



**Figure 1.** Serum C-reactive protein (CRP) values before and at the end of the study period. Serum CRP did not differ significantly between the two groups before treatment ( $P = .08$ ). In the Hochuekkito-treated group, the mean value  $\pm$  standard error of serum CRP decreased significantly from  $3,230 \pm 450$  ng/mL to  $2,060 \pm 330$  ng/mL ( $P < .01$ ). In the control group, serum CRP remained unchanged from  $2,380 \pm 380$  ng/mL to  $2,380 \pm 360$  ng/mL during the study period. NS = not significant.

pg/mL after treatment, whereas it was unchanged in the control group ( $2.2 \pm 0.3$  pg/mL before and after treatment). Serum IL-6 remained unchanged in both groups. In the Hochuekkito-treated group, serum prealbumin level, a marker of nutritional status, increased from  $23.6 \pm 1.1$  mg/dL to  $26.6 \pm 1.2$  mg/dL, whereas it was unchanged in the control group.

These data suggest that Hochuekkito improves systemic inflammation and nutritional status in older patients with moderate to severe COPD, although the mechanisms of Hochuekkito have not been defined. Systemic inflammation, in addition to nutritional status, is a determinant of quality of life and prognosis in COPD patients.<sup>2,7</sup> Further larger studies on its effects and mechanisms of action will be needed, although Hochuekkito has a long history of use in patients with COPD and weakness, and its safety has been clinically established.

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## SIMPLE COGNITIVE TESTING (MINI-COG) PREDICTS IN-HOSPITAL DELIRIUM IN THE ELDERLY

*To the Editor:* Cognitive impairment is a well-known risk factor for delirium.<sup>1-4</sup> Delirium, in turn, is also a marker of risk for the development of dementia, even in older individuals without prior cognitive or functional impairment.<sup>5</sup> Obtaining a cognitive assessment on patients admitted acutely to the hospital is challenging. A simple cognitive test that a range of healthcare professionals could easily administer would facilitate assessment of people at risk for delirium. The Mini-Cog is a simple tool to screen for cognition that has been validated in a population-based sample of ethnically and linguistically diverse older adults. It takes 3 minutes to administer, performs as well as or better than the Mini-Mental State Examination for screening for dementia, and is not influenced by language and education.<sup>6-9</sup> This study aimed to evaluate the usefulness of the Mini-Cog, a simple cognitive test as a predictor of in-hospital (incident) delirium in older people.

## STUDY DESIGN

This is a prospective cohort study. The study population consisted of patients aged 65 and older admitted consecutively to general medical teaching units at the University of Alberta Hospital in Edmonton over a period of 7 months. After obtaining informed consent (from the patient or proxy), all patients who were willing to participate and who were deemed to be at high risk for delirium were included in the study. Patients were screened for high risk using a delirium risk questionnaire, which was based on information from the literature. High risk was defined as cognitive impairment, aged 80 or older, or any two of the following comorbidities: functional impairment, special sensory impairments (hearing or vision impairment), or critical

comorbid illnesses. Subjects were excluded if there was an admission diagnosis of coma, delirium, alcohol or drug withdrawal or intoxication, or if Confusion Assessment Method (CAM) screening was positive at the time of entry into the study. Subjects were also excluded if they had a short stay (<72 hours). Information on variables that can predict delirium, including aged 80 and older, history of dementia, vision and hearing impairment, and functional impairment, were obtained. Major medications that confer risk for delirium, including benzodiazepines, narcotics, and anticholinergics, were part of the delirium screening. Trained research assistants performed Mini-Cog testing on all patients enrolled. The Mini-Cog assessment instrument combines an uncued three-item recall test with a clock drawing test. A normal clock has all of the following elements. All numbers 1 to 12 are present in the correct order and direction, numbers are evenly spaced in the circle, and the two hands point to 11 and 2 to indicate 10 past 11. If any of these elements are missing, the clock is scored as abnormal. The Mini-Cog was scored per the scoring algorithm.<sup>6</sup> One point was assigned to each correctly recalled word, 2 points were given for a correctly drawn clock, and 0 points were given for an incorrect clock, with possible scores of 0 to 5. Scores of 0 to 2 indicate a positive screen for dementia. The outcome, delirium, was based on twice-daily assessments by the trained research assistants and confirmed by specialists in geriatric medicine using the CAM.<sup>10</sup>

## RESULTS

Three hundred seventy-five subjects were asked to consent; 327 (87%) consented to screen. One hundred thirty-two patients were enrolled in the study; all these patients had a negative CAM screening at the time of admission. Incident delirium in this group was 15% (20/132). A significant proportion (110/132, 83.3%) were not known to have cognitive impairment or dementia at the time of entry into the study based on chart review. Five of 20 (25%) delirious subjects had a history of dementia and two of 20 (10%) had cognitive impairment, whereas 13 or 20 (68%) delirious subjects had an abnormal Mini-Cog at the time of entry into the study. In the univariate analysis, a history of dementia (odds ratio (OR) = 4.23, 95% confidence interval (CI) = 1.22–14.64;  $P < .02$ ) and an abnormal Mini-Cog (OR = 4.09, 95% CI = 1.50–11.13;  $P < .006$ ) were significantly associated with risk for in-hospital delirium. In the multivariate analysis, after adjusting for all the predictive variables tested, abnormal Mini-Cog was a predictor of in-hospital delirium (OR = 5.24, 95% CI = 1.50–18.31;  $P < .01$ ). The Mini-Cog was a significant predictor of in-hospital delirium (OR = 3.96, 95% CI = 1.11–14.2;  $P < .03$ ), even after removing the group with a known history of dementia and cognitive impairment.

## DISCUSSION

This study suggests that the Mini-Cog is a predictor of delirium in at-risk older persons. In this study, patients with an abnormal Mini-Cog were five times as likely to develop incident delirium as those who had a normal Mini-Cog. Although established dementia is a risk factor for delirium, it is often undiagnosed in the community and might not be identified on admission to hospital. The current study

shows that simple and practical cognitive screening using the Mini-Cog at the time of admission is predictive of incident or in-hospital delirium.

## CONCLUSION

In elderly patients who do not have a history of dementia or cognitive impairment at the time of admission, the Mini-Cog can be used to identify patients at high risk for in-hospital delirium. Therefore, we suggest screening using a simple test like the Mini-Cog in all elderly patients admitted to the hospital. This approach may not only help to identify patients with a possible cognitive impairment, but also help patients at risk for delirium in whom targeted preventive interventions might be applied.

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## A CLOSE ASSOCIATION BETWEEN HEARING IMPAIRMENT AND ACTIVITIES OF DAILY LIVING, DEPRESSION, AND QUALITY OF LIFE IN COMMUNITY-DWELLING OLDER PEOPLE IN JAPAN

*To the Editor:* The prevalence of impaired hearing increases greatly with age.<sup>1</sup> In the article entitled, "The relationship

between hearing impairment and depression in older veterans,"<sup>2</sup> the authors showed that hearing impairment (HI) is strongly correlated with depression in older people. To confirm these findings, we compared quantitative scores in activities of daily living (ADLs), subjective quality of life (QOL), and depression of elderly subjects with HI and those without in community-dwelling older people living in three towns in Japan.

The study population consisted of 434 community-dwelling older people with HI aged 65 and older (210 men, 224 women; mean age  $76.9 \pm 6.9$ ) and 2,170 age- and sex-matched older people without HI (adjusted ratio = 1:5, male:female = 1,050:1,120, mean age  $76.9 \pm 6.7$ ) living in three towns: Tosa, Kahoku, and Urausu, in Kochi and Hokkaido Prefectures, Japan. Hearing function was assessed using a self-reported questionnaire, and the subjects were classified into four classes using a hearing function scale: those able to hear well (include those requiring a hearing aid) = 3, those able to hear loud voices only = 2, those able to hear only when the speaker shouts into his/her ear = 1, and those who can scarcely hear = 0. Subjects with HI were defined as those with a score of 0 to 2 and subjects without HI as those with a score of 3. Seven basic ADL items (walking, ascending and descending stairs, feeding, dressing, using the toilet, bathing, grooming) were assessed, each on a 4-level scale, whereby 3 = completely independent, 2 = needs some help, 1 = needs much help, and 0 = completely dependent. Scores for each item were summed to generate a total basic ADL score ranging from 0 to 21.<sup>3</sup> For higher-level daily activities, assessed using the Tokyo Metropolitan Institute of Gerontology (TMIG) Index of Competence, a 13-item index was used that included three sublevels of competence, each rated on a yes/no basis: (1) instrumental ADL: instrumental self-maintenance (5 items: the ability to use public transport, buy daily

**Table 1. Comparison of Activity of Daily Living (ADL), Depression, and Quality-of-Life (QOL) Scores Between Community-Dwelling Elderly Subjects in Japan with and without Hearing Impairment (HI)**

| Variable   | With HI<br>(n = 434) | Without HI<br>(n = 2,170) | P-value* |
|--|----------------------|---------------------------|----------|
| Age, mean $\pm$ SD   | 76.9 $\pm$ 6.9       | 76.9 $\pm$ 6.7            | NS       |
| Male, n (%)  | 210 (48.3)           | 1,050 (48.3)              | NS       |
| ADL scores, mean $\pm$ SD  |                      |                           |          |
| Basic ADLs (range 0-21)  | 18.1 $\pm$ 5.2       | 19.9 $\pm$ 3.0            | <.01     |
| Instrumental ADLs (range 0-5)                                    | 3.5 $\pm$ 1.9        | 4.3 $\pm$ 1.5             | <.01     |
| Intellectual ADLs (range 0-4)                                    | 2.3 $\pm$ 1.4        | 3.1 $\pm$ 1.2             | <.01     |
| Social Role (range 0-4)  | 2.4 $\pm$ 1.5        | 3.1 $\pm$ 1.2             | <.01     |
| Tokyo Metropolitan Institute of Gerontology - Index (range 0-13) | 8.3 $\pm$ 4.1        | 10.6 $\pm$ 3.3            | <.01     |
| Depression   |                      |                           |          |
| Taking antidepressive drugs, n (%)                               | 14 (6.7)             | 40 (3.7)                  | .045     |
| GDS score (range 0-15), mean $\pm$ SD                            | 7.3 $\pm$ 4.0        | 5.4 $\pm$ 3.9             | <.01     |
| With depression (GDS score $\geq$ 10), n (%)                     | 122 (31.8)           | 351 (17.8)                | <.01     |
| QOL score (range 0-100), mean $\pm$ SD                           |                      |                           |          |
| Subjective health  | 46.0 $\pm$ 22.5      | 59.7 $\pm$ 21.8           | <.01     |
| Family relationship  | 67.9 $\pm$ 25.3      | 77.4 $\pm$ 21.0           | <.01     |
| Friend relationship  | 65.2 $\pm$ 24.1      | 75.9 $\pm$ 20.5           | <.01     |
| Financial satisfaction   | 47.3 $\pm$ 24.6      | 56.9 $\pm$ 24.4           | <.01     |
| Subjective life satisfaction                                     | 52.5 $\pm$ 25.3      | 62.9 $\pm$ 24.4           | <.01     |

\*Based on Student *t* test for continuous variables and chi-square test for categorical variables.  
SD = standard deviation; NS = not significant; GDS = Geriatric Depression Scale.