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Dietary habits and risk of ossification of the posterior longitudinal ligaments of the spine (OPLL); findings from a case-control study in Japan

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Abstract The relation between dietary habits and the risk of ossification of the posterior longitudinal ligaments of the spine (OPLL) was investigated in a case-control study conducted in Japan from 1998 to 2001. Prevalent OPLL cases ($n = 69$) were identified and individually matched by age and sex with community controls ($n = 138$) randomly selected from the general population in Hokkaido. A self-administered food-frequency questionnaire was used to assess habitual dietary intake. The odds ratio (OR) and its 95% confidence interval (CI) were estimated, using conditional logistic regression models to compute the OR adjusted for a history of diabetes mellitus. We found that frequent consumption of pickles (salted products) was significantly associated with an increased risk of OPLL, with an adjusted OR of 1.6 (95% CI, 1.1 to 2.2). The adjusted OR for nondaily consumers of rice was 3.0 (95% CI, 2.4 to 3.7). Frequent consumption of chicken (adjusted OR, 0.5; 95% CI, 0.3 to 0.98) and soy foods (adjusted OR, 0.4; 95% CI, 0.2 to 0.7) was significantly associated with a decreased risk of OPLL. Our findings suggest that dietary habits may constitute independent risk factors for OPLL. Further studies will be needed to prospectively determine the relationship between dietary habits and OPLL risk.

Key words OPLL · case-control study · nutrient intake · risk factors · protein-rich foods

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Introduction

In Japan, ossification of the posterior longitudinal ligaments of the spine (OPLL) is an intractable disease that tends to manifest itself in the cervical vertebrae and presents with various symptom such as neck pain and numbness in the hand. It has been reported that Asian populations, including the Japanese, have a higher prevalence and incidence of OPLL compared with Caucasians, i.e., about 1.9%–4.3% in the Japanese sgeneral population [1]. Males are three times more likely to suffer OPLL than females, with the peak of OPLL prevalence occurring in their sixties [2].

OPLL is considered to be a multifactorial disease in which complex environmental and genetic factors interact. In order to facilitate the early prediction, prevention, and treatment of OPLL, it is necessary to elucidate the specific role of environmental factors, which can be regulated by appropriate interventions, as well as possible genetic markers [3–8].

Many epidemiological studies have been done suggesting a variety of possible causative factors, with most of them focusing on factors such as sex [9], and lifestyle factors such as diabetes mellitus (DM) [9–11], trauma [12], and hormonal imbalance [13]. Compared with Caucasians, Asian populations, including the Japanese, commonly tend toward a lower intake of total calories and animal proteins and a high intake of carbohydrates.

Many epidemiological and animal feeding studies have demonstrated that current and past habitual

dietary intakes may affect both bone mass and bone quality [14–18]. Harrington et al. [18] reported that a high-protein, high-Na (calciuric) diet, inducing urinary Ca loss, was compensated for by increased bone resorption. According to Lin et al. [16], a reduced sodium intake reduced calcium excretion. Moreover, a western-style diet, i.e., one high in fat and low in Ca, vitamin D, and folic acid, may reduce bone mass and quality [17]. Higashi et al. [14] also demonstrated the relationship of bone density to diet and lifestyle, finding that the relationship between milk intake during childhood and bone density was the most significant among other studied variables. According to Takuma et al. [19], and Seichi et al. [20], the development of cervical OPLL is associated with decreased intestinal calcium absorption. These findings suggest that dietary factors may affect the development of OPLL. However, only a few studies have examined the relationship of dietary factors to the risk of OPLL. Epidemiological studies carried out in Japan [12] and Taiwan [21] have suggested that both a high-salt diet and low consumption of animal protein foods may be risk factors for OPLL. Therefore, we conducted a case-control study, using community controls, to explore the possible relationship between dietary factors and the risk of OPLL among the Japanese.

Subjects and methods

Study populations

Cases

The details of the present study have been reported elsewhere [22]. In brief, the 69 eligible cases were comprised of patients who visited nine collaborating hospitals in Hokkaido from 1998 to 2001 and who had been diagnosed as having OPLL in the 3 years before they were enrolled in the study. We defined the onset of OPLL as the time when it was diagnosed by specialists on the basis of clinical symptoms and radiological examinations, using radiographs of the cervical and thoracic spine, tomographs, computed tomographs, and magnetic resonance imaging, and a classification based on the criteria of the Investigation Committee on the Ossification of the Spinal Ligaments of the Japanese Ministry of Health, Labour and Welfare [4].

Controls

As controls, 138 individuals, matched by sex and year of birth (within 3 years), who proved to be without any backbone disorders, were recruited from among participants in a health check-up in a town in Hokkaido.

Data collection

We asked patients to recall their lifestyle during the 5 years before the onset of OPLL, and controls during the 5 years before the interview, using a structured self-administered questionnaire specifically designed for this case-control study.

The data obtained from each subject were as follows; demographic characteristics (sex, age, present and past height and weight, years of education, and occupation and work environment maintained for the longest period), past history and family history (including history of diabetes mellitus), smoking habits, alcohol consumption, subjective stress level, the kinds and frequency of physical activities engaged in for the longest time, lack of natural body flexibility, and type A personality tendency. Among those data, in this study, we used a history of DM, body mass index (BMI), and lack of natural body flexibility, reported as risk factors for OPLL [22], as confounding factors. As for dietary habits, subjects were asked about the frequencies of intake of selected foods, with six response options ("never/seldom", "less than once a week", "once to three times a week", "four to six times a week", "once a day", and "twice or more a day").

The present study was approved by the institutional review board (IRB) of the Hokkaido University School of Medicine and the IRBs of each collaborating hospital.

Statistical analyses

The odds ratio (OR) and its 95% confidence interval (CI) were estimated, using multiple conditional logistic regression models in which matched variables (sex and age at diagnosis); and a history of diabetes mellitus, body mass index, and lack of natural body flexibility, which have been reported as risk factors for OPLL [20], were adjusted for [23].

The differences in mean values or frequencies between OPLL patients and controls were statistically examined by unpaired t-test, χ^2-test, or the Mantel-Extension test. Tests for trends in logistic regression analysis were performed using exposure variables and treating those variables scored as continuous variables. Missing values in the food items category and covariates were replaced by median or mode values. BMI was calculated using self-reported height and weight (kg/m^2). All statistical analyses were conducted using a statistical analysis system package (SAS Institute, Cary, NC, USA).

Table 1. Selected background characteristics of cases and control subjects

Characteristics	Cases (n = 69)	Controls (n = 138)
	Mean value or percentage	
Sex		
Male	58%	58%
Female	42	42
Age at interview (years)		
<50	10.2%	9.5%
50–59	31.9	31.2
60–69	33.3	33.3
70+	24.7	25.4
Mean age[a]	61.7 ± 9.9	61.83 ± 9.8
BMI[a]	25.8 ± 4.2	23.3 ± 2.9***
Lack of natural body flexibility	78.2	57.2***
Past history		
Stroke	4.3%	0%
Diabetes mellitus	23.2	5.6***
Hypertension	24.6	18.1
Head injury	2.9	2.4
Neck injury	8.7	0
Lumbago	37.7	21.1**
Family history		
Cancer	29.0%	34.8%
Stroke	15.9	19.6
Diabetes mellitus	21.7	13.0
Hypertension	33.3	23.2
Rheumatoid arthritis	5.8	6.5

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$ vs Ossification of the posterior longitudinal ligaments of the spine (OPLL)
[a]Mean ± SD

Results

The characteristics of the patients with OPLL and the controls are shown in Table 1. No significant differences in the distribution of age at interview were found between patients and controls. OPLL patients showed a significantly higher proportion of subjects with DM and those with a lack of natural body flexibility than controls. The BMIs were significantly higher in the OPLL patients than in controls, at 25.8 ± 0.6 (mean ± SE) and 23.3 ± 0.3, respectively.

Table 2 shows the crude and adjusted ORs with 95% CIs for OPLL, based on the intake frequency of selected foods. Because the crude and adjusted ORs were similar, we therefore describe only the adjusted ORs in the text. The adjusted OR for nondaily consumers of rice was 3.0 (95% CI, 2.4 to 3.7). Frequent intake of salted products was significantly associated with an increased risk of OPLL, with an adjusted OR of 1.6 (95% CI, 1.1 to 2.2) for a history of DM. Frequent intake of chicken (adjusted OR, 0.5; 95% CI, 0.3 to 0.98), and soy foods (adjusted OR, 0.4; 95% CI, 0.2 to 0.7) was significantly associated with a decreased risk of OPLL. Processed meat was apparently associated with a decreased risk of OPLL.

Discussion

The nondaily consumption of rice and the intake of (salted products) pickled foods were positively associated with OPLL risk in the present study, whereas we found a negative association of chicken and soy foods consumption with that risk.

A methodological issue may arise from the fact that this study was limited to subjects within the Hokkaido region. However, no significant differences in the mean BMI and nutrient intakes (total energy, intake of protein, fat, and carbohydrate) were observed between the Hokkaido subjects and a representative sample of the Japanese population as a whole, implying that the study subjects (OPLL patients and controls) revealed no deviation from the average Japanese population.

Consistent with previous studies in Japan [12] and Taiwan [16], frequent consumption of pickled foods was positively associated with OPLL risk. It is reported that a significant increase in salt intake not only causes a rise in calcium excretion but also leads to increased levels of parathyroid hormone, 1,25-dihydroxy-vitamin D, and serum osteocalcin (a marker of bone formation), as well as leading to increases in urinary cyclic AMP and

Table 2. Odds ratios (ORs) and 95% confidence intervals (CIs) for OPLL according to frequency of intake of selected foods

	Cases (percentage of subjects)	Controls (percentage of subjects)	Crude OR	Adjusted OR[a]
Rice				
Daily	38	64	1.0	1.0
Not daily	62	36	3.9 (3.1–4.7)	3.0 (2.4–3.7)
Salted products (times per week)				
<4	58	72	1.0	1.0
≧4	42	28	1.9 (1.0–3.5)	1.6 (1.1–2.2)
Vegetables (times per week)				
<3	33	28	1.0	1.0
≧3	67	72	1.4 (0.8–2.7)	1.2 (0.6–1.9)
Total fish (times per week)				
<3	48	50	1.0	1.0
≧3	52	50	1.1 (0.6–1.9)	1.1 (0.4–1.6)
Chicken (times per week)				
<3	64	47	1.0	1.0
≧3	36	53	0.5 (0.3–0.9)	0.5 (0.3–0.8)
Meat (times per week)				
<3	75	81		
≧3	25	19	1.4 (0.7–2.4)	1.1 (0.5–1.8)
Processed meat (times per week)				
<1	47	62	1.0	1.0
≧1	53	38	0.5 (0.3–1.0)	0.5 (0.4–1.1)
Milk (times per week)				
<3	48	46	1.0	1.0
≧3	52	54	0.9 (0.6–1.5)	0.9 (0.5–1.1)
Soy foods (times per week)				
<3	73	48	1.0	1.0
≧3	27	52	0.3 (0.2–0.6)	0.4 (0.2–0.7)

[a] Adjusted for a history of diabetes mellitus, BMI, and lack of natural body flexbility

urinary hydroxyproline (a marker of bone resorption) [24–26].

Recent studies have shown that a high-salt diet increases the rate of bone resorption, and subsequently decreases bone mineral content and density [27–29]. High sodium chloride intake increases urinary calcium loss and stimulates parathyroid activity [30]. Metz et al. [31] reported that 1.0% sodium diets were associated with decreased bone density, and reductions in both renal calcium reabsorption and intestinal calcium transport. According to Greendale et al. [32], who prospectively observed dietary sodium and bone mineral density (BMD) over a 16-year period, age and multivariate-adjusted BMD at the ultradistal radius increased with higher sodium intake in men. These findings suggested that a habitual high-salt intake may contribute to ossification of the spinal ligaments through the accumulation of excessive bone mass.

Some studies have demonstrated that vegetable protein was positively associated with an increased OPLL risk. In an observational study, Musha [13] found that OPLL patients tended to prefer vegetable protein to animal protein. Morisu [33] reported that a diet rich in vegetable protein stimulated chondroblast growth in the rat. According to Bederova et al. [34], who compared calcium absorption between adolescent vegetarians and nonvegetarians, calcium absorption was inhibited in the vegetarian group. According to Takuma et al. [19] and Seichi et al. [20], the development of cervical OPLL is associated with decreased intestinal calcium absorption. We found that frequent intakes of both chicken (rich in animal protein) and soy foods (rich in vegetable protein) were significantly associated with a decreased risk of OPLL. Recent studies [9,35–37] have shown that a low-protein diet reduced intestinal calcium absorption, resulting in secondary hyperparathyroidism. According to Kerstetter et al. [35], fractional calcium absorption after a low-protein diet was 0.19 ± 0.03, which was significantly lower than that after a high-protein diet (0.26 ± 0.03; $P = 0.05$). Massey [38] also reported that "excess" dietary protein from either animal or plant foods may be detrimental to bone health. These findings best explain our result that the frequent intake of foods rich in protein may be protective against the development of OPLL.

In our present study, the daily consumption of rice was also significantly associated with a decreased risk of OPLL. Hansen et al. [39] reported that rice-based cereal significantly improved the total quantity of calcium absorption.

There are some limitations in our study. First, we used self-reporting and retrospective recall of the intake frequency of food items in prevalent OPLL patients, rather than in newly diagnosed OPLL patients. It is possible that patients with OPLL may have reported dietary habits that had already been altered due to the onset of OPLL. However, it seems that the effect would not be significant, because there is very little information on whether or not dietary habits are a possible risk factor for OPLL. Secondly, nutritional conditions were assessed by using only the intake frequency of specific food items. Food-frequency questionnaires are widely used in epidemiological studies, because they are more likely to reflect the average daily nutritional intake than recall methods. As we had no direct information about the reproducibility of the food-consumption data under study, it is likely that the intake frequency may not necessarily reflect the total amount of intake. Sasazuki et al. [40] reported that it was possible that people who consumed large amounts at one sitting were apt to report a high-frequency level of consumption compared with those who consumed only small amounts per meal. Accordingly, misclassification may result due to an over- or underestimation of the association between food intake and OPLL. Wakai et al. [41] reported that both a food diary and a food-frequency questionnaire (FFQ) estimated dietary soy isoflavone intake sufficiently well to use them in epidemiological studies. Drewnowski and Hann [42] reported that mean frequencies of food consumption were a significant predictor of dietary outcomes. Although frequency of consumption may not necessarily reflect the amount of intake, it is the most widely used method of assessing dietary intakes in epidemiological studies of chronic disease. These findings strongly suggest that any misclassification may not be serious enough to produce a spurious positive or inverse association.

In summary, we found that the frequent intake of pickled foods was associated with an increased OPLL risk, whereas the consumption of protein-rich foods was related to a reduced risk. Follow-up studies, including the investigating of hospital-based controls, and analyses of possible associations with genetic polymorphisms, will be needed in the future.

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Appendix

Members of the Japan Collaborative Epidemiological Study Group for Evaluation of Ossification of the Posterior Longitudinal Ligament of the Spine (OPLL) Risk are listed in alphabetical order for each affiliated institution.

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Original Article

Sleeping Habit and Other Life Styles in the Prime of Life and Risk for Ossification of the Posterior Longitudinal Ligament of the Spine (OPLL): a Case-control Study in Japan

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BACKGROUND: Although the average age of onset of ossification of the posterior longitudinal ligament of the spine (OPLL) is at around 50 years, the onset of the symptoms is insidious and the progression is very slow. The etiology of OPLL has not been elucidated in detail. Previous studies have suggested that a high-salt diet and low consumption of animal protein, glucose intolerance and high body mass are risk factors for OPLL. However, there is little information about the relationship between OPLL and life styles in the prime of life (between 30 and 50 years).
METHODS: To facilitate early prediction and prevention of OPLL, we analyzed life styles such as sleeping habit, physical exercise, smoking, alcohol drinking and hangover in subjects in the prime of life. Self-administered questionnaires were obtained from patients with OPLL and their sex- and age-matched controls. Sixty-nine patients diagnosed with OPLL within 3 years previously and 138 sex- and age-matched controls without backbone diseases, randomly selected from participants in a health checkup in a local town, were enrolled.
RESULT: Moderate amount of sleep (6-8 hours vs. 5 hours or shorter and 9 hours or longer; odds ratio [OR] = 0.18, 95% confidence interval [CI] = 0.06, 0.54) and a regular sleeping habit (i.e., going to bed and getting up at regular time) (OR=0.44, 95% CI=0.22, 0.90) were associated with a decreased risk of OPLL even after adjusting for other factors. On the other hand, moderate physical exercise (once a week or more v.s. less than once a week: OR=0.97, 95% CI=0.42, 2.26), smoking (OR=1.41, 95% CI=0.67, 2.97), drinking (OR=1.08, 95% CI=0.53, 2.20) and hangover (OR=1.12, 95% CI=0.43, 2.94) in the prime of life showed no correlation with risk of OPLL.
CONCLUSION: Good sleeping habits in the prime of life may decrease the risk of OPLL.
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Key words: Ossification of Posterior Longitudinal Ligament, Case-Control Studies, Risk Factors, Life Style, Sleep.

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The Japanese Ministry of Health, Labour and Welfare has designated ossification of the posterior longitudinal ligament of the spine (OPLL) as an intractable disease because there is no established way to cure or prevent it.[1] OPLL is manifested in the cervical vertebrae and causes a range of disease conditions varying from slight abnormality to quadriplegia.[2,3] It has been called a Japanese disease because the prevalence is especially high in Japan.[4] However, the relation of diffuse idiopathic skeletal hyperosteosis (DISH) to OPLL reported by Resnick et al.[5] has recently attracted attention, and many cases of coexistence of the two diseases have been reported.[6] Now, OPLL is recognized as an important disease occurring not only in Japan but also in Europe and in the United States.[7] The prevalence is about 1.9% to 4.3% in general Japanese population.[2,4] Males are twice[4] or three times[8] as likely to suffer from OPLL as females. Matsunaga et al.[4] reported that the average age of onset of OPLL was 51 years for males and 49 years for females.

The etiology of OPLL has not yet been elucidated in detail, although it is thought to be a multifactorial disease in which complex environmental and genetic factors interact.[2] Although many possible causative factors have been suggested, including genetic factors,[9] sex,[10] diabetes mellitus (DM),[10-12] hypertension,[13] high body mass index,[11,12] injuries,[13,14] hormonal imbalance,[15] and dietary habits,[15,16] the cause of the disease has not yet been clarified. Regarding dietary factors, previous epidemiologic studies carried out in Japan[15] and Taiwan[16] have suggested that both a high-salt diet and low consumption of animal protein are risk factors for OPLL. On the other hand, hospital-based studies in Japan[11,12] revealed that both glucose intolerance and high body mass index were significantly associated with OPLL.

Among these risk factors, metabolic syndromes (i.e., insulin-resistance) including such as diabetes mellitus,[10-12] glucose intolerance,[12] and high body mass index[11,12] may be important risk factors for OPLL from the point of view of prevention because they are also risk factors for lifestyle-related diseases such as cardiovascular diseases.[17] Lifestyle modification such as physical exercise may reduce coronary risk[18] by increasing insulin sensitivity. In contrast, sleeping few hours decreases the insulin-sensitivity[19] and worsens the glucose intolerance.[20] However, there is little information about the relationship between OPLL and life styles,[13] even though lifestyles (e.g., physical exercise,[18,21] alcohol drinking habits[18,22] smoking habits,[18] and sleeping habits[19,20]) are associated with the metabolic syndromes.

Although the average age of onset of OPLL is at around 50 years,[4] the onset of the symptoms is insidious and the progression is very slow in most cases.[3] OPLL may have a long period of latency. Thus, the present study was conducted to investigate the influence of sleeping habits and other lifestyle factors in the prime of life (between 30 and 50 years of age) on the development of OPLL.

METHODS

Subjects were 69 patients who visited 9 collaborating hospitals in Hokkaido from 1998 through 2001, and who had been diagnosed as having OPLL in the previous 3 years. Diagnosis of OPLL was carried out by specialists on the basis of clinical symptoms and radiological examinations by using radiographs of the cervical and thoracic spines, tomography, computed tomography, and magnetic-resonance imaging according to the criteria of the Investigation Committee on the Ossification of the Spinal Ligaments, Japanese Ministry of Health and Welfare.[4] All the patients were symptomatic and required medical consultation, and many of them underwent spinal surgery before or during the present study. Two controls matched to each case for sex and year of birth (within 3 years) without any backbone disorders were randomly recruited from participants in a health checkup in a town in Hokkaido. From 1998 through 2001, a self-administered questionnaire was obtained from the 69 OPLL patients and 138 controls. Written informed consent to cooperate in this study was obtained from all the subjects and controls. The contents of the questionnaire included (1) sleeping habits in the prime of life, (2) other lifestyles such as leisure time physical exercise, alcohol drinking and smoking in the prime of life and at the time of handling out the questionnarie, (3) height and body weight, and (4) past history of diseases such as diabetes mellitus. Many of the participants also agreed to donate blood samples which were stored until use for DNA extraction and genotyping of the candidate genes of OPLL. The details of the present study have been reported elsewhere.[11]

In univariate analysis, the differences were analyzed statistically by the chi-square test (degree of freedom = 1). Yates' correction for continuity was used when the observed number was less than 5. A conditional logistic model was applied to evaluate the odds ratios (ORs) of lifestyle-related factors after adjusting for other risk factors (i.e., obesity, and diabetes mellitus). Because our previous report[11] showed that diabetes mellitus and high body mass index (25 kg/m^2 and over) were risk factors for OPLL, age, sex, and these two variables were used as other risk factors for OPLL to adjust the odds ratio in relation to the sleeping habit, leisure time physical exercise, smoking, alcohol drinking or hangover in multiple logistic regression analysis. Age was treated as a continuous variable, and indicator variables were used for other factors. All the statistical analyses were conducted by use of SAS® package (SAS Institute Inc., Cary, NC).

The present study was approved by the institutional review boards of Hokkaido University School of Medicine and of each collaborating hospital.

RESULTS

The mean (± standard deviation) ages of the 40 male cases and 80 male controls were 63.1 (± 9.6) years and 63.2 (± 9.5) years, respectively, and the mean ages of the 29 female cases and 58

female controls were 59.8 (± 10.1) years and 59.8 (± 10.1) years, respectively (not shown in the table).

Table 1 summarizes the ORs for OPLL and 95% confidence intervals in relation to lifestyles (i.e., sleeping habits, leisure time physical exercise, and smoking and drinking) in the prime of life. In univariate analysis, moderate (6-8 hours) sleeping hour (vs. short [5 hour or shorter] and excessive [9 hour or longer]) was associated with a decreased risk of OPLL (OR = 0.24, 95% confidence interval [CI] = 0.09, 0.59). So was a regular sleeping habit (i.e., going to bed and getting up at regular time) (vs. irregular sleeping habits; OR = 0.48, 95% CI = 0.27, 0.88). In contrast, insufficient sleep (i.e., the subjects felt that they had insufficient sleep) was associated with an increased risk of OPLL (vs. sufficient sleep; OR = 3.10, 95% CI = 1.31, 7.01). Even after adjusting for other factors such as age, sex, diabetes mellitus and high body mass index, moderate amount of sleep (OR = 0.18, 95% CI = 0.06, 0.54) and regular sleeping habit (OR=0.44, 95% CI=0.22, 0.90) were associated with a decreased risk of OPLL.

On the other hand, leisure time physical exercise in the prime of life did not show any significant relation to the risk of OPLL.

Smoking showed an adjusted OR greater than unity (current smokers vs. never smokers or ex-smokers; OR = 1.41, 95% CI =

Table 1. Odds ratios (ORs) and 95% confidence intervals (CIs) for ossification of the posterior longitudinal ligament of the spine according to life style in the prime of life (between 30 and 50 years).

Factors		Crude OR (95% CI)	Adjusted OR (95% CI)
Sleeping hours			
Moderate (6-8 h/d) / Short (5h/d or less) and long (9h/d or more)		0.24 (0.09, 0.59)*1	0.18 (0.06, 0.54)*7
Had regular sleeping habits	Yes/ No	0.48 (0.27, 0.88)*2	0.44 (0.22, 0.90)*8
Had	Insufficient sleep/ Sufficient sleep	3.10 (1.31, 7.01)*2	1.85 (0.70, 4.91)*8
Moderate physical exercise			
	Once a week and more/ Less than once a week	0.86 (0.44, 1.70)*3	0.97 (0.42, 2.26)*9
Smoking habit	Current smokers/Never smokers, ex-smokers	1.37 (0.74, 2.54)*4	1.41 (0.67, 2.97)*10
Drinking habit	Once a week and more/ Less than once a week	1.03 (0.57, 1.88)*5	1.08 (0.53, 2.20)*11
Had a hangover	Once a week and more/ Less than once a week	6.86 (1.37, 32.24)*6	1.12 (0.43, 2.94)*12

Adjusted OR: adjusted for high body mass index (25.0 or greater) and diabetes mellitus.

* The number of cases and controls used for analysis.

*1:68 cases and 127 controls, *2: 68 cases and 133 controls, *3: 65 cases and 121 controls, *4:63 cases and 121 controls, *4: 67 cases and 127 controls, *5: 67 cases and 121 controls, *6: 57 cases and 104 controls, *7: 66 cases and 119 controls, *8: 66 cases and 122 controls, *9: 64 cases and 112 controls, *10: 60 cases and 114 controls, *11: 64 cases and 112 controls, *12: 57 cases and 98 controls

Table 2. Odds ratios (ORs) and 95% confidence intervals (CIs) for ossification of the posterior longitudinal ligament of the spine according to sleeping hours in the prime of life (between 30 and 50 years).

Factors	Cases	Controls	Crude OR (95% CI)	Adjusted OR (95%CI)
Sleeping hours				
Short (5 hours /day or shorter)	12	4	6.74 (2.08, 21.85)*1	6.64 (1.88, 23.49)*1
Moderate (6-8 hours /day)	53	119	1.00 (reference)	1.00 (reference)
Long (9 hours /day or longer)	3	4	1.68 (0.36, 7.79)*2	2.54 (0.47, 13.65)*2

Adjusted OR: adjusted for high body mass index (25.0 or greater) and diabetes mellitus.

* The number of cases and controls used for analysis.

*1:65 cases and 123 controls, *2: 56 cases and 123 controls

Table 3. Odds ratios (ORs) and 95% confidence intervals (CIs) for ossification of the posterior longitudinal ligament of the spine according to present status of smoking and drinking.

Factors		Crude OR (95% CI)	Adjusted OR (95%CI)
Smoking habit	Current smokers/Never smokers, ex-smokers	1.56 (0.81, 2.81)*1	1.68 (0.78, 3.63)*3
Drinking habit	Once a week and more/ Less than once a week	0.29 (0.15, 0.57)*2	0.35 (0.17, 0.75)*4

Adjusted OR: adjusted for high body mass index (25.0 or greater) and diabetes mellitus.

* The number of cases and controls used for analysis.

*1: 65 cases and 125 controls, *2: 66 cases and 120 controls, *3: 63 cases and 118 controls, *4: 64 cases and 113 controls

0.67, 2.97) but failed to become a significant risk factor. There was no meaningful association between OPLL and alcohol drinking, while hangover was associated with an increased risk of OPLL (OR = 6.86, 95% CI = 1.37, 32.24). However, this positive association disappeared after adjusting for age, sex, diabetes mellitus, and high body mass index (OR = 1.12, 95% CI = 0.43, 2.94).

Table 2 shows the ORs and 95% CIs for OPLL according to sleeping hours in the prime of life. Short sleeping hours (5 hours or shorter) was associated with an increased risk of OPLL (vs. 6-8 hours; OR=6.74, 95% CI=2.08, 21.85). Even after adjusting for other factors such as age, sex, diabetes mellitus, and high body mass index, small amount of sleep (vs. 6-8 hours; OR=6.64, 95% CI=1.88, 23.49) was associated with an increased risk of OPLL. On the other hand, long sleeping hours (9 hours or longer) showed an increased OR (vs. 6-8 hours; OR=1.68, 95% CI=0.36, 7.79) and an adjusted OR greater than the unity (vs. 6-8 hours; OR=2.54, 95% CI=0.47, 13.65) but neither of them became a significant risk factor.

The participants also answered questions about their present drinking and smoking habits (Table 3). Current smokers did not differ between the two groups (40.0% vs. 30.4%, p=0.18: OR=1.56, 95% CI=0.81, 2.85). However, after adjusting for confounding factors such as age, sex, diabetes mellitus, and high body mass index, smoking showed an increased OR (OR=1.68, 95% CI=0.78, 3.63), but it did not reach significance. On the other hand, current drinkers were less common in the OPLL patients than in controls (30.3% vs. 64.2%, p<0.01: OR=0.29, 95%CI=0.15, 0.57). Even after adjusting for confounding factors such as age, sex, diabetes mellitus and high body mass index, current drinkers were less common among OPLL patients than among controls (OR=0.35, 95% CI=0.17, 0.75).

DISCUSSION

The present study showed that bad sleeping habits in the prime of life were associated with an increased risk of OPLL though the average age of onset of OPLL is around 50 years.[4] In the present study, moderate amount of sleep and regular sleeping habit in the prime of life were associated with a decreased risk of OPLL. These findings suggest that good sleeping habits in the prime of life may help prevent the development of OPLL.

In the present study, insufficient or excessive sleeping hour was more prevalent among OPLL patients than controls. Of the OPLL patients from the category who slept either too little or too much, 80% belonged to the former, whereas for the controls, this figure was 50%. Even after adjusting for other factors, small amount of sleep (5 hours or shorter) was associated with an increased risk of OPLL. On the other hand, sleeping long hours (9 hours or longer) showed an adjusted OR greater than the unity, but failed to become a significant risk factor. These findings suggest that sleeping few hours may be a risk factor for OPLL.

Although cigarette smoking and alcohol consumption are reported to have a negative relation to sleep duration,[23] neither of these showed a significant relationship to the development of OPLL in the present study. In the present study, therefore, we did not adjust for smoking or drinking when evaluating the association between sleeping habits and the risk of OPLL.

The mechanism by which OPLL develops in persons with bad sleeping habits is still unclear. Chronic sleep deprivation predisposes to metabolic syndromes.[19] Because diabetes mellitus,[10-12] glucose intolerance,[12] and high body mass index[11,12] are reported as risk factors for OPLL, the insulin-resistance caused by bad sleeping habits may play a role in the development of OPLL. In the present study, however, even after statistical adjustment for diabetes mellitus and high body mass index, good sleeping habits such as sleeping an adequate but not excessive number of hours, and regular sleeping habit were associated with a decreased risk of OPLL.

Gonzalez-Ortiz et al.[24] reported that 24-hour sleep deprivation decreased the insulin-sensitivity in healthy subjects. In addition, Spiegel et al.[20] demonstrated that glucose tolerance decreased in the sleep-debt conditions. Furthermore, Vgontzas et al.[25] pointed out that the indexes of sleep-disordered breathing were positively correlated with visceral fat but not body mass index among sleep-apnea patients. These findings and the results of the present study suggest that bad sleeping habits may cause insulin resistance, which may play an important role in the development of OPLL.

In the present study, current alcohol drinkers were less common in OPLL patients than controls even after adjusting for confounding factors such as diabetes mellitus and high body mass index. This result, however, should be interpreted with caution. First, the onset of the symptoms of OPLL is insidious and the progression is very slow in most cases.[3] Second, in the present study, the proportion of current drinkers in the prime of life did not differ between OPLL patients and controls. In addition, the case control study by Nakamura et al.[13] demonstrated that the proportion of drinkers who drank more than once a week did not differ between OPLL patients and controls. Furthermore, hangover in the prime of life was associated with an increased risk of OPLL before adjusting for confounding factors. We cannot deny the possibility that OPLL patients may have stopped drinking after the onset of their diseases. Further studies are needed to obtain a more accurate answer to this question.

Nakamura et al.[13] reported that smoking showed an OR greater than unity (OR = 1.31, 95% CI = 0.77, 2.23) but did not reach significance. In the present study, smoking showed an increased OR (OR=1.68) but was not a significant risk factor, either. Our result was consistent with the result of the case control study by Nakamura et al.[13] Further studies with large subject samples are required in order to evaluate the association between OPLL and smoking habit.

There are certain limitations to our study. First, our study is not free from information bias. OPLL patients may be more likely than controls to remember details of their lifestyles in the prime of life. In the present study, however, leisure time physical exer-

cise, smoking and drinking in the prime of life were not associated with an increased risk of OPLL. In contrast, good sleeping habits such as sleeping a moderate number of hours and going to sleep and waking at regular hours in the prime of life were associated with a decreased risk of OPLL. These findings suggest that sleeping habits in the prime of life may be a more important factor than leisure time physical exercise, smoking or drinking in terms of the risk of OPLL in the prime of life.

Second, we obtained information about life style only in the prime of life and after the diagnosis of OPLL. Therefore, in the present study, we could not evaluate life style just before the diagnosis of OPLL. However, the average age of onset of OPLL is at around 50 years and the onset of the symptoms is insidious and progression is very slow. For these reasons, we suspected that life styles in the prime of life (between 30 and 50 years) may play the most prominent role in the development of OPLL.

Third, we did not obtain information about their activities of daily living (ADL). In the present study, however, the degree of disability in ADL may be similarly light among the patients because the progression of OPLL is very slow in most cases[3] and all the patients were diagnosed as having the disease within 3 years.

Fourth, we matched controls to each case for sex and age only and not for proximity of residence. Although both OPLL patients and controls lived in Hokkaido prefecture, we cannot definitively deny that OPLL patients may have had different life styles from controls because they lived in towns other than the town where the health checkup was conducted.

Fifth, controls were recruited from participants in the town where the health checkup was conducted, and as such they may have been more health conscious than their OPLL counterparts. In order to confirm the result of the present study, we need to perform another case-control study in which the patients and controls are recruited in the same hospital.

Last, although OPLL is thought to be a multifactorial disease in which complex environmental and genetic factors interact,[2,9] we did not evaluate the genetic factors in this paper.

On the other hand, our study has its strength as well. To the best of our knowledge, this case-control study is the first study to demonstrate an association between sleeping habits and OPLL.

In summary, the present study revealed that good sleeping habits in the prime of life such as sleeping a moderate number of hours and regular sleeping times were associated with a decreased risk for OPLL, while leisure time physical exercise, smoking and drinking in the prime of life did not show any meaningful relation to OPLL. The results of the present study suggest that bad sleeping habits in the prime of life may be a more important factor to increase the risk of OPLL than leisure time physical exercise, smoking or drinking in the prime of life. Since sleeping a moderate number of hours is negatively associated with mortality of all causes,[26-30] good sleeping habits (i.e., going to bed and rising at approximately the same time everyday and sleeping for between 6 to 8 hours a day) should be recommended not only for the prevention of OPLL but also for longevity.

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APPENDIX

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【原著】

人工呼吸 6 療法の患者数推計に関する研究

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要 旨

人口の高齢化にともない、呼吸器疾患や神経筋疾患を有し、在宅、入院呼吸療法を実施している患者が増加しているとされるが、その現状は不明である。そこで、人工呼吸 6 療法（侵襲、非侵襲人工換気療法など）の疫学調査を行い、患者数の推計を行った。対象診療科は、一般病院では内科(呼吸器担当)、神経内科とし、大学病院では内科、神経内科、呼吸器内科（呼吸器科）とした。発送総数 3,298 通で、回収率は 20.4 %（674/3,298）であった。診療科を 15 層に分割し、多項超幾何分布を想定し、返答（返送）のない診療科にも同様に患者がいると考え、比例配分に基づき算出すると、1. home oxygen therapy (HOT) 12.4 万人、2. nasal continuous positive airway pressure (NCPAP) 1.24 万人、3. noninvasive positive pressure ventilation (NPPV) 在宅 0.79 万人、4. NPPV 入院 0.30 万人、5. tracheal intermittent positive pressure ventilation (TPPV) 在宅 0.25 万人、6. TPPV 入院 0.58 万人になった。しかし回収率が低いことは、今後の克服すべき課題である。

キーワード:人工呼吸療法、非侵襲人工換気療法、多項超幾何分布、患者数推計

目 的

呼吸、換気様式の歴史、発展をみると、1. 終末呼気陽圧（positive end-expiratory pressure ventilation: PEEP）、2. 間欠的強制換気法（intermittent mandatory ventilation: IMV)、3. 持続気道陽圧（continuous positive airway pressure: CPAP）、4. 高頻度換気（high-frequency ventilation: HFV）、5. pressure support ventilation (PSV)、6. proportional assisted ventilation (PAV)、7. permissive hypercapnia、8. 腹臥位（prone position）による呼吸管理から、新しい呼吸管理法として、1) 非侵襲的陽圧換気法（noninvasive positive pressure ventilation: NPPV)、2) 液体換気療法（liquid ventilation）、3) 体外膜型肺（extracorporeal membrane oxygenation: ECMO）等が提唱、導入されつつある。

近年わが国でも高炭酸ガス血症を伴なう慢性呼吸不全に対する HMV (home mechanical ventilation 在宅人工呼吸療法）として鼻マスク等を装着する NPPV が導入され、普及・定着しつつある。NPPV の多くは、自己管理が可能であり、介護面でも問題が少なく、HMV の換気補助療法としては適している。実際、患者の QOL（生活の質)、ADL (activities of daily livings）の改善や、再入院の回数、日数の減少などの効果も報告されている。しかし、導入のテクニック、合併症、NPPV で充分換気出来なくなった時の対処など、多くの問題も内在している。また、適応基準に関しても未だに一定のものは無く、各施設でまちまちである。

1998 年調査では、HMV 症例数が 2,800 例と急増傾向を認め、特に NPPV 症例が 64 % を占め、TPPV (tracheal intermittent positive

pressure ventilation 侵襲的陽圧換気療法：気管切開手術実施）症例数を凌駕した。しかし、NPPV 実施施設は 18 % と限られた施設でしか行われていない。そして患者数の加速度的増加傾向に対して、介護診療体制を始めとする支援体制の未整備が問題である。介護体制に関しては NPPV 症例と TPPV 症例では、その必要度においてかなり差異があった。人工呼吸器の稼動時間にも、介護の必要性も、介護体制にも差異が認められた。診療体制においては、NPPV 症例の場合、基本的に外来受診が可能な症例が多く、この点も差異が認められる。

近年、人口構造の急速な老齢化、HMV 療法の進歩に伴い、1998 年調査以降、HMV 患者数の急増が予想され、NPPV、TPPV の比率にも変化があることが予想される。また、NPPV 実施施設も変化があると予測されている。患者数の加速度的増加傾向に対して、介護診療体制等の支援体制の整備状況を把握する必要がある。これらの問題を整備し、NPPV 適応基準についても原則を定める必要がある。今回は、HMV も含めた機械的人工換気（mechanical ventilation：MV）の全国調査を実施し、これらの基礎資料を得、患者数推計を行う事を目的とする。

方　法

調査方法、診療科抽出率などは、1998 年調査に準ずる。対象診療科は、一般病院では内科（呼吸器担当）、神経内科とし、大学病院は内科、神経内科、呼吸器内科（呼吸器科）とする（表 1）。

調査項目は施設名、診療科名、記載年月日、記載者氏名、過去 1 年間の次の病状を有する患者数、1. HOT（在宅酸素療法: home oxygen therapy:総数、HOT のみ、HMV 併用）、2. NPPV 在宅（総数、酸素併用）、3. NPPV 入院（総数、酸素併用）、4. TPPV 在宅（総数、酸素併用）、5. TPPV 入院（総数、酸素併用）である。また、1-5. の内訳としての a. 慢性閉塞性肺疾患（COPD）、b. 結核（TB）、c. 後側弯、d. 神経筋、e. 睡眠時無呼吸症候群（SAS）、f. 肺胞低換気、g. その他、の数などである。ほかに、NCPAP（Nasal Continuous Positive Airway Pressure: 鼻マスク持続陽圧呼吸、経鼻持続気道陽圧）、急性期 NPPV（改善離脱、IPPV せず死亡、IPPV に移行）の実数、NPPV 死亡例の検討内容、各症例の適応要件などである。調査は 2001-2 年に実施した。

このうち、過去 1 年間に次の病状の報告があった患者数、1. HOT（以下いずれも総数）、2. NCPAP、3. NPPV 在宅、4. NPPV 入院、5. TPPV 在宅、6. TPPV 入院 に関して、回収率をもとに患者数推計を行った。

推計は患者の分布を考慮し、多項超幾何分布を想定し、診療科、病床等区分により、15 層にわけ（表 1）、推計患者数、分散を求めた。なお、多項超幾何分布の場合、患者推計数、分散は下記のような式で求められる。

$$\text{推計数}\quad \alpha=\frac{\sum i\cdot N_i}{N/n}$$

$$\text{分散}\quad s^2=\frac{\sum i^2\cdot Ni/N-(\sum i\cdot N_i/N)^2}{n-1}\cdot n^3(1/N-1/n)$$

n：対象機関数

i：患者数

N：回収機関数

N_i：患者数iの回収機関数

これを各層について合計すれば、全体の推計患者数、分散が求められる。

結　果

2002 年現在の経過を報告する。表 1 に規模別対象数、発送数、返送数、回収率等を示す。回収率は 20.4 %（674/3298）である。

報告患者数は 1. HOT 18,250 人、2. NCPAP 2,831 人、3. NPPV 在宅 1,334 人、4. NPPV 入院 438 人、5. TPPV 在宅 434 人、6. TPPV 入院 789 人であった。

表 2 に治療法別、推計患者数を示す。6 治療法の患者数は、返答（返送）のない診療科にも同数の患者がいると考え、単純な比例配分に基づき算出し、多項超幾何分布で推計すると、1. HOT 12.4 万人（95 % 信頼区間 10.5-14.3 万人）、2. NCPAP 1.24 万人（95 % 信頼区間

表1. 調査の回収状況、回収率

	発送数	全数	返送あり	患者あり
大学 内科学	269	269	85	56
大学 呼吸器科	32	32	17	16
神経内科 ー99床	57	340	9	5
ー199床	57	398	12	11
ー299床	218	218	29	18
ー399床	173	173	25	14
ー499床	103	103	31	23
500床ー	142	142	37	26
大学	55	55	24	17
内科(呼) ー99床	173	3456	29	17
ー199床	214	2173	31	25
ー299床	840	840	149	129
ー399床	495	495	94	84
ー499床	215	215	48	47
500床ー	255	255	54	48
計	3298	9165	674	536
	回収率	20.44%		

0.59-1.9 万人)、3. NPPV 在宅 0.79 万人 (95 % 信頼区間 0.63-0.95 万人)、4. NPPV 入院 0.30 万人 (95 % 信頼区間 0.19-0.41 万人)、5. TPPV 在宅 0.25 万人 (95 % 信頼区間 0.19-0.31 万人)、6. TPPV 入院 0.58 万人 (95 % 信頼区間 0.43-0.73 万人) になった。

考 察

近年在宅呼吸療法は長足の進歩を遂げており、在宅 NPPV の疾患は、肺結核後遺症 34 %、閉塞性肺疾患 29 % と人口老齢化の影響を強く受けていると推測される。一方、在宅 TPPV の疾患割合は神経筋疾患 (筋萎縮性側索硬化症 ALS、クロイツフェルト・ヤコブ病 CJD、筋ジストロフィーなど) 71 % と種々の要因の患者が混在している。しかし、その比率は NPPV : TPPV は 3 : 1 であり、やはり老齢化の影響を強く受けると考えられる。

呼吸不全調査研究班と特定疾患の疫学に関する研究班の研究は COPD[1-6] など、数多く行われ、また、MV についても多くの研究がある[7-10]。患者概数調査なので、重複 (10-20 %) を考慮する必要がある。また、これら以外に診療所で加療している症例を考慮する必要もある。これは、病院受療者数よりは少ないと予想される。病院受診患者の 1/2 以下であり、在宅酸素療法をうけている症例数が、病院:診療所 = 10 : 1 を考えると、病院受診患者の 1/5 から 1/10 と考えられる。このような増減を考慮すると病院診療所での受療患者は結局先の推定値程度と考えられる。

表2.　推計患者数

	HOT	NCPAP	NPPV 在宅	NPPV 入院	TPPV 在宅	TPPV 入院
95%下限	105000	5900	6300	1900	1900	4300
平均値	124000	12400	7900	3000	2500	5800
95%上限	143000	18900	9500	4100	3100	7300

また、回収率の低さ (20.4 %) も推定精度を下げる要因と考えられ、回収率を上げる努力、方策が必要である。

また本調査以外に、現在、肺疾患疫学研究を全国的に展開中なので、将来、この結果も含め受療患者数を検討したい。

結 論

在宅、入院人工呼吸 6 療法 (侵襲、非侵襲人工換気療法など) の患者数は、返答 (返送) のない診療科にも同様に患者がいると考え、比例配分に基づき算出すると、

1. HOT 12.4 万人、2. NCPAP 1.24 万人、3. NPPV 在宅 0.79 万人、4. NPPV 入院 0.30 万人、5. TPPV 在宅 0.25 万人、6. TPPV 入院 0.58 万人になる。

しかし回収率が低く、今後の課題である。この結果は 2002 年現在の結果であるので新情報の追加、データの集積具合により変化する可能性もある。

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【Original Article】

An Epidemiological Study and Estimation of the Patients with 6 MV(Mechanical Ventilations)

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Summary

The prevalence and incidence for mechanical ventilation (MV) in Japan have not been clarified. The most common reasons for requiring MV are respiratory failures, amyotrophic lateral sclerosis (ALS), sleep apnea syndrome (SAS), chronic obstructive pulmonary disease (COPD), etc. We therefore performed a nation-wide epidemiological and statistical study on MV to make clear current situation of MV use in Japan. We previously made criteria of diagnosis for the first survey and a personal questionnaire for secondary survey, and sent it to the divisions of internal and respiratory medicine in all over the nation.

The members of our committee on epidemiology of intractable disease have already conducted the first survey to make clear of incidence and prevalence of MV use. In this study we sent the questionnaire to 3,300 divisions all over Japan. We estimated numbers of prevalent cases using the 95 % confidence interval obtained from the mail survey results and by the hyper geometric distribution method. The numbers of patients thus obtained were as follows: 105-143 thousands for home oxygen therapy (HOT), 6-19 thousands nasal continuous positive airway pressure (NCPAP), 6.3-9.5 thousands noninvasive positive pressure ventilation (NPPV) at home, 1.9-4.1 thousands NPPV in hospitals, 1.9-3.1 thousands tracheal intermittent positive pressure ventilation (TPPV) at home, and 4.3-7.3 thousands TPPV in hospitals.

Key words; MV (mechanical ventilation), NPPV (noninvasive positive pressure ventilation), patient estimation, hyper geometric distribution.

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投稿
臨床・教育の現場から

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炎症性腸疾患患者の主観的QOLに関する研究

要旨

炎症性腸疾患患者の主観的QOLに関連する要因を明らかにし，より望ましいサポートについて示唆を得ることを目的に，「難病患者に共通の主観的QOL尺度」と「Euro-QOL」を含む自記式無記名質問票による調査を行った．対象者は275名で，潰瘍性大腸炎(UC)が116名(42.2%)，クローン病(CD)が158名(57.5%)であった．

主観的QOL尺度はクロンバックα=0.85で，高い信頼度を示した．主観的QOL得点はUCが平均11.6(SD=4.5)点，CDが平均10.3(SD=4.7)点であり，UCとCDの平均点のあいだには有意差をみとめた($p<0.05$)．

[まとめ]
①健康状態は主観的QOLに大きく影響するため，患者の健康状態を包括的に評価し，全人的にサポートをする必要がある．
②「体調悪化が心配」の得点が低く，増悪・再燃因子を明らかにするとともに，患者一人ひとりに合わせたサポートが必要である．
③「志気」の項目において，得点群間の差が大きく，社会が炎症性腸疾患(IBD)患者を受け入れるためにも，保健・医療・福祉など多方面からのサポートが必要である．
④CDは「将来の希望」に関する点が低く，症状が悪化傾向もしくは変わらない患者と，緩解経験のない患者には，とくに精神的なサポートをする必要がある．

はじめに

潰瘍性大腸炎(ulcerative colitis；UC)とクローン病(Crohn's disease；CD)に代表される炎症性腸疾患(inflammatory bowel disease；IBD)は，腸管の病変に伴うはげしい腹部症状や栄養状態の低下が起こり，その病態はさまざまである．そのうえ，医療機関や主治医により治療方針が多岐にわたる．また，二次的に心理的・情緒的不安定をきたしたり，家庭や社会での役割変更を余儀なくされたりすることもある．

本研究では，UCとCDの2つの疾患を区分したうえで，病気とともに生きる患者が，現在の生活をどう受けとめているのかという主観的側面に焦点を当てる．そして，IBD患者の主観的QOLに関連する要因を明らかにしたうえで，IBD患者へのより望ましいサポートについて示唆を得ることを目的とする．

方法

1 調査の実際と倫理的配慮

個人情報保護を厳守し，研究で得た情報を研究以外の目的で使用しないことを約束し，研究の趣旨を説明し，同意を得られた患者に自記式無記名質問票を配布する．

2対象者

愛知県N大学病院，東京都S総合病院に通院または入院しているIBD患者とする．

3調査内容

基本的属性(病院，性別，年齢)，現在の健康状態(主観的健康状態，医師による重症度分類，緩解期にあるか，療養状態，通院頻度，薬物による副作用，食事制限の有無など)，疾患の経過(発症年齢，罹患病年数，医師による重症度分類，症状の経過，緩解期経験，入院経験，手術経験など)，社会生活に関すること(就学・就労状況，職場の理解度，経済状態，保険加入など)，困っている・不安に思っていること(排泄，睡眠，結婚・出産など)，について主観的QOL，Euro-QOLの26項目から構成する．

①主観的QOL

川南ら[1)2)]は主観的QOLの概念を構成する下位次元として，受容および志気を想定し，「主観的QOLが高いとは，疾患をもちながら生活している現状を不安なく受容し，高い志気をもっている状態」と定義し，「難病患者に共通の主観的QOL尺度」を開発している．質問は9項目で，「志気」と「受容」の2因子構造からなり，1項目0～2点で評価し，総得点は0～18点の範囲で，点数が高いほどQOLが高いことになる．本研究では川南らの許可を得たうえで本尺度を用いる(図1～3の横軸①～⑨を参照)．

②Euro-QOL

ヨーロッパで開発され，現在多くの国で標準化され，使用されている簡便なQOL尺度で，健康水準の変化を基数的に評価するための包括的なシステムの1つである[3)]．現在のバージョン(EQ-5D)は5項目法と視覚評価法の2部から構成される．5項目法は，あらゆる健康状態を5つの次元に分解し，それぞれについて3段階で記述する(この項目の内容は表2の左欄を参照)．

4データの収集方法

研究の同意を得られた患者に対し，質問票をIBD専門医である主治医から手渡しで配布し，郵送による回収を行った．データの収集は，2003年7～8月に実施した．

5データの分析方法

分析は，Excel2000とSPSS v.11.0の統計解析プログラムを用いる．

結果

調査票の配付数は550件であり，回収は275件(回収率50%)であった．

1対象の概要

対象は275名で，UCが116名(42.2%)，CDが158名(57.5%)，UCとCDの合併が1名であった．性別でみるとUCでは男性が55名(47.4%)，女性が61名(52.6%)，CDでは男性が108名(68.4%)，女性が50名(31.6%)であった．

年齢は，UCが平均42.9(SD＝16.1，幅11～78)歳，CDが平均35.0(SD＝10.1，幅15～66)歳で，全体では平均38.3(SD＝13.5，幅11～78)歳であった．

ここ2週間が緩解期であると答えたのは，UCが64名(55.5%)，CDでは82名(51.7%)，全体では53.4%であった．

現在の職業は，UCでは学生が10.9%，就業者50.9%，家事21.8%，無職15.5%，CDではそれぞれ9.0%，61.5%，12.8%，15.4%であった．

2主観的QOL平均得点の比較

①分析対象数

主観的QOLの設問9項目のなかに1項目でも欠損回答のあったものは，分析の対象外とした．分析対象数は261名(UC105名，CD155名，UCとCDの合併が1名)であった．主観的QOL尺度の信頼性分析で，クロンバック係数はα＝0.85を示し，川南らのα＝0.85と同じであった(表1)．

②平均点の検定

各項目により平均点を，2群の場合はt検定，3群以上の場合は一元配置分散分析で比較した．p値が0.05未満の場合は「有意差あり」，0.05以上0.1未満の場合は「有意な傾向あり」とした．

全体の平均点は10.9(SD＝4.7，幅0～18)点，UCは平均11.6(SD＝4.5)点，CDは平均10.3(SD＝4.7)点で，UCとCDの平均点のあいだには有意差をみとめた($p<0.05$)．

③主観的健康状態ほか

主観的健康状態では，UCとCDで，有意差をみとめた．

UCでは，発症年齢，入院経験，手術経験で有意差をみとめた．CDでは，緩解期の経験で有意差をみとめた．IBD症状の経過では，UC，CDともに有意差をみとめた．現在職業は，UCでは一元配置分散分析により，CDで

表1　主観的QOL得点の比較　　$n=261$（欠損値を除く）

		UC 人数	平均値	SD	p値	CD 人数	平均値	SD	p値
		105	11.6	4.5	$p=0.022$	155	10.3	4.7	
性別	男	48	11.4	4.7	0.572	105	9.9	4.8	0.079
	女	57	11.9	4.3		50	11.3	4.3	
年齢	平均未満	55	11.7	4.6	0.874	83	10.0	4.5	0.320
現在の健康状態	よい群	73	12.5	4.2	0.001**	118	11.1	4.6	0.000***
	悪い群	31	9.5	4.5		36	7.7	3.9	
現在の重症度	軽症・中等症	70	11.8	4.3	0.259	103	10.9	4.6	0.016*
	重症・激症	12	10.3	4.2		27	8.5	4.7	
ここ2週間緩解期である	はい	54	11.0	4.8	0.283	77	10.9	4.5	0.152
	いいえ	46	12.0	4.1		71	9.8	4.8	
食事制限の実施	している群	69	11.3	4.6	0.178	139	10.3	4.8	0.739
	していない群	33	12.6	4.3		15	10.7	3.7	
現在の職業	学生	12	14.8	2.3	0.014*	13	9.0	4.6	0.092
	就業者	54	11.4	4.6		94	10.6	4.5	
	家事	22	12.1	4.3		20	11.3	4.5	
	無職	14	8.7	4.5		24	8.4	5.3	
	その他	1	12.0	—		2	14.5	4.9	
職場の理解(就業者)	理解がある	17	13.1	3.2	0.009**	38	11.1	4.5	0.450
	多少ある，ない	12	8.5	5.6		34	10.3	4.9	
家計は安定しているか	安定している	58	13.1	3.6	0.000***	61	12.1	4.2	0.000***
	不安定，困っている	46	9.8	4.9		89	8.9	4.4	
罹病年数	10年未満	56	11.8	4.6	0.840	59	9.7	4.6	0.195
	10年以上	43	11.6	4.4		90	10.7	4.7	
IBD症状の経過	よくなっていてほとんど症状はない	14	14.1	4.6	0.018*	16	12.9	4.8	0.003**
	よくなっているが，ときどき症状が出る	51	12.2	4.0		66	11.1	4.2	
	症状を繰り返し変わらない	19	10.7	4.9		33	8.5	4.9	
	悪化している	10	8.9	3.7		33	9.1	4.8	
緩解期の経験	あり	71	12.1	4.4	0.228	99	10.8	4.6	0.005**
	なし	12	10.3	5.5		32	8.2	4.7	

t検定，一元配置分散分析：*＝$p<0.05$，**＝$p<0.01$，***＝$p<0.001$

は就業者と無職間のt検定により有意差をみとめた．家計では，UC，CDともに有意差をみとめた．

④Euro-QOLの移動の程度

Euro-QOLの移動の程度では，UCで有意差をみとめ，CDでは有意な傾向がみられた．

「身のまわりの管理」，「ふだんの活動」，「痛み・不快感」，「不安・ふさぎ込み」で，それぞれUC，CDともに有意差をみとめた(表2)．

❸主観的QOL設問項目ごとの比較

①UCとCDの比較(図1)

UC，CDともに平均点の低かった項目は「体調悪化が心配」(UC：0.72，CD：0.58)であった．UCとCD間で平均点の差が大きかった項目は「将来に希望がある」(差：0.22)であった．

②高得点群と低得点群の比較(図2，3)

主観的QOL得点の平均点で高得点群と低得点群の2群に分けて，項目ごとに比較した．UCで平均点に1点以上の差がみられた項目は「いまの自分が好き」(差：1.02)，「はりあいを感じる」(差：1.14)，「生き生きしている」(差：1.22)であった．

CDで平均点に1点以上の差がみられた項目は「いまの自分が好き」(差：1.04)，「将来に希望がある」(差：1.08)，「はりあいを感じる」(差：1.13)，「生