hemisphere, especially the right parietal lobe. \(^5\) However, the present study failed to demonstrate an involvement of the executive or visuospatial/constructive functions in UMI. The scores of the executive or visuospatial/constructive tests were only slightly impaired in the present study, suggesting that dysfunctions of self-monitoring and judgment in the subjects with mild AD were relatively mild. These results raise the possibility that dysfunctions of self-monitoring and judgment, which are in general less impaired during the early stage of AD, are less important to the development of unawareness in patients with mild AD. Starkstein et al\(^6\) also failed to demonstrate an involvement of the executive function in unawareness of impairment, which they attributed to the mildness of dementia severity in their AD patients. The pathological finding that cortical pathology of AD begins in the temporal lobes, with subsequent spread to posterior parietal and frontal areas, \(^48\) might support this interpretation. However, the tests for executive and visuospatial/constructive functions performed in this study were limited. Thus, the tests might not have enough power to show the association between executive and visuospatial/constructive functions and UMI. Previous studies with comprehensive tests for frontal lobe functions found an association between frontal executive function and unawareness of impairment. \(^4,7,8\) Further study with comprehensive executive tests is needed to determine the effect of executive functions on unawareness of impairment in patients with mild AD and to examine the possibility that the cognitive functions and psychiatric symptoms that are associated with unawareness depend on the severity of dementia.

A limitation of this study is that it did not include a control for the effect of caregiver burden on caregiver-rated EMC score. Caregivers, because of the burden that they carry, tend to rate the patient’s severity of symptoms worse than the actual severity. \(^36,37\) In the present study, the ratings of patient impairment seemed to depend on the type of caregiver. The EMC score given by a spouse was less than the scores given by other types of caregivers. However, the delayed recall scores of patients whose caregiver was a spouse were better than the scores given by patients who had other types of caregivers, and the delusion scores of the patients whose caregiver was a spouse were less than the scores of patients whose caregiver was a son or daughter. Thus, differences in EMC scores among the different types of caregivers may be due to differences in memory impairment and delusions of the patients. In the present study, the caregiver-rated EMC score might be reliable as an index of memory function, as it was significantly correlated with the WMS-R delayed recall score.

The unawareness of impairment in patients with AD has never been studied as an end point in clinical trials, despite the clinical significance of unawareness. The present findings raise the possibility of treating unawareness of impairment in patients with mild AD through the treatment of memory impairment and delusions. Cholinesterase inhibitors improve memory function in mild to moderate AD. \(^50,51\) They are also effective in treating delusions. \(^52,53\) Psychotropic drugs, such as atypical antipsychotic agents, are used in the treatment of the psychiatric symptoms in dementia. \(^54\) In future clinical studies, the efficacy of such agents and other antidementia drugs for treating unawareness should be examined.

References


