

made available through newspapers. The 185 people with DM or IGT were individually contacted, lifestyle changes of dieting and exercise were recommended, and their family doctors were informed of the results of their OGTT. One year later, in 2007, 206 people (37 with DM, 90 with IGT, and 79 with NGT) participated in a follow-up survey. Because 10 people with DM or IGT had started taking medication for DM, 196 subjects were analyzed for the effects of the intervention-caused lifestyle changes without medication. Factors related to glucose intolerance, such as body weight, hemoglobin A1c (HbA1c), fasting blood sugar (FBS), fasting insulin, and homeostasis model assessment ratio (HOMA-R), were compared between the subjects' OGTTs in 2006 and in 2007. The rate of people with improvement for each factor was compared in those with DM, IGT, and NGT. Body weight was analyzed using the same machine (Ueda Avancer Corporation U-we'll2, Tokyo, Japan), and the same company (BML Inc., Saitama, Japan) analyzed blood chemistry in 2006 and 2007.

It was revealed that, by 2007, 72.0% of subjects with DM and 71.8% with IGT were dieting and 76.9% and 66.0%, respectively, of them had been exercising after the recommendations in the 2006 intervention. Body weight had significantly decreased from that in 2006 in all subjects with DM (from 56.7 to 54.4 kg), IGT (from 55.9 to 54.4 kg), and NGT (from 53.8 to 53.1 kg) (Table 1). The rate of people with decreases in body weight of more than 3 kg was 33.3% in DM, 20.9% in IGT, and 15.2% in NGT, but there were no significant differences between them. HbA1c significantly decreased one year later in DM (from

5.8% to 5.5%), IGT (from 5.4% to 5.3%), and NGT (from 5.3% to 5.2%). The rate of people with decreases in HbA1c of more than 0.4% was significantly higher in those with DM (43.3%) than IGT (18.8%) or NGT (8.1%). FBS also significantly decreased 1 year later in subjects with DM (from 118.7 to 110.1 mg/dL) and IGT (from 103.1 to 100.0 mg/dL) but not with NGT (from 96.0 to 95.4 mg/dL). The rate of people with decreases of FBS of more than 10 mg/dL was significantly higher in those with DM (40.0%) than IGT (20.7%) or NGT (3.8%). Fasting insulin and HOMA-R were significantly lower 1 year later but only in subjects with DM (from 7.0 to 5.5 μ U/mL for insulin, from 2.1 to 1.5 for HOMA-R). The percentage of people with decreases of HOMA-R of more than 0.5 was significantly higher in those with DM (43.3%) than IGT (15.0%) or NGT (19.2%) (Table 1).

The study revealed improvements after 1 year in glucose intolerance as a result of health education for lifestyle changes combined with OGTT in community-dwelling elderly Japanese people not taking antidiabetic medication. In subjects with DM, all factors related to glucose intolerance (body weight, HbA1c, FBS, fasting insulin, and HOMA-R) improved. In IGT, body weight, HbA1c, and FBS improved. Even in NGT, body weight and HbA1c improved. Lifestyle changes were a simple and effective way to improve non-severe cases of DM or IGT, and prevention of their complications may be expected. OGTT was effective for the detection of preventable early DM or IGT.² A community network system for long-term follow-up and education of people with glucose intolerance is needed in Japan and other

Table 1. Effect of Nonpharmaceutical Intervention Through Lifestyle Changes on Glucose Intolerance in Community-Dwelling Elderly People in Japan

Factors Related to Glucose Intolerance	DM (n = 30)	IGT (n = 87)	NGT (n = 79)
Body weight, kg			
2006, mean \pm SD	56.7 \pm 9.4	55.9 \pm 10.0	53.8 \pm 8.6
2007, mean \pm SD	54.4 \pm 9.5***	54.4 \pm 10.0***	53.1 \pm 8.7**
Decrease of >3 kg, % [†]	33.3	20.9	15.2
Hemoglobin A1c level, %			
2006, mean \pm SD	5.8 \pm 0.5	5.4 \pm 0.3	5.3 \pm 0.2
2007, mean \pm SD	5.5 \pm 0.3***	5.3 \pm 0.3***	5.2 \pm 0.2***
Decrease of >0.4%, % [†]	43.3	18.8	8.1
Fasting blood sugar, mg/dL			
2006, mean \pm SD	118.7 \pm 20.8	103.1 \pm 10.0	96.0 \pm 6.5
2007, mean \pm SD	110.1 \pm 17.2**	100.0 \pm 8.4**	95.4 \pm 6.9
Decrease of >10 mg/dL, % [†]	40.0	20.7	3.8
Insulin, μ U/mL			
2006, mean \pm SD	7.0 \pm 4.0	5.2 \pm 2.6	4.5 \pm 3.1
2007, mean \pm SD	5.5 \pm 3.4*	5.0 \pm 3.2	4.6 \pm 2.6
Decrease of >0.5 μ U/mL, %	63.3	45.0	39.7
Homeostasis model assessment ratio (HOMA-R)			
2006, mean \pm SD	2.1 \pm 1.2	1.4 \pm 0.7	1.1 \pm 0.7
2007, mean \pm SD	1.5 \pm 0.9**	1.2 \pm 0.8	1.1 \pm 0.8
Decrease of >0.5, % [#]	43.3	15.0	19.2

P < *.05, **.01, ***.001. Factors were compared between 2006 and 2007 (paired Student t-test).

P < *.01, †.001. Rates of people with improvement were compared between diabetes mellitus (DM), impaired glucose tolerance (IGT), and normal glucose tolerance (NGT) (chi-square test).

SD = standard deviation.

countries, because the numbers of poor people with DM are increasing, especially in developing countries, and treatment by medication is not always readily available.³⁻⁵

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INTELLIGENCE AND CAROTID ATHEROSCLEROSIS IN OLDER PEOPLE: CROSS-SECTIONAL STUDY

To the Editor: Children who score higher on tests of intelligence have a lower subsequent risk of coronary heart dis-

ease.^{1,2} One explanation may lie in observations linking higher intelligence in childhood with healthier behaviors and lower levels of some cardiovascular risk factors in adulthood.³⁻⁵ Such individuals may be less susceptible to atherosclerosis.

Intelligence differences measured in childhood tend to remain stable into old age.⁶ Crystallized intelligence is often assessed using vocabulary-based tests and shows little deterioration with aging. Fluid intelligence, often assessed using time-limited reasoning tests, ages like many physical abilities. At older ages, cognitive performance reflects not just peak ability earlier in life, but also the cumulative effects of disease processes. However, crystallized intelligence, being relatively resistant to the influences of age-related pathologies, provides an indicator of peak prior intelligence that is strongly correlated with intelligence in childhood.⁷ The relationship between crystallized and fluid intelligence and carotid atherosclerosis in older people was investigated.

The participants were 466 men and women aged 66 to 75 from Sheffield, United Kingdom. The North Sheffield Research Ethics Committee approved the study. Fluid intelligence was assessed using the Alice Heim 4 test, Part 1 (AH4), which consists of 65 reasoning items of increasing difficulty.⁸ Crystallized intelligence was assessed using the Mill Hill vocabulary scale's synonyms subtest, which assesses knowledge of word meaning.⁹ It consists of 33 words of increasing difficulty. Participants underwent a color duplex ultrasonographic examination of the carotid arteries with an HDI3000 high-resolution, real-time scanner (Advanced Technology Laboratories, Bothell, WA). The ultrasonographer examined the carotid arteries and the bifurcation and estimated the maximum degree of stenosis. Intima-media thickness (IMT) of the far wall was measured three times in the common carotid artery and twice in the internal carotid artery on both sides and a mean value calculated. Linear regression was used to examine the relationship between cognitive test scores and IMT, and logistic regression was used to examine the relationship between cognitive test scores and having carotid stenosis greater than 30%.

Men who scored higher on the Mill Hill test of crystallized intelligence had less carotid atherosclerosis as measured according to IMT and degree of stenosis (Table 1). For a standard deviation increase in Mill Hill score, IMT decreased 2.26 μm (95% confidence interval (CI) = 0.36-4.17) and the odds ratio for having carotid stenosis greater than 30% was 0.72 (95% CI = 0.56-0.93). Separate adjustment for education, vitamin C concentration, and cardiovascular risk factors attenuated the relationship between Mill Hill score and IMT. Adjustment only slightly affected the relationship between Mill Hill score and carotid stenosis. Relationships between scores on the AH4 test of fluid intelligence and markers of carotid atherosclerosis in men were in a similar direction but considerably weaker and nonsignificant (data not shown). In women, there were no significant associations with either test.

No previous study has examined the relationship between crystallized intelligence and carotid atherosclerosis. Because the effects of aging and disease affect this area of cognitive function little, if at all,⁷ scores on tests such as the Mill Hill provide an estimate of peak prior intelligence in older people. The findings of the current study suggest that higher preinorbital intelligence may protect men against atherogenesis. Associations were not found between fluid

COMMUNITY-DWELLING ELDERLY FALLERS IN JAPAN ARE OLDER, MORE DISABLED, AND MORE DEPRESSED THAN NONFALLERS

To the Editor: We read with interest the article published by Somadder et al.¹ The authors document a correlation between depressive symptoms and self-reported numbers of falls in older subjects attending a day hospital in the United Kingdom. They reported that there were no significant differences in age, comorbidities, or performance on activities of daily living (ADLs) between fallers and infrequent fallers in their small population. We reexamined this important issue in community-dwelling elderly people in Japan and found findings different from those of Somadder et al.

The study population consisted of 1,261 people aged 65 and older (men 529, women 732, mean age 75.4 ± 7.2) living in T town, Kochi Prefecture, Japan. Fallers were screened using self-reported questionnaires, along with additional tests of ADLs and subjective quality of life (QOL) for community-dwelling older people in 2006. The question "Do you have any history of a fall within the past year?" was used for detecting fallers. Subjects who answered yes to the question were considered to be fallers. For the assessment of basic ADLs, the scores for seven items (walking, ascending and descending stairs, feeding, dressing, using the toilet, bathing, and grooming) were summed using a rating

scale from 0 (completely dependent) to 3 (completely independent) to obtain a basic ADL score (0–21). For advanced ADLs, the Tokyo Metropolitan Institute of Gerontology index of competence rating scale of 0 to 13 was used.² This scale includes instrumental self-maintenance (0–5), intellectual activity (0–4), and social role (0–4). Five indicators of QOL (sense of subjective health, relationship with family, relationship with friends, financial satisfaction, and subjective happiness) were rated on a 100-mm visual analogue scale (worst QOL on the left end of the scale, best to the right).^{3,4} The 15-item Geriatric Depression Scale (GDS-15)⁵ was used for the assessment of depression; a score of 10 or more was considered to indicate depression. A fall risk index^{6,7} with a score ranging from 0 (low risk of fall) to 21 (high risk of fall) was added to those and used for the assessment of risk of falls. Statview version 5.0 (SAS Institute, Inc., Cary, NC) was used for calculating chi-square tests for categorical variables, unpaired *t*-test for continuous variables, and Spearman correlation (r_s) between number of falls and GDS-15 and between fall risk index and GDS-15.

The proportion of fallers was 31.6% in this population. Fallers were significantly older (76.9 vs 74.7) and had significantly lower scores for each item of the ADLs and QOLs than nonfallers, even after the adjustment for age (Table 1). The proportion of subjects with depression was significantly

Table 1. Comparison of Activities of Daily Living (ADLs), 15-Item Geriatric Depression Scale (GDS-15) and Quality of Life (QOL) Scores of Fallers and Nonfallers

Characteristic	Fallers n = 399 (31.6%)	Nonfallers n = 862 (68.4%)	P-Value
Age, mean \pm SD	76.9 \pm 7.5	74.7 \pm 6.9	<.001
Male, %	40.2	42.6	.40
Basic ADLs score, mean \pm SD	19.1 \pm 3.5	20.2 \pm 2.5	<.001
Tokyo Metropolitan Institute of Gerontology index of competence (range 0–13), mean \pm SD	9.3 \pm 3.8	10.7 \pm 3.2	<.001
Self-maintenance (range 0–5), mean \pm SD	4.0 \pm 1.6	4.4 \pm 1.3	<.001
Intellectual activity (range 0–4), mean \pm SD	2.7 \pm 1.3	3.2 \pm 1.1	<.001
Social role (range 0–4), mean \pm SD	2.8 \pm 1.4	3.2 \pm 1.2	<.001
GDS-15 score			
Mean \pm SD	6.5 \pm 4.1	4.3 \pm 3.7	<.001
> 10, %	26.8	11.6	<.001
Fall risk index (range 0–21), mean \pm SD	11.8 \pm 3.8	7.0 \pm 3.9	<.001
QOL score, mean \pm SD			
Sense of subjective health	47.7 \pm 21.8	56.7 \pm 20.9	<.001
Relationship with family	72.3 \pm 21.7	76.9 \pm 20.3	<.001
Relationship with friends	69.5 \pm 23.1	74.3 \pm 20.7	<.001
Financial satisfaction	43.8 \pm 24.9	51.2 \pm 23.8	<.001
Subjective happiness	54.8 \pm 22.0	62.0 \pm 21.5	<.001

Unpaired *t*-test for continuous variables, chi square test for categorical variables. Variables were adjusted for age when they were significantly correlated with age. SD = standard deviation.

higher in fallers (26.8% vs 11.6%, $P < .001$). Although only 59.6% of the fallers answered the numbers of falls, there was weak but significant correlation between number of falls and GDS-15 scores in those who had fallen ($r_s = 0.17$, $P = .002$). The mean fall risk index score was significantly higher in fallers than nonfallers, and there was significant correlation between fall risk index and GDS-15 ($r_s = 0.53$, $P < .001$) in fallers.

We confirmed the higher prevalence of depression in fallers than nonfallers, and there was a significant correlation between the number of falls and GDS-15, as Somadder et al. reported. However, unlike with the findings of Somadder et al., community-dwelling elderly fallers in Japan were significantly older and had lower quantitative ADL and QOL scores, as well as higher GDS-15 scores than nonfallers, even after adjustment for age.

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SUBJECTIVE SLEEP DISTURBANCES WERE CLOSELY ASSOCIATED WITH COMPREHENSIVE GERIATRIC FUNCTIONS IN DOSE-RESPONSIVE MANNER IN THE COMMUNITY-DWELLING ELDERLY PEOPLE IN JAPAN

To the Editor: Sleep disturbance and insomnia increase greatly with age. Because of its multifactorial origins, sleep disturbance should be regarded as a geriatric syndrome and a comprehensive geriatric assessment should be performed for its improvement.^{1,2} The association between sleep satisfaction and activities of daily living (ADLs), depression, and qualities of life (QOL) was assessed in community-dwelling elderly people in Japan. Elderly people with poor and moderate sleep satisfaction had lower comprehensive geriatric function (CGF) scores than those with good sleep satisfaction.

The study population consisted of 1,432 subjects aged 65 and older (male:female 594:838, mean age 75.6 ± 7.2) living in a rural Japanese town, Tosa, in Kochi prefecture. Sleep satisfaction was assessed using a self-reported questionnaire, and subjects were classified into three classes using a sleep satisfaction scale; each subject was asked, "Do you sleep well?" Possible answers were good, moderate, and poor. Seven basic ADL items (walking, ascending and descending stairs, feeding, dressing, using the toilet, bathing, grooming) were assessed, each on a 4-level scale, with 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 21.³ Higher-level daily activities were assessed using the Tokyo Metropolitan Institute of

from the final analysis. Participants were categorized as having received house calls based on their response to the following question: "In the last month how many times did you see a doctor in your home?" Participants who responded that they had at least one house call were labeled "House Call Group" and those with none were labeled "No House Call Group." The groups were compared on preselected demographic, functional, medical, and social measures. Descriptive statistics and Wilcoxon rank sum and chi-square tests were used. Statistical analysis was performed using SAS 9.1.3 (SAS Institute, Inc., Cary, NC).

RESULTS

The Table describes the two groups.

DISCUSSION

In a cross-section of community-dwelling older adults with disabilities, house call recipients were older and more likely not to be white, to live in large cities, to be Medicaid recipients, and to have more activity limitations than those who had not received house calls. This analysis has several limitations including its cross-sectional design, unadjusted comparisons, unweighted comparisons, and a probable underreporting of the prevalence of house calls because of the 1-month recall window. In spite of these limitations, the most significant general finding is unaffected; house calls are targeted to the most vulnerable elderly people. As healthcare organizations and policymakers consider how to address the healthcare needs of an aging population, they should recognize that house calls may be an important safety net service that helps highly vulnerable older adults remain in the community.

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IMPROVEMENT IN OBESITY AND GLUCOSE TOLERANCE IN ELDERLY PEOPLE AFTER LIFESTYLE CHANGES 1 YEAR AFTER AN ORAL GLUCOSE TOLERANCE TEST IN A RURAL AREA IN LAO PEOPLE'S DEMOCRATIC REPUBLIC

To the Editor: A high prevalence of diabetes mellitus (DM) and impaired glucose tolerance (IGT) was reported in a previous study in community-dwelling elderly people in a rural area of Lao People's Democratic Republic (PDR), a developing Southeast Asian country.¹ Prevention of DM has become an urgent issue, especially in developing countries, because the rate of increase of DM is much faster in developing countries than in developed ones.^{2,3} This study examined the effect of a lifestyle change intervention on glucose tolerance detected using a 75-g oral glucose tolerance test (OGTT) in community-dwelling elderly Laotians.

In 2005, OGTTs were conducted in 209 Laotians aged 60 and older to detect DM or IGT. The subjects lived in rural villages in the Lahanam and Paxon zones in Songkhon District in Savannakhet Province in Lao PDR.¹ None had ever been diagnosed with or treated for DM or IGT. Using the criteria of the World Health Organization, DM, IGT, and normal glucose tolerance (NGT) were determined based on OGTT. Seventy-two subjects were found to have DM, 45 IGT, and 92 NGT.¹ All 209 participants were individually informed of the significance of the OGTT in detecting early DM or IGT and of its prevention. The 117 subjects with DM or IGT were individually contacted, and changes in diet and exercise were recommended. One year later, in 2006, 73 subjects (25 with DM, 16 with IGT, and 32 with NGT) participated in a follow-up survey. Because seven subjects with DM or IGT had started taking medication for DM, 66 subjects were analyzed for the effects of the lifestyle-change intervention without medication. Body weight, height, fasting blood sugar (FBS), and fasting insulin were examined in the subjects in 2005 and in 2006. Body mass index (BMI) was calculated, and the prevalence of obese subjects (BMI ≥ 25) was compared between 2005 and 2006. A homeostasis model assessment ratio (HOMA-R) was calculated, and the prevalence of subjects with glucose intolerance (HOMA-R ≥ 2.5) was also compared. Body weight was analyzed using the same scale (Tanita Inc., Tokyo, Japan), and the same company analyzed blood chemistry (BML Inc., Saitama, Japan) in 2005 and 2006.

It was revealed in interviews that most of the subjects with DM and IGT were dieting or exercising in 2006 after the lifestyle change recommendations in 2005. As a result,

Table 1. Improvement of Obesity and Glucose Tolerance After Lifestyle Changes After Oral Glucose Tolerance Test

Glucose Tolerance	N	Body Mass Index ≥ 25		Homeostasis Model Assessment Ratio ≥ 2.5	
		2005	2006	2005	2006
Diabetes mellitus	19	21.1	5.3*	47.4	21.1*
Impaired glucose tolerance	15	26.7	13.3*	33.3	13.3
Normal glucose tolerance	32	18.8	12.5**	6.3	21.9

$P < .05$; ** .001.

The rates of obesity and glucose intolerance were compared between in 2005 and 2006 in each glucose tolerance group (chi-square test).

body weight in 2006 had significantly decreased from 2005 in all subjects with DM (from 53.1 to 49.8 kg), IGT (from 51.5 to 49.0 kg), and NGT (from 50.3 to 48.5 kg) ($P < .01$, $< .05$, $< .001$, respectively; paired Student *t*-test). The percentage of subjects with obesity (BMI ≥ 25) had significantly decreased in all subjects with DM (from 21.1% to 5.3%), IGT (from 26.7% to 13.3%), and even with NGT (from 18.8% to 12.5%) ($P < .05$, $< .05$, $< .001$, respectively; chi-square (χ^2) test) (Table 1).

The average FBS decreased in the subjects with DM (from 133.4 to 127.8 mg/dL) and IGT (from 99.0 to 94.1 mg/dL) and increased in those with NGT (from 88.9 to 96.5 mg/dL), but the differences were not statistically significant. The rate of subjects with decreases in FBS of more than 15 mg/dL after 1 year was significantly higher in those with DM (42.1%) than IGT (20.0%) or NGT (9.3%) (χ^2 test, $P < .05$).

The percentage of subjects with glucose intolerance (HOMA-R ≥ 2.5) had significantly decreased in subjects with DM (from 47.4% to 21.1%) (χ^2 test, $P < .05$). The percentage with glucose intolerance decreased in subjects with IGT (from 33.3% to 13.3%) and increased in those with NGT (from 6.3% to 21.9%), but the differences were not statistically significant (Table 1).

The study revealed improvements after 1 year in glucose tolerance as a result of health education for lifestyle changes combined with OGTT in community-dwelling elderly Laotians not taking antidiabetic medication, as in previous reports in Japan.^{4,5} In subjects with DM, obesity and glucose tolerance significantly improved. In subjects with IGT, obesity significantly improved and the rate of glucose intolerance decreased, but the difference failed to reach a statistical significance because of the small sample size. Even in subjects with NGT, obesity significantly decreased.

Prevention of DM using lifestyle changes combined with OGTT screening may be effective, especially for people in developing countries, where the number of poor people with DM is increasing and medication is not always readily available.⁶

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ORIGINAL ARTICLE: EPIDEMIOLOGY, CLINICAL PRACTICE AND HEALTH

Factors associated with carotid atherosclerosis in community-dwelling oldest elderly aged over 80 years

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Background: Hypertension, hyperlipidemia, impaired glucose tolerance and smoking have been known to be risk factors for atherosclerosis. Recently, it was shown that hyperhomocysteinemia is also a risk factor for cerebral vascular disease and atherosclerosis. However, it is unknown if these are also risk factors in the oldest elderly population aged 80 years or older. We carried out a cross-sectional analysis to determine the associated factors with carotid atherosclerosis in the oldest elderly living in the community.

Methods: Subjects consisted of 136 oldest elderly aged 80 years or older living in the community. Blood pressure, orthostatic change of blood pressure, blood chemical parameters, height and bodyweight, lifestyle and medical history were examined. The thickness was measured of the total carotid artery intima-media complex (IMT) by carotid artery ultrasonography and used the maximum thickness (max IMT) for analysis.

Results: The factors that correlated with max IMT were age and low γ -glutamyl transpeptidase in males, and serum homocysteine levels in females. The subjects were divided into two groups: those with a max IMT of less than 1.0 mm and those with that of 1.0 mm or more. Factors associated with max IMT were age and abstinence from alcohol in males, and orthostatic blood pressure change in females. Factors significantly associated with higher carotid artery IMT were aging in males and orthostatic blood pressure change in females.

Conclusion: The factors associated with carotid artery IMT as an indicator of carotid atherosclerosis in community-dwelling oldest elderly aged 80 years or older were sex, aging, orthostatic blood pressure change and no alcohol intake. There were differences in risk factors for carotid atherosclerosis between the male and female population.

Keywords: carotid artery, Kahoku town in Kochi, oldest elderly, orthostatic blood pressure change, ultrasonic tomography.

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Introduction

Aging, hypertension, hyperlipidemia, impaired glucose tolerance, hyperhomocysteinemia, obesity and smoking have been pointed out as risk factors for atherosclerosis.¹⁻³ However, as most of the subjects in these studies were middle-aged or younger elderly, it remains unclear whether they are also the risk factors for atherosclerosis in oldest elderly aged 80 years or older. For example, although hypertension is generally known to be one of the risk factors for atherosclerosis in the middle-aged population, there is a study that points out the possibility that mortality rate rather rises in the elderly with hypotension.⁴ In addition, though hyperlipidemia is one of the risk factors for ischemic heart disease and known to promote atherosclerosis, a longitudinal study in Japan showed that cognitive functions decline more rapidly in the elderly aged 75 years or older with lower serum cholesterol levels than those with higher serum cholesterol levels.⁵

In this study, we examined atherosclerosis of the carotid artery by ultrasonic tomography in the oldest elderly aged 80 years or older living in Kahoku, Kochi in Japan. The factors related to atherosclerosis of the elderly were analyzed using multiple regression analysis.

Carotid artery ultrasonic tomographic examination is a simple and noninvasive method. It is known that an increase of the intima-media complex in the carotid artery is one of the indicators of atherosclerosis in the early stages of the disease.¹ Investigations in middle-aged subjects showed that an increase of the intima-media complex, evaluated by carotid artery ultrasonic tomography, was related to the onset of cerebral vascular diseases and atherosclerotic heart diseases.^{6,9}

On the other hand, it is still unclear if the factors associated with subjects aged 80 years or older may be applied to those of middle-aged ones. Thus, in this cross-sectional study, we investigated carotid atherosclerosis in the oldest elderly living in the community by ultrasonic tomography. We assessed carotid atherosclerosis using the thickness of the carotid artery intima-media complex and associated factors such as lifestyle, blood pressure, and blood chemical analysis including serum homocysteine levels.

Methods

The study population consisted of 136 community-dwelling oldest elderly people (male:female, 53:83; mean age, 84 years old) aged 80 years or older living in Kahoku in Kochi Prefecture in 1998. Kahoku town had a population of 5810 with 603 people of 80 years or more. There were 489 eligible people that were informed and 136 people agreed to join the study and underwent a comprehensive check-up of geriatric func-

tion in the community health center (27.8% of eligible subjects) as part of the Kahoku Longitudinal Aging Study.^{10,11} Informed consent was obtained from these people. Physical examination, blood pressure measurement, blood chemistry analysis, an electrocardiogram, evaluation of cognitive and neurobehavioral functions and ultrasonography (SSA-340 A; Toshiba, Nasu, Japan) for carotid atherosclerosis were carried out. Two blood pressure measurements were carried out using an automatic sphygmomanometer (HEM 755C; Omron, Tokyo, Japan) while the subject was in a sitting, supine and then standing position, in this particular order, to examine the presence of orthostatic blood pressure change. The second measurement of blood pressure in the sitting position was used to define the high blood pressure group. The subjects were defined as having high blood pressure if their levels were 160 mmHg or more in the systolic phase, or 95 mmHg or more in the diastolic phase, or if they took antihypertensive drugs. Orthostatic change of blood pressure was defined as a systolic blood pressure (SBP) decline or increase of 20 mmHg or more after standing up from the supine position.

Blood chemical examination comprised assessment of total cholesterol, high-density lipoprotein (HDL) cholesterol, blood glucose, hemoglobin concentration, aspartate aminotransferase (AST), alanine aminotransferase (ALT), γ -glutamyl transpeptidase (γ -GTP), urea nitrogen, creatinine, total protein, albumin and homocysteine levels in non-fasting conditions. HbA1c was assessed when the blood glucose level was more than 110 mg/dL. The impaired glucose tolerance group was defined as having a blood glucose value of 200 mg/dL or more or HbA1c over 6.5%, or with a medical history of diabetes mellitus. Age, blood pressure values and blood chemical results were analyzed for an association with atherosclerosis evaluated by carotid artery ultrasonic tomography. In addition, body mass index (BMI), current smoking habits or alcohol consumption, medical history of cerebral infarction and ischemic heart disease were also analyzed.

Thickness of the intima-media complex was used as an indicator of carotid atherosclerosis. The thickness of the carotid artery intima-media complex, 1-cm proximal to the common carotid artery bulb in the long axial direction, was measured. The detection limit was 0.1 mm. Three different longitudinal views (anterior oblique, lateral, and posterior oblique) and transverse views of both carotid arteries were obtained. From the views, the thickness was measured from three directions bilaterally and a maximum of six measurements were used.¹²

Continuous variables are shown as mean (standard error). The SAS program was used to analyze the data, subdivided into male and female (SAS Institute, Cary, NC, USA). For comparison of categorical variables,

χ^2 calibration was used. For comparison of means, the general linear model was used. For multivariate analysis, the logistic regression analysis was used. A *P*-value of <0.05 was considered to be statistically significant.

Results

Table 1 shows the average of each variable according to the male and female categories. The mean age of the males was significantly higher than that of the females. The mean SBP in females was significantly higher than that in males, and there was no significant difference between the mean diastolic blood pressure (DBP) between both sexes. There was also no significant difference in the orthostatically changed blood pressure between both sexes. Both serum total cholesterol and HDL cholesterol levels were significantly higher in females than in males. AST, ALT, γ -GTP, creatinine and hemoglobin concentrations were significantly higher in males than in females. Of particular note is that γ -GTP was remarkably higher in males than in females, perhaps due to alcohol consumption. Serum homocysteine levels were significantly higher in males than in females. There were no significant differences in serum blood urea nitrogen (BUN), total protein, albumin, and BMI between both sexes. The average maximum thickness of the carotid artery intima-media complex (max IMT) was significantly higher in males than in females.

With a mean thickness plus standard deviation of 1.0 mm, subjects were classified into two groups according to their max IMT value: (i) increased IMT group with an IMT of 1.0 mm or more; and (ii) non-increased IMT group with an IMT of less than 1.0 mm. Table 2 shows the comparison of max IMT between the two IMT groups by sex difference. The mean age of the non-increased IMT group was significantly younger than that of the other group in males. There was no significant difference in mean age between the females in both the groups. There were no significant differences in SBP, DBP, orthostatic change of blood pressure, BMI and blood parameters between both the IMT groups for both sexes. However, in females, homocysteine levels were significantly higher in the increased IMT group than in the non-increased IMT group after the adjustment for the effect of age.

Table 3 shows the comparison of medical history and background factors between the increased IMT group and the non-increased IMT group according to gender difference. The rate of male subjects who were drinking alcohol every day was significantly higher in the non-increased IMT group than in the other group. The rate of female subjects with an orthostatic blood pressure change of 20 mmHg or more was significantly higher in the increased IMT group than in the other group. There was no significant difference in the other factors between the two groups.

Table 1 Baseline characteristics of the subjects used in this study

	Male (<i>n</i> = 53)		Female (<i>n</i> = 84)		<i>P</i>
	Mean	(SE)	Mean	(SE)	
Age	84.6	(0.5)	82.9	(0.4)	0.01
Body mass index	22.0	(0.5)	22.7	(0.4)	ns
Systolic blood pressure	137.6	(2.8)	146.4	(2.2)	<0.05
Diastolic blood pressure	74.6	(1.7)	78.7	(1.3)	ns
Orthostatic change of blood pressure	10.8	(1.5)	12.8	(0.2)	ns
Blood chemical findings					
Total cholesterol (mg/dL)	174.0	(4.3)	198.6	(3.4)	<0.01
HDL cholesterol (mg/dL)	49.4	(2.0)	54.6	(1.6)	<0.05
AST (IU/L)	24.7	(0.8)	22.3	(0.7)	<0.05
ALT (IU/L)	17.8	(0.9)	14.2	(0.8)	<0.01
γ -GTP (IU/L)	32.5	(3.7)	12.2	(2.9)	<0.01
BUN (mg/dL)	20.4	(0.7)	19.8	(0.6)	ns
Creatinine (mg/dL)	0.89	(0.04)	0.76	(0.03)	<0.01
Hemoglobin (g/dL)	13.0	(0.2)	11.8	(0.1)	<0.01
Total protein (g/dL)	7.4	(0.1)	7.5	(0.1)	ns
Albumin (g/dL)	4.2	(0.0)	4.2	(0.0)	ns
Homocysteine (nmol/mL)	12.8	(0.6)	10.8	(0.5)	<0.05
max IMT (mm)	0.97	(0.02)	0.90	(0.01)	<0.01

ALT, alanine aminotransferase; AST, aspartate aminotransferase; BUN, blood urea nitrogen; γ -GTP, γ -glutamyl transpeptidase; HDL, high-density lipoprotein; max IMT, max intima-media thickness; ns, not significant; SE, standard error.

Table 2 Comparison of each variable between the group divided by intima-media thickness (max)

	Male				P	Female				
	max IMT < 1.0		max IMT ≥ 1.0			max IMT < 1.0		max IMT ≥ 1.0		P
	Mean	(SE)	Mean	(SE)		Mean	(SE)	Mean	(SE)	
Age	82.6	(0.75)	85.8	(0.63)	<0.01	82.9	(0.45)	82.7	(0.69)	
Body mass index	22.3	(0.64)	21.4	(0.54)	ns	22.8	(0.49)	22.7	(0.74)	ns
Systolic blood pressure	136.2	(4.79)	139.8	(4.00)	ns	145.1	(2.51)	148.7	(3.79)	ns
Diastolic blood pressure	74.1	(2.72)	76.4	(2.27)	ns	77.9	(1.61)	78.7	(2.43)	ns
Orthostatic change of blood pressure	10.0	(2.07)	11.4	(1.73)	ns	11.8	(1.60)	14.6	(2.41)	ns
Blood chemical findings										
Total cholesterol	170.2	(6.66)	176.8	(5.58)	ns	199.7	(4.27)	202.3	(6.40)	ns
HDL cholesterol	47.1	(2.84)	50.5	(2.38)	ns	55.2	(2.05)	53.6	(3.07)	ns
Hemoglobin	13.1	(0.34)	12.9	(0.28)	ns	12	(0.16)	11.7	(0.24)	ns
Total protein	7.5	(0.09)	7.4	(0.08)	ns	7.5	(0.06)	7.3	(0.10)	ns
Albumin	4.2	(0.058)	4.13	(0.048)	ns	4.22	(0.039)	4.22	(0.059)	ns
AST	25.3	(1.73)	24.2	(1.45)	ns	22.4	(0.63)	22.3	(0.94)	ns
ALT	20	(2.046)	15.7	(1.71)	ns	14.4	(0.67)	14.8	(0.998)	ns
γ-GTP	36.3	(9.52)	28.4	(7.97)	ns	13.9	(0.72)	11.4	(1.08)	ns
Creatinine	0.92	(0.059)	0.9	(0.049)	ns	0.71	(0.034)	0.8	(0.051)	ns
BUN	19.3	(1.18)	21.7	(0.99)	ns	19.79	(0.66)	19.46	(0.99)	ns
Homocysteine	14.9	(1.28)	11.8	(1.07)	ns	10.1	(0.47)	11.8	(0.71)	<0.05*

*After adjustment for age.

Table 3 Comparison of the frequency of each factor with the level of max IMT

	Male				P	Female				
	max IMT < 1.0		max IMT ≥ 1.0			max IMT < 1.0		max IMT ≥ 1.0		P
	n	(%)	n	(%)		n	(%)	n	(%)	
Blood pressure of ≥160/95 mmHg or medication	10	(47.6%)	15	(46.9%)	ns	40	(70.2%)	17	(65.4%)	
Orthostatic change of blood pressure ≥20 mmHg	3	(14.3%)	4	(12.5%)	ns	8	(13.8%)	10	(38.5%)	<0.05
Impaired glucose tolerance	1	(4.8%)	1	(3.1%)	ns	7	(12.1%)	0	(0.0%)	ns
Body mass index ≥25	5	(23.8%)	4	(12.5%)	ns	14	(24.1%)	6	(23.1%)	ns
Smoking habit	5	(23.8%)	5	(16.1%)	ns	0	(0.0%)	0	(0.0%)	ns
Alcohol intake	10	(47.6%)	6	(18.8%)	<0.05	1	(2.0%)	0	(0.0%)	ns
History of cerebral infarction	1	(4.8%)	2	(6.3%)	ns	5	(8.6%)	1	(3.8%)	ns
History of ischemic heart disease	1	(4.8%)	0	(0.0%)	ns	4	(6.9%)	1	(3.8%)	ns

Spearman's correlation analysis between each variable and the max IMT of the carotid artery were analyzed. There was a positive correlation between age and max IMT in males ($r = 0.44$), but there was no correlation in females. The analysis of all other variables was adjusted by age. There was a negative correlation between γ -GTP levels and max IMT ($r = 0.30$) in males, but not in females. Max IMT was also significantly correlated with serum homocysteine levels ($r = 0.29$) in the female group, but there was no significant correlation in the male group.

Table 4 shows the association of each variable with increased IMT by univariate logistic analysis. In males, factors that were associated with increased IMT were aging, and not daily alcohol consumption. In contrast, in females, orthostatic change of blood pressure was significantly associated with increased IMT.

Table 5 shows odds ratios with significance for increased IMT in multiple logistic regression models. In males, only aging was independently associated with increased IMT. On the other hand, presence of

Table 4 Association with max IMT according to sex

	Monovariate logistic analysis		
	Odds ratio	95% CI	P
Male			
Age	1.32	1.09–1.61	<0.01
Hypertension	1.18	0.38–3.63	ns
Smoking habit	0.51	0.12–2.20	ns
Total cholesterol	1.01	0.99–1.03	ns
HDL cholesterol	1.02	0.98–1.07	ns
γ -GTP	1.00	0.98–1.01	ns
Orthostatic change of blood pressure ≥ 20 mmHg	0.92	0.18–4.63	ns
Body mass index	0.51	0.12–2.20	ns
Alcohol intake	0.22	0.06–0.80	<0.05
Homocysteine	0.90	0.79–1.03	ns
Hx of cerebral infarction	1.43	0.12–16.9	ns
Female			
Age	0.98	0.85–1.13	ns
Hypertension	0.71	0.26–1.94	ns
Total cholesterol	1.00	0.99–1.02	ns
HDL cholesterol	0.99	0.96–1.03	ns
Orthostatic change of blood pressure ≥ 20 mmHg	3.45	1.14–10.4	<0.05
Body mass index	1.07	0.35–3.23	ns
Homocysteine	1.14	0.99–1.31	ns
Hx of cerebral infarction	0.43	0.05–3.91	ns
Hx of ischemic heart disease	0.55	0.06–5.21	ns

95% CI, 95% confidence interval; Hx, history of.

orthostatic change of blood pressure was independently associated with increased IMT in females.

When age and sex were added as an explanation variable in multiple logistic analysis in both sexes, the presence of orthostatic change of blood pressure and no daily alcohol consumption were independently associated with increase of IMT in males.

Discussion

In this study, the association between carotid atherosclerosis and risk factors, verified in the middle-aged or younger elderly population, was examined in community-dwelling oldest subjects aged 80 years or older. These subjects covered 27.8% of the eligible community-dwelling old people over 80 years who were relatively healthy without severe disability. The prevalence of a history of cerebral infarction was 6.6% and that of ischemic heart disease was 4.4%. The frequency of carotid atherosclerosis is known to be different between males and females,¹³ and there is a difference in the contribution of each risk factor level to carotid atherosclerosis between males and females, especially in the oldest group.³ Taking this into account, we divided our subjects into two gender groups for the analyses.

Generally, in middle-aged people, it is known that aging, hypertension and orthostatic change of blood pressure, hyperlipidemia, glucose intolerance, obesity, smoking habit, alcohol consumption and hyperhomocysteinemia are risk factors for arteriosclerosis. However, in this study, which investigated community-dwelling oldest elderly people aged 80 years or older, the only independent associated factor that showed an increase of carotid artery IMT as an indicator of carotid atherosclerosis in males was aging.

It is suggested in this study that the risk factors other than aging do not have a large influence on progression of arteriosclerosis in the oldest old population, because many old males with those risk factors might have already died before they were 80 years old.

In females, on the other hand, the presence of orthostatic change of blood pressure was independently associated with an increased IMT of the carotid artery. There are some cross-sectional and longitudinal studies showing that orthostatic hypotension and hypertension are the important risk factors for cerebral infarction and ischemic heart disease.^{14–17} Orthostatic change of blood pressure was independently associated with an increase of IMT of the carotid artery, especially in females. As orthostatic change of blood pressure was shown to be

Table 5 Association with max IMT according to sex

	Multivariate logistic analysis		
	Odds ratio	95% CI	P
Male			
Age	1.48	1.09-2.00	<0.05
Hypertension	1.88	0.34-10.37	ns
Smoking habit	0.89	0.10-8.19	ns
Total cholesterol	1.01	0.98-1.04	ns
HDL cholesterol	1.04	0.97-1.11	ns
γ -GTP	1.01	0.99-1.03	ns
Orthostatic change of blood pressure ≥ 20 mmHg	0.32	0.03-3.26	ns
Body mass index	0.61	0.08-4.87	ns
Alcohol intake	0.17	0.02-1.32	ns
Homocysteine	0.89	0.71-1.11	ns
Hx of cerebral infarction	0.63	0.02-18.20	ns
Female			
Age	0.92	0.77-1.10	ns
Hypertension	0.55	0.17-1.78	ns
Total cholesterol	1.01	0.99-1.02	ns
HDL cholesterol	1.01	0.98-1.05	ns
Orthostatic change of blood pressure ≥ 20 mmHg	8.34	2.12-32.85	<0.005
Body mass index	0.69	0.18-2.58	ns
Homocysteine	1.17	0.99-1.39	<0.1
Hx of cerebral infarction	0.23	0.02-2.97	ns
Hx of ischemic heart disease	1.46	0.12-17.39	ns

one of the risk factors of atherosclerotic diseases in previous longitudinal studies,^{8,9} orthostatic change in blood pressure might be a better indicator of atherosclerosis than blood pressure levels themselves, which is easily modified by antihypertensive medication in the oldest elderly.

In general, it is known that high serum homocysteine levels are associated with carotid artery stenosis and with the severity of carotid artery lesions by ultrasonic tomographic examination.³ An effect of homocysteine on platelet aggregation ability, fibrinolysis system, arterial endothelial cell disorder has been reported in vascular disorders, but its mechanism has not yet been clarified.¹⁸⁻²⁰ It is also known that hyperhomocysteinemia is one of the risk factors of atherosclerosis in addition to thromboembolism. This cross-sectional study supported the significant association between serum homocysteine levels and carotid arteriosclerosis in the oldest female population.

There are some reports that a small amount of alcohol consumption prevents atherosclerosis.^{9,21} This study also revealed a negative association between alcohol consumption and IMT in the oldest male population.

In male elderly subjects aged 80 years or older, only aging was associated with arteriosclerosis, while ortho-

static change of blood pressure was associated with an increase of IMT in the oldest female subjects. In general, progression of atherosclerosis is known to be slower in females than in males, and female subjects live longer than male subjects. Max IMT was also significantly lower in females than in males in this study. These results suggested that various risk factors are associated with atherosclerosis even in very old females. While in males, because of a more rapid progression of atherosclerosis, those who survived to more than 80 years old might have already been selected as extremely healthy ones and they might have been influenced to a lesser extent by various risk factors compared with females. This difference might be due to the influence of female hormones.^{22,23} Estrogen has the effect of delaying atherosclerosis and it may be related to lipids.

Homma *et al.* examined the IMT and plaques in the carotid artery in subjects aged from young to over 100 years old. They reported that IMT size became greater with aging, but the numbers of plaques only increased with aging until 100 years, and after that, plaques decreased with aging.²⁴ In this study, IMT was associated with aging in males, while that was not demonstrated in females (Table 4).

A different association between risk factors and atherosclerosis may exist in oldest elderly subjects compared with younger people.

Although there were some study limitations, such as it being a cross-sectional study and having a small number of subjects, this study revealed gender differences in association with risk factors and carotid atherosclerosis by ultrasonic tomography.

In conclusion, the factors associated with carotid atherosclerosis in community-dwelling oldest elderly aged 80 years or older were sex, orthostatic change of blood pressure and alcohol intake. To determine definite risk factors for carotid atherosclerosis, further longitudinal studies including oldest elderly subjects will be needed.

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LETTER TO THE EDITOR

Community-dwelling elderly with chewing difficulties are more disabled, depressed and have lower quality of life scores

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Dear Editor,

Since 2006, the Japanese Ministry of Health, Welfare and Labor has recommended to screen swallowing and chewing abilities with the community-based comprehensive health-check examination to prevent disability of the elderly population. However, nationwide data of the actual condition of chewing disability in the community-dwelling elderly in Japan remains to be collected and be put in order. To address this important issue in a cross-sectional study in a community in Japan, we analyzed prevalence of elderly subjects with chewing difficulty associated with comprehensive geriatric assessment.

The study population consisted of 877 people aged 65 years and older (309 men, 568 women; mean age, 75.6 years; standard deviation, 6.7) living in Tosa, Kochi Prefecture, Japan (the response rate of questionnaire was 59.3% and the complete answering rate was 50.0% of the eligible population in the town). Using self-reported questionnaires, chewing difficulty was screened along with additional assessment of activities of daily living (ADL), depression and subjective quality of life (QOL) in community-dwelling elderly subjects in 2007. Each elderly subject was asked, "In the past 6 months, do you feel chewing difficulty when you eat hard foods?" to identify the deterioration in chewing ability on a yes/no basis.

For the assessment of basic ADL, the scores for seven items (walking, ascending and descending stairs, feeding, dressing, using the toilet, bathing, and grooming) were summed using a rating scale from 3 to 0 (3, completely independent; 2, need some help; 1, need help much; 0, completely dependent)

into a basic ADL score (0-21).¹ For assessing higher-level ADL, each subject rated his/her independence in the Tokyo Metropolitan Institute of Gerontology Index of Competence (TMIG-IC).² This assessment consists of a 13-item index including three sublevels of competence: instrumental self-maintenance (0-5), intellectual activity (0-4) and social role (0-4). We screened for depressive symptoms using the Japanese version of the 15-item Geriatric Depression Scale (GDS-15).³ Quantitative QOL were assessed using a 100 mm visual analog scale (worst QOL on the left end of the scale, best on the right) in the following five items: subjective sense of health, relationship with family, relationship with friends, financial satisfaction and subjective happiness.^{4,5} SPSS statistical software package ver. 16.0 (SPSS, Chicago, IL, USA) was used for statistical analysis with a significance of $P < 0.05$.

Table 1 shows the comparison of scores in ADL, GDS-15 and subjective QOL between elderly subjects with and without chewing difficulty. The proportion of elderly who had chewing difficulty was 35.2% in this population. The elderly subjects with chewing difficulty were significantly older than those without chewing difficulty (77.5 vs 75.5 years). Mean scores in each ADL were significantly lower in the elderly with chewing difficulty than those without chewing difficulty after the adjustment for the effect of age. Mean score in GDS 15 was significantly higher and subjective QOL were lower in the elderly with chewing difficulty than those without. A significantly close association between chewing difficulty and ADL were consistent even after the adjustment for the effect of depression in multiple logistic regression analysis.

Table 1 Comparison of activities of daily living, 15-Item Geriatric Depression Scale and quality of life between elderly with and without chewing difficulties

Chewing difficulties	With n = 309 (35.2%)	Without n = 568 (64.8%)	P-value
Age, mean \pm SD	77.5 \pm 6.9	75.5 \pm 6.7	<0.001
Sex (male/female)	106/138	197/274	NS
ADL, mean \pm SD			
Basic ADL score (range, 0-21)	18.9 \pm 4.4	20.4 \pm 1.6	<0.001*
TMIG-IC (range, 0-13)	9.4 \pm 4.0	10.9 \pm 2.7	<0.001*
Self-maintenance (range, 0-5)	3.9 \pm 1.8	4.5 \pm 1.1	<0.001*
Intellectual activity (range, 0-4)	2.7 \pm 1.3	3.1 \pm 1.1	<0.001*
Social role (range, 0-4)	2.8 \pm 1.4	3.3 \pm 1.1	<0.001*
Depression, mean \pm SD			
GDS-15 score (range, 0-15)	6.2 \pm 4.1	4.3 \pm 3.6	<0.001
QOL, mean \pm SD			
Sense of subjective health (range, 0-100)	46.3 \pm 22.8	57.1 \pm 20.8	<0.001
Relationship with family (range, 0-100)	70.2 \pm 24.8	70.7 \pm 20.3	<0.001
Relationship with friends (range, 0-100)	67.9 \pm 25.9	77.5 \pm 19.8	<0.001
Financial satisfaction (range, 0-100)	47.3 \pm 24.6	49.9 \pm 23.0	NS
Subjective happiness (range, 0-100)	55.4 \pm 24.1	61.6 \pm 21.3	<0.001

P-values were analyzed by Student's *t*-test. *After adjustment for the effect of age. ADL, activities of daily living; GDS-15, 15-Item Geriatric Depression Scale; NS, not significant; QOL, quality of life; SD, standard deviation; TMIG-IC, Tokyo Metropolitan Institute of Gerontology Index of Competence.

Our study revealed high prevalence of community-dwelling elderly who had chewing difficulty and also revealed the close association between chewing difficulty and ADL, depression and subjective QOL. Chewing ability is supposed to affect people's food selection.⁶ Thus, these findings are considered to be particularly important for older people relevant to an influence on their nutritional states. Some previous studies show the relation between chewing ability and general health⁷ and even mortality.^{8,9} Although this study was based on a self-rated questionnaire, subjective chewing difficulty might be a very important indicator as Gordon *et al.* suggested that this might be a more reliable indicator than the quality of dentition itself.¹⁰ The definition of "hard food" can be different among various foods and among several kinds of cooked conditions such as raw or boiled.¹¹ However, a subjective indicator could be useful, because it is supposed that how the hardness of foods is felt may differ from person to person in community-living elderly people.

In conclusion, community-dwelling elderly with chewing difficulties are more disabled, depressed and have lower QOL than those without. These findings suggest that, in considering the strategy for treatable subjects with chewing difficulties in the community, family physicians, dentists and care workers should be more aware that approximately 35% of community-dwelling elderly people have chewing difficulties deeply

associated with lower ADL and QOL in the elderly population.

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第49回日本老年医学会学術集会記録

〈若手企画シンポジウム1：地域高齢者の今：高齢者を対象とした疫学研究より〉

2. 高知県香北町研究—老年医学的総合機能評価

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2. 高知県香北町研究—老年医学的総合機能評価

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Key words: 香北町研究, CGA, 地域在住高齢者, フィールド医学

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はじめに

老年医学的総合機能評価 (CGA) という概念は、今や、老年医学の世界ではコモンセンスとなっている。英国のウォーレンが提唱し、1980年代後半の米国で有効性が実証されたCGAを日本でいち早く取り入れたのは高知医大老年病科 (当時、小澤利男教授主宰) であった。病院医学のみでは完結しない高齢者の医学的問題をさぐり、予防的介入を目的として、1990年、高知医大老年病科のグループは、高知県香美郡香北町を対象としてフィールド医学研究を開始した。当時、人口約6千人の香北町における65歳以上の高齢者人口は29%であり、全国平均の12%、高知県全体の16%に比して有数の高齢化率であった。人口構成だけをみると21世紀中葉の日本全体のモデルともいえた。高齢者の「健康度」を、精神・身体面、社会的関連の中で客観的に評価し、毎年、追跡することにより、高齢者の健康度を疎外する要因は何か、あるいは、健康維持に寄与する要因は何か、を明らかにして、加齢にともなう能力の衰退を予防してゆくことが、本計画の目的であった。このような老年医学的悉皆地域研究は、国際的にも、また国内的にも初めての試みであった。

この地域介入フィールド医学研究は、本邦地域在住高齢者に関する多くの知見をもたらした^{1)~10)}。本研究は、町村合併によって香北町が歴史を閉じる2006年まで、ほぼ17年間にわたって継続され、そのコンセプトは、2000年に導入された介護保険の制度設計の重要な柱となった。著者は、当初から本計画に参画し、2000年に高知を離任するまでの10年間、本計画の実務を担当し

た。香北町から得られた老年医学的知見は、すでに、論文や本学会でも多数報告している。ここでは、香北町フィールド研究を通じて、著者が学んだコンセプトについて私見を述べてみたいと思う。

「病氣」と「老化」

「病氣」をあらわす英語には、語感を異にする3つの概念がある。Disease, Illness, Sicknessである。

Disease (疾病) という語は、人間になんらかの症状をきたす原因が何で、どのようなメカニズムによって、その異状がもたらされたのか、どう対処すれば科学的に適切か、といった近代科学にもとづいた原因志向的概念ともいえる。

一方、Illness (やまい) という語は、疾病の結果として患者が体験する苦痛、自覚症状、不安など、患者の主観的体験のありようを重視する概念である。患者が癒しを求めるのは、Diseaseではなく、むしろIllnessである場合が多い。Diseaseは根治したがIllnessは緩解していない、ということもあり、逆にDiseaseは根治できないが、Illnessについては癒された、ということを高年齢医療の現場では、さまざまに経験する。

Diseaseを解きあかさそうとする近代医学の論理は、客観性、再現性、普遍性といった、いわゆる科学的根拠に基づいた優れた利点はある。しかし、個人のそれぞれに異なる価値観に応じた要請には十分に答えられないという冷徹な欠点をもまた併せもっている。それに対して、Illnessを重視する立場は、経験則にもとづくものであるゆえに科学的ではない反面、個人の体型や反応、情感を非常に重んじるという暖かさをもっている。個人の症状の違いにより薬剤や治療法を工夫して調合する伝統医学もしくは代替医療は、個人の特性と価値観を重視するという点で、DiseaseよりもIllnessを問題にしている。21世紀、高齢者医療の現場では、個人々の要請にこた

Kahoku longitudinal aging study (KLAS) based on comprehensive geriatric assessment (CGA)

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える医療が再度重んじられるようになり、オーダーメイド医療を含む近代西洋医療と代替・伝統医療を必要に応じて組み合わせた「統合医療」がより主流となると考えられる。

第3の病気の概念は、Sickness (病的状態) という語であらわされる。Sickness という語感、Illness や Disease が「正常ならざるもの」、「善からぬ状態」、「異状」として社会化された概念であろう。近代医学の発展は、患者の苦痛をとまわず社会も病氣とはとらえていなかった状態から、さまざまな「病的状態」を発見し、社会化してきた。高血圧、高コレステロール血症など、将来の心血管事故の発生を統計確率的に高めるリスク因子は、Disease ではあるかもしれないが医師から知らされない限り Illness ではなかった。しかし、医師からその存在を指摘されて以降は、Disease、Sickness と自覚するようになる。高齢者の初期認知症の認定など、病気の診断を確定すること自体が、その病気を社会化することにつながる難しい問題である。

医療者はともすればこの Disease、Illness、Sickness を一元的に解釈しがちで、科学的前提で疾病の原因解明とその治療に重きをおく傾向があるが、本当に患者が求めているのは Illness の緩解であり、Sickness からの復権であろう。以上の疾病の三つの概念に加えて老年医学で最重要な課題が「老化」である。

多くの老人が訴える慢性的な身体症状は、従来、それは宿命的な老化のためであると考えられ、ながらく医学の主要な対象とはみなされてこなかった。しかし、高齢患者の増加と医学の進展によって、医学は高齢者の慢性疾患というあらたな課題に直面するようになった。高齢者がしばしば訴える慢性的な症状は、はたして宿命的な「老化現象」なのか、あるいは治療可能な「疾病」であるのか、という困難な問題である。臨床家による長い苦闘と試行錯誤のすえ、高齢者の医学的問題は、従来の医学的視点からでは必ずしも捉えきることができないことが認識されるようになってきた。ここに、「老年医学」が誕生する消息がある。

老年医学のアイデンティティー細分化の再統合

「臨床医学」とはその名のとおりに、ベッドサイドで、病める患者の疾病を診断し、その治療を行うことを本来の使命としてきた。近代医学の発展とともに、疾患は臓器別、システム別に細分化され、さらに各臓器別の分野でも、臓器から細胞へ、細胞から遺伝子へとレベルのうえからもマイクロ化して、現在めざましい発展を遂げている。生命現象のありさまを追求する生命科学の最先端に

おいても、そこで操作される生命は、試験管のなかでの生命である。これらの先端医療は、これまで急性期疾患患者の救命や治療に多大な貢献をなしてきた。急性期疾患の救命率は飛躍的に増大し、その結果として、日本はかつて人類史上類をみない速度で平均寿命を延ばし、今日では世界一の長寿国となった。しかし、著しい寿命の延長と超高齢化は必然的に、虚弱高齢者 (frail elderly) や要介護者をもたらし、これらの多臓器に慢性疾患をかかえながら地域で生活している高齢者に対する医学的対応のありかたが老年医学に問われている。慢性疾患が急性疾患と異なる点は、主要な次元が生死よりもむしろ、患者自身の苦痛、能力の障害、社会的ハンディキャップというように、簡単に測定することが困難で、しかも患者自身にしかわからない問題を抱えていることである。医療技術が高度に発達した現在においても、患者の苦痛、能力の障害、ハンディキャップを正確に測定する医学検査は乏しい。香北町研究が始まって10年余、今では、高齢者の「能力障害」を評価し、障害を可能な限り改善あるいは予防することが重要であるという概念は定着した。老年医学が、医学的問題を細分化した臓器の病変に還元することなく、老人という一個の個体のありかたとして再認識せねばならないこともよく理解されるようになった。しかし、包括的、全人的医療の必要性が叫ばれて久しいものの、臓器専門科別に組織されている病院の制度内では、統合的診療の実践は容易ではない。医学が高度に専門分化した結果、医師はその専門の臓器病変のみに関心を集め、それ以外の問題を顧みる余裕がないのが実情でもあろう。その患者がどういうふうにも暮らしており、どんな仲間や家族がいてどんなものを食べ、日常生活の上でどんな課題を抱えているのか、こういった問題は大病院中心の医療ではほとんどわかりにくい。病院から患者が生活している地域へでゆくフィールド医学の基本的姿勢は、医学の細分化ではなくその統合をめざすひとつの試みである。

医療、医学研究における生態学的視点

かつて、生物学は「死物」の研究でもあった。動物にせよ植物にせよ標本を採取して分類するとき、その生物はすでに生きてはいない。うす暗い研究室に整然と並べられた標本箱…。このような、古典的生物学にあきたりず、自然の中でのあるがままの生き物の世界を描きだそうと考えた一群の研究者たちによって、「生態学」という学問が創始された。

医学についても同様のことがいえる。かつて病氣は、病院を訪れた患者さんを中心に、病院や研究室の中だけ

で考究されていた。しかし、病院を訪れる患者はあくまで仮の姿である。とくに、種々の慢性疾患をかかえた高齢者のほんとうの姿は、あくまで生活の場である家庭や地域にある。人の疾病や加齢のありさまは、自然環境の違いによって影響を受けるとともに、時代や文明環境によっても影響される。したがって、ありのままの高齢者の医学的問題をひろい上げようとするならば、医療スタッフのほうが地域にでていって、さまざまな自然環境、文化的背景のなかで暮らす、高齢者の姿をとらえなければならぬ。病院から地域にでてゆく「香北町研究」のようなフィールド医学の原点のひとつはこのような消息によっている。

おわりに

私たちが、香北町を起点にアジアの多くのフィールドで感ずることは、人の老いには、たとえそれがいつの時代、どのような場所での老いかたであっても、そこには普遍的な人類悠長の時間の流れが刻まれており、生態系の多様性のなかで人々が生に“意味”をもたせるためにつくりあげた文化という価値観が凝縮しているということである。人々はそれぞれ異なる固有の自然環境と歴史・文化背景に囲まれたある地域に、故あって生まれ成長し、老化して生を終える。個々人それぞれ異なる生老病死は多様である。しかし、人々は、決して不老不死を求めているのではない。人生における痛み、苦痛、不安の緩解を望み、年老いてからの生活機能障害を避けたいと願い、苦しいみじめな死を恐れているのである。アジアの熱帯では、慢性のマラリアに罹患した子供たちが楽しそうに遊びまわり、多くの人々は還暦をむかえる前に従容として家族に囲まれて死んでゆく。先進諸国では、高齢者が迎える尊厳ある死とは何か、Quality of Death (死にかたの質) が真剣に討議されている。生命の延長ではなく、生命の質を老年医学は重視する。そして有限である生命の質を最終的に決定するのは、人間の究極的価値観としての哲学である可能性が高い。

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