

Correlations among the Continence Function, Cognitive Function and Activities of Daily Living in Elderly Male Patients with Dementia in a Geriatric Hospital

The purpose of this study was to identify correlations among the continence function, cognitive function, and activities of daily living(ADL) in elderly male patients with dementia in geriatric hospitals. The subjects were 64 patients aged 65 or above who were diagnosed with dementia among the hospitalized male patients in a geriatric hospital. For the subjects' cognitive function, a questionnaire developed for the Korean Mini Mental Status Examination(K-MMSE) was used. For the continence function and ADL, data were collected using a patient evaluation table. As a result, a lower level of cognitive function resulted in corresponding higher levels of dependence in all items of ADL except bathing($p<.05$), and a lower level of cognitive function led to corresponding declines in the continence function(bowel control, bladder control)($p<.01$). In addition, a higher level of dependence in ADL resulted in corresponding higher levels of difficulty in bowel and bladder control($p<.01$). This study showed correlations among the cognitive function, ADL, and continence function of elderly men with dementia. The results of this study may be used as basic data for the management and treatment of hospitalized elderly male patients with dementia in geriatric hospitals.

Key words: *Continence Function; Cognitive Function; ADL; Dementia*

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INTRODUCTION

In Korea, the incidence of dementia among elderly people aged 65 or above is estimated at 9.6%(approximately 610,000 people) and is projected to continue to increase with 15.05%(approximately 2,710,000 people) in 2050(1). Moreover, medical expenses per person for dementia in 2014 amounted to 11.67 million won(2).

Dementia is defined as follows: 1) the existence of at least one cognitive disorder in addition to memory disorder following an acquired brain disease; 2) In the absence of memory disorder, a condition in which three or more cognitive disorders among disorders in the executive functions of the frontal lobes, including speech disorder, visuospatial disorder, changes in personality and emotion, and judgement, cause difficulties in daily activities and social life(3). Dementia is one of the most serious diseases in terms of making

the life of old age inert by causing the continuous and extensive deterioration of cognitive functions(4). For the elderly, an older age and a larger number of chronic diseases lead to corresponding higher levels of dependence in ADL and instrumental activities of daily living(IADL)(5). While women feel an overall higher level of discomfort in ADL, men are also reported to feel discomfort in ADL(6,7).

While men showed a relatively lower frequency of urinary incontinence than women, they also exhibit increases in the frequency of urinary incontinence with aging(8). In particular, elderly people who live in nursing facilities show increases in the incidence of urinary incontinence when they are older, have cognitive disorders, or have lower levels of ADL and larger numbers of associated diseases(9,10). Elderly patients are generally hospitalized in long-term care hospitals due to cerebrovascular disorders, old age, and dementia,

and around 51.8% of patients in long-term care hospitals are reported to show urinary incontinence(11).

A study reported that the incidence of bowel incontinence increases with aging(12), and among elderly people aged 75 or above, urinary and bowel incontinence have correlations with dementia and low scores in ADL(12). Elderly people in nursing homes frequently show urinary and bowel incontinence, and disorders in ADL are reported to have a higher correlation with dementia than age(13). In particular, when elderly people with dementia have both urinary and bowel incontinence, they are more likely to show disorders in ADL(14).

Most previous studies attempted to analyze correlations between the cognitive function and ADL of elderly people with dementia, and improve them(15,16). However, only a limited number of studies have so far examined correlations among the continence function, cognitive function, and ADL of hospitalized elderly men with dementia in domestic geriatric hospitals. In addition, the continence function has mostly been evaluated using tools for the evaluation of ADL, such as the Modified Barthel Index(MBI) and the Functional Independence Measure(FIM). In these evaluation methods, bowel and bladder control are assessed in terms of managing urine and feces rather than the continence function. Therefore, this study intended to provide basic data for the efficient management and treatment of male dementia patients by researching correlations among the continence function, cognitive function, ADL of male dementia patients who were hospitalized in a geriatric hospital.

METHODS

Subjects

The subjects were selected from the male patients who were hospitalized between January 1, 2012 and September 30, 2013 in a geriatric hospital in Yongin City, Gyeonggi-do. They were 64 patients aged 65 or above who had been diagnosed with dementia based on their medical records and assessed using the "patient evaluation table" produced based on the medical records to evaluate these patients. The exclusion criteria were as follows: those who were in a coma, had diplegia, complete visual impairment, or femoral fractures, or required "full support" in all items of

ADL. The general characteristics of the subjects are presented in Table 1.

Table 1. General characteristics of the subjects (M±SD)

Subjects(n)	Age(yr)	MMSE(score)
64	81,34±6,55	13,59±7,65

Procedures

Data collection

For data collection, the patient evaluation table was used, which is generally produced by nurses in charge of patients in long-term care hospitals. The patient evaluation table used in this study was produced through a comprehensive evaluation of the patients' conditions for the recent seven days between the 1st and 10th of each month.

Cognitive function test

The cognitive function of the patients was measured using the questionnaire developed by Kang et al.(18) for the Korean Mini Mental State Examination(K-MMSE) based on the Mini Mental State Examination(MMSE) developed by Folstein et al.(17). The K-MMSE is an evaluation tool with a high level of reliability(19).

ADL Test

The ADL were evaluated by examining the following ten items based on the "patient evaluation table": dressing, washing, brushing teeth, bathing, eating, changing posture, standing up and sitting, moving and sitting, getting out, and toileting. A study reported that the evaluation domain of ADL in the patient evaluation table and the K-MBI have a substantially high correlation with a correlation coefficient of .96(20). The ADL were evaluated based on zero point for "complete independence", one point for "requiring supervision", two points for "requiring minor support", three points for "requiring substantial support", four points for "requiring full support", and five points for "no occurrence of activities".

Continence function test

The continence function was evaluated by examining the existence of any incontinence that occurred regardless of its cause and the degree of the incontinence based on the "patient evaluation table". For the continence function, the weighted kappa coefficients for bowel control and bladder

control were .60 and .51, respectively. Therefore, the tool used in this study had a high level of inter-observer reliability(20). The continence function for feces and urine was evaluated based on zero point for "capable of control", one point for "occasional incontinence", two points for "frequent incontinence", and three points for "incapable of control".

Data Analysis

The statistical software program PASW 18.0 was used to process all data collected in this study. The general characteristics of the subjects were identified by performing a frequency analysis using descriptive statistics. In addition, an analysis was performed using Spearman's rank correlation coefficient to identify correlations between the cognitive function and ADL, the cognitive function and continence function, and the ADL and continence function of elderly men with dementia. The statistical significance level was set at $\alpha = .05$.

RESULTS

The analysis of correlations between the cognitive function and ADL of elderly men with dementia

A review of the correlations between the cognitive function and the items of ADL in elderly men with dementia showed low correlations(-.257~- .358) between the cognitive function and all items of ADL except bathing. This result was statistically significant($p < .05$). A lower level of cognitive function in elderly men with dementia resulted in a corresponding higher level of dependence in ADL.

The analysis of correlations between the cognitive function and continence function of elderly men with dementia

A review of the coefficients of correlations between the cognitive function and continence function of elderly men with dementia showed relatively high correlations(-.322~- .356) between the cognitive function and bowel control, and the cognitive function and bladder control. The analysis of correlations between the cognitive function and continence function of elderly men with dementia showed statistically significant correlations. In other words, a lower level of cognitive function led to corresponding declines in the continence function($p < .01$)(Table 3).

Table 3. The analysis of correlations between the cognitive function and continence function of elderly men with dementia

	Continence function	
	Bowel control	Bladder control
Cognitive function r(p)	-.356(.004**)	-.322(.009**)

ρ : Spearman's rank correlation coefficient, ** $p < .01$

The analysis of correlations between the continence function and the items of ADL in elderly men with dementia

A review of the coefficients of correlations between the continence function and the items of ADL in elderly men with dementia showed substantially high correlations with .707~- .925. In terms of correlations between the continence function and the items of ADL in elderly men with dementia, statistically significant correlations were found in the elderly men with dementia. In other words, a higher level of dependence in ADL resulted in corresponding higher levels of difficulty in bowel and bladder control($p < .01$)(Table 4).

Table 2. The analysis of correlations between the cognitive function and ADL of elderly men with dementia

	ADL									
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Cognitive function	-.299	-.281	-.317	-.221	-.358	-.269	-.311	-.321	-.257	-.314
r(p)	(.017*)	(.024*)	(.011*)	(.079)	(.004*)	(.032*)	(.012*)	(.010*)	(.041*)	(.011*)

ρ : Spearman's rank correlation coefficient, * $p < .05$, A1: Dressing, A2: Washing, A3: Brushing teeth, A 4: Bathing, A5: Eating, A6: Changing posture, A7: Standing up and sitting, A8: Moving and sitting, A9: Getting out, A10: Toileting

Table 4. The analysis of correlations between the ADL and continence function of elderly men with dementia

	ADL									
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Bowel control	.750	.726	.720	.707	.733	.825	.867	.901	.813	.875
r(p)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)
Bladder control	.771	.750	.766	.737	.778	.856	.905	.925	.838	.867
r(p)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)	(.000**)

ρ : Spearman's rank correlation coefficient, * $p < .01$, A1: Dressing, A2: Washing, A3: Brushing teeth, A 4: Bathing, A5: Eating, A6: $\text{\textcircled{A}}$ Changing posture, A7: Standing up and sitting, A8: Moving and sitting, A9: Getting out, A10: Toileting

DISCUSSION

With rapid population aging, senile diseases such as dementia and cerebrovascular diseases are rapidly increasing. Accordingly, the country's financial burdens are increasing. In particular, increases in expenses for the treatment and management of dementia patients are becoming a large burden for national medical budgets(21). By the nature of dementia, as the symptoms of dementia patients become serious, the effects of treatment decrease and the financial burdens of their' families rapidly increase. Therefore, the trend for managing dementia patients is changing toward active treatment(21).

This study was conducted to analyze correlations among the continence function, cognitive function, and ADL of elderly men with dementia in a geriatric hospital using the "patient evaluation table" that all long-term care hospitals in Korea are obligated to produce.

The average score of the K-MMSE, through which the cognitive function was evaluated, was 13.59 ± 7.65 . This was a higher score compared to the average scores of 9.13~12.24 resulting from evaluating the cognitive function of elderly people in nursing facilities using the MMSE-K and K-MMSE(15,16,22). However, this result still suggests large reductions in the cognitive function of elderly men in geriatric hospitals.

The average score for the each item of ADL ranged from 2.59 to 3.73, which showed that elderly men with dementia in geriatric hospitals require substantial support in ADL. In terms of the continence function, the average scores for bowel and bladder control were 1.84 and 1.82, respectively. These scores show that elderly men with dementia in geriatric hospitals have difficul-

ties in the control of evacuation as they often experience incontinence.

This study analyzed correlations between the cognitive function and ADL, the cognitive function and continence function, and the continence function and ADL of elderly men with dementia. In terms of the correlations between the cognitive function and ADL, statistically significant correlations were found between the cognitive function and all items of ADL except bathing. In other words, a lower level of cognitive function resulted in a corresponding higher level of dependence in ADL($p < .05$). In addition, a lower level of cognitive function led to corresponding declines in the continence function (bowel control, bladder control) ($p < .01$). Moreover, a higher level of dependence in ADL resulted in corresponding higher levels of difficulty in bowel and bladder control($p < .01$). According to the results of studies on correlations between the cognitive function and ADL of elderly people with dementia in nursing facilities for the elderly, a lower level of cognitive function led to a corresponding decline in ADL, thereby making the elderly people more dependent(15,22), and there was a statistically significant positive correlation between ADL and dementia(23). Moreover, correlations were also found between the cognitive function and ADL of elderly people in communities and nursing homes, homebound elderly people registered at senior welfare centers, and homebound elderly people, and a higher level of cognitive function resulted in a corresponding higher level of independence in ADL(24-26). While these previous studies focused on elderly people with dementia who were in nursing facilities rather than geriatric hospitals, most patients in nursing facilities for the elderly and geriatric hospitals form a relatively homogeneous patient group that

has cerebrovascular, musculoskeletal, or neurological diseases, or cognitive disorders(27), and show similar declines in the cognitive function(15, 16, 22). Therefore, the results of these studies may support the result of the present study, which involved elderly men with dementia in a geriatric hospital, that a lower level of cognitive function resulted in a corresponding higher level of dependence in ADL.

In general, the incidence of urinary and bowel incontinence in elderly people increases with aging (28), and women show a higher incidence than men(29,30). In a study that involved elderly people in nursing homes, the incidence of bowel incontinence in elderly people with dementia or cognitive disorders was 2.2 times higher than that in elderly people without the conditions(30). In another study, among the elderly people who were subject to home-visit nursing, those who experienced almost daily urinary or bowel incontinence exhibited an overall lower level of cognitive function than the group that was capable of controlling evacuation regardless of the degree of control(31). Another study reported that among homebound elderly people, those with the risk of dementia have disorders in bowel and bladder control(32). Given that previous relevant studies evaluated elderly people who were in nursing homes or homebound, it is difficult to directly compare their results with the correlation between the cognitive function and continence function of elderly people in a geriatric hospital. However, both the previous studies and the present study could confirm the fact that a lower level of cognitive function led to corresponding lower levels of bowel and bladder control. Incontinence is an important risk factor that makes elderly people in nursing homes experience declines in ADL(33), and it was reported that among the elderly people in communities, those with urinary incontinence showed an overall higher level of dependence in ADL than those without urinary incontinence(34). In addition, there was a high correlation between ADL and disorders(35). A study defined ADL as a predictor in terms that a lower level of ADL upon hospitalization increases the incidence of urinary incontinence after hospitalization(10). This supports the result of the present study that among the elderly people with dementia in a geriatric hospital, a higher level of dependence in ADL resulted in a corresponding higher level of difficulty in bowel and bladder control.

This study has some limitations. First, this study

involved only elderly men with dementia who were hospitalized in a single geriatric hospital. Therefore, its results are unlikely generalized for all elderly people with dementia who are hospitalized in geriatric hospitals. Second, this study could not identify correlations between the variables according to the diagnostic classification of dementia. Thus, future studies should identify the correlations according to the diagnostic classification of dementia. Third, additional studies may be required to examine the effects of rehabilitation therapies such as physical therapy performed in geriatric hospitals on improvements in the continence function, ADL, and cognitive function of elderly people with dementia.

CONCLUSIONS

This study could identify high correlations between the cognitive function of elderly men with dementia in a geriatric hospital and their ADL and continence function. The results of this study may be used as basic data to manage and treat hospitalized elderly men with dementia in geriatric hospitals.

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