

図. Geriatrics post-graduate trainees allocation of time by activity

高いのに比べ、プライマリーケア医を選択する学生が多いようである。老年学も老年医学の教科書もアメリカから多く排出されている。つまり研究者の層が厚く、世界的にもレベルが高い。

3. ヨーロッパ

イギリスでは1940年代初めより高齢者医療に取り組んでおり、1947年には英国老年医学会が発足し、その活動は継続されている。イギリス老年科医の臨床と研究は脳卒中を主な対象疾患としており、ニューカッスル大学にはオリバー・ジェームズらが率いる老年科講座があり、日本の老年医学会のメンバーとも交流がある。

スイスではいくつかの大学に老年医学講座があるが、ジュネーブ大学のMichel教授がひきいる老年医学教室ではリハビリ病院や精神科病棟、緩和ケア病棟とともに600床を超える老人病院を運営している。急性期から慢性期医療に対応している。

オランダにはいぜんから老化研究所があり、大学と連携し、研究を続けている。Geronototechnologyを含んだ老年病の研究を行っている。

スウェーデンではWinbrad教授らが中心となり、老年医学講座を開設している。老年医学教育のみならず、アルツハイマー病の研究も精力的に行われている。

こうした各国の取組をふまえ、EUではEUROPEAN UNION GERIATRIC SOCIETYという老年医学の合同団体ができており、さらにEuropean Alzheimer Disease Consortiumというアルツハイマー病を対象にした共同研究グループもある。またEuropean Academy for Medicine of Ageing (EAMA)という老年医学の教育を促進する組織ができており、多くの国と研究者が参加している。EAMAの研究テーマを表1に示した。

4. アジア・オセアニア

韓国においても、ここ数年高齢化の問題には関心が高まっており、介護保険の導入も検討されている。すでに老年医学会ができており、学会活動を行っているが、「内科の一分野」として位置づけられている。また日本老年医学会との交流もあり、毎年どちらかの国で研究会を開催している。今後の活動が期待される。

最近中国でも高齢化が問題となりつつある。つまり一人っ子政策の負の部分が増えてくること、さらに高齢者全体が豊かになり、老後の準備が個人でも、社会保障の面でも整う前に中国社会は急速に高齢化しつつあることが憂慮されている。最近老年学センターが設立されたと聞く、高齢者医療の確立が求められている。香港ではいぜんより老年学の研究者の層があつく、充実している。英国の影響もあると思われる。

オーストラリアでは歴史的にイギリスの影響が大きく、いぜんより老年医学、老年学が盛んであり、ガリーアンドリュースが前世界老年学

会会長を務めたことに示されるように、世界の老年学のリーダー的存在である。また各地の大学にも老年科があり、老人看護か介護の分野でも教育に熱心である。表2にアジア各国の老年医学講座の一覧を示した。また図にアジア各国の学生教育の内容の時間配分の一覧を示した^{3~9)}。

おわりに

高齢者医療問題は全世界的にスピードの差はあるものの、そのニーズは高く、今後も重要性は増すものと思われる。世界的に情報交換と交流をしつつ、発展していく必要がある。その中心となるのは日本である。しかし高齢者医療においてもエビデンスが必要であり、EBMが求められる。さらにNBM(Narrative Based Medicine)が今後重要となるであろう。こうした医療を包括的に体系化した高齢者医療のシステム化が今後必須である。国立長寿医療センターでは自立

と健康長寿をキーワードに今後この分野の発展に寄与したいと考えている。また国際的にも認知され、成果を発信してゆく計画である。

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Prevention of Late Complications by Half-Solid Enteral Nutrients in Percutaneous Endoscopic Gastrostomy Tube Feeding

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Key Words

Percutaneous endoscopic gastrostomy · Enteral nutrients, half-solid · Gastroesophageal reflux

Abstract

Background: Percutaneous endoscopic gastrostomy feeding is accompanied by unique complications, which are not easily controlled. **Objective:** In an attempt to decrease complications, we used half-solid nutrients for percutaneous endoscopic gastrostomy feeding in an 85-year-old woman. The patient had been receiving enteral nutrients via percutaneous endoscopic gastrostomy, and we examined whether this approach can reduce complications. She presented with regurgitation of enteral nutrients and recurrent respiratory infections. **Methods:** Half-solid enteral nutrients, prepared by mixing liquid enteral nutrients with agar powder, were administered via percutaneous endoscopic gastrostomy. **Results:** Symptoms of gastroesophageal reflux disappeared immediately after the start of half-solid enteral nutrient feeding. **Conclusion:** Gastroesophageal reflux and leakage, two intractable late complications of percutaneous endoscopic gastrostomy tube feeding, can be alleviated

by the solidification of enteral nutrients. Since this method allows quick administration of nutrients, it is also expected to help prevent the occurrence of decubitus ulcers and reduce the burden to the caregiver.

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Introduction

Feeding via a percutaneous endoscopic gastrostomy (PEG) tube is a safe and efficient method for patients who cannot maintain adequate oral intake. PEG feeding is accompanied, however, by unique complications which are not easily controlled. The administration of liquid nutrients is often accompanied by complications such as vomiting and diarrhea, although these complications may be minimized if the patient is sitting up during the administration or if the nutrients are administered at a slower rate. Nevertheless, these methods do not completely succeed in eliminating these common complications, and may require the patients and their caregivers to have great patience. In addition, maintaining the same position for many hours may worsen the conditions of patients who have pressure ulcers. Here we report a case in which, by

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our method (<5 min), the stomach wall is expected to be distended to a greater degree and thus stimulate peristaltic movement.

Another disadvantage of slow feed infusion is that patients are forced to remain in a sitting position for long periods while the nutrients are administered, which is unfavorable in terms of the prevention of decubitus ulcers, which are commonly found in patients with PEG feeding.

One of the late complications after PEG tube placement is leakage from the PEG tube insertion site. This is a difficult problem to cope with. There are two causes of leakage: inappropriate fixation of the bumper (including the so-called buried bumper syndrome [7]), and a decrease in the elasticity of the fistular opening, which develops over a long period after PEG placement [8]. The leakage resulting from a decrease in elasticity is intractable. Simply increasing the tube diameter cannot solve this

problem [7, 9]. We found, however, that solidification of the enteral nutrients alleviated the leakage in the present case. This may simply be explained by the fact that the solidified nutrients could not be leaked out by the intragastric pressure through the narrow gap between the fistular pore and the tube.

So far, we have administered half-solid nutrients to 17 patients with PEG feeding and followed up the patients for 6 months. During the observation period, we confirmed significant reductions in the complications observed before the commencement of the half-solid nutrients (data not shown).

In conclusion, our experience indicates that the use of half-solid nutrients in PEG feeding and their rapid administration can substantially reduce the risk of GER and may eventually contribute to a reduction in complications as well as an improvement in the quality of life of the patients and their caregivers.

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CORRESPONDENCE

Survival rate after percutaneous endoscopic gastrostomy in a long-term care hospital

Dear Sir,

We previously reported the mortality after percutaneous endoscopic gastrostomy (PEG) in a general hospital.¹ The results showed a higher survival rate (30-day survival rate: 92.5%, 1-year survival rate: 64.0%, 2-year survival rate: 55.5%, mean age \pm SD at PEG: 75.7 ± 14.1 years) than the results in other studies.²

In this study we surveyed the survival rate of 93 consecutive patients older than 65 years (mean age: 80.3 ± 7.4 years) who received PEG by reviewing their charts in a long-term care hospital. Because the hospital has an affiliated nursing home, home-visit nursing and day care centers for the frail elderly, we could track the record of survival in 84.9% of the post-PEG patients at the time of survey. The primary diagnoses whose symptoms required the patients to receive PEG were: cerebrovascular disease (61.3%), Alzheimer's dementia and/or vascular dementia (15.1%) and brain injury (4.3%). Most patients were severely disabled, showing a mean of $5.5 \pm 1.2/6$ on the score of Cognitive Performance Scale³ (only one patient showed intact cognitive performance) and a mean of $0.8 \pm 3.0/20$ on Barthel Index.⁴

Fig. 1 shows the Kaplan–Meier's survival curve after PEG. The survival rate was 88.9% at 30 days, 59.1% at 1 year and 52.0% at 2 years. The mean fully observed survival period was 382.3 ± 485.2 days. Age was a significant predictor for the survival period ($\beta = -18.7$, $P = 0.008$). The relative risks of serum total protein < 6.0 , white blood count $> 12,000$, and coexisting decubitus at the time of PEG for the death at 1 year after PEG was 1.33 (95% CI; 0.77–2.28, $P = 0.263$), 1.79 (95% CI; 1.10–2.93, $P = 0.080$) and 1.29 (95% CI; 0.78–2.13, $P = 0.228$), respectively.

The 30-days, 1-year and 2-year survival rates of post-PEG patients in a long-term care hospital were

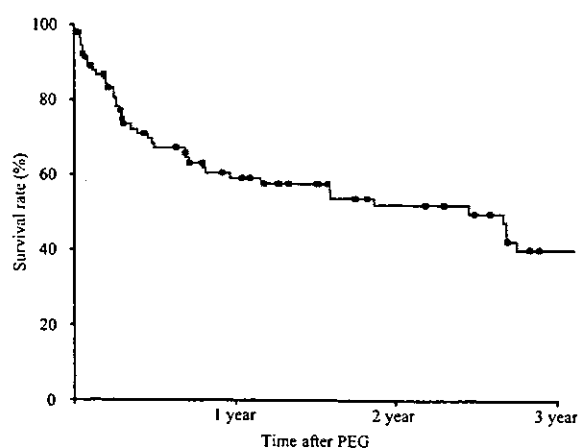


Figure 1 Kaplan–Meier survival curve after PEG. (●) Censored (dead) cases; PEG, percutaneous endoscopic gastrostomy.

lower than those in a general hospital. According to the 2002 annual report released by the Ministry of Health, Welfare and Labor of the government, the mean length of patients' hospital stay was 22.2 days in general hospitals, and 179.1 days in long-term care hospitals in Japan. By the current political pressure of shortening the length of stay in acute hospitals, the number of patients receiving PEG in long-term care hospitals has been constantly increasing. As shown in the results, the patients in long-term care hospitals usually have severe functional disabilities relative to those in acute hospitals. Under the circumstances, it is crucial to build up evidences regarding the post-PEG prognosis in long-term care hospitals.

In summary, the results indicate lower survival rates for post-PEG patients in a long-term care hospital than those in a general hospital. We believe that the present findings add some insights to the application of PEG in the long-term care.

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The Relationship Between Functional Disability and Depressive Mood in Japanese Older Adult Inpatients

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ABSTRACT

Depression is commonly found in older adult patients and is often associated with handicaps. The authors administered the Comprehensive Geriatric Assessment (CGA), including basic activities of daily living (BADL), instrumental activities of daily living (IADL), Mini-Mental State Examination (MMSE), Geriatric Depression Scale (GDS)-15, and a socioenvironmental questionnaire to 198 patients who were admitted to Nagoya University Hospital, to examine the relationship between depressive mood and various physical and socioenvironmental outcomes. The overall GDS-15 score was correlated with the BADL and IADL. The factor analysis extracted 4 factors from the GDS-15 subscales. The factors labeled "loss of morale and hope" and "memory loss and reduction of social activity" were highly correlated with both ADLs, social variables, and the MMSE score. The results reveal that factor analysis of GDS-15 will help in understanding the etiology of depressive mood, thereby contributing to better therapeutic approaches. (*J Geriatr Psychiatry Neurol* 2004; 17:93-98)

Keywords: depressive mood; Geriatric Depression Scale; Comprehensive Geriatric Assessment; factor analysis

Depression is one of the most insidious problems faced by older adults, and its incidence is increasing with the growth of an aging population. Koenig and Blazer reported that the prevalence of major depression was about 1% among community-dwelling older adults and that less severe depressive disorder was present in over 25%.¹ Moreover, they reported that the rate of major depressive disorder in older adult hospitalized patients with illness was more than 10 times greater than that of the unhospitalized aging population. Depression is not only psychologically traumatic but also quite costly² because it is related to psychosomatic symptoms resulting in a higher frequency of examination and prescription of drugs. Fur-

thermore, depression also decreases the morale of older people and increases the risk of being housebound. Although it is very important to adequately diagnose and treat depression in its early stage, it often remains unrecognized or untreated.³ One of the main reasons for this is that depressive symptoms often resemble those of the aging process itself, such as progressive cognitive deterioration or physical disabilities.⁴

The Geriatric Depression Scale (GDS) is a self-administered questionnaire with 30 items⁵ and is recommended by the Royal College of Physicians and British Geriatrics Society as a valid screening method for depression in older adults.⁶ A short form of the GDS (GDS-15) was developed later⁷ and was translated into Japanese.⁸ The validity and reliability of the GDS-15 have been confirmed in both community and hospital settings.⁹⁻¹¹ Several studies have subjected the GDS-15 data to a factor analysis, which is a statistical technique to analyze interrelationships within a set of variables, resulting in the construction of a few hypothetical variables. To our knowledge, however, there has been only 1 study involving factor analysis of the Japanese version of the GDS-15, reported by Schreiner et al in poststroke patients.¹² In addition, there have been few studies demonstrating the relationship between GDS-15 factor loading and disabilities in the older population.

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The GDS-15 is included as one of the components in the Comprehensive Geriatric Assessment (CGA), a tool developed in the late 1980s^{13,14} to assess not only medical conditions but also overall functional status with respect to physical, psychological, and social problems of the older adults.

Although it is well known that depressive mood is often associated with functional disabilities, the mechanism by which the disabilities cause depressive mood in the older adults remains unclear. We hypothesized that some variables associated with functional disability may be associated with depressive mood. Therefore, we investigated the relationship between depressive mood and physical health and socioenvironmental variables in older adult inpatients. In addition, we attempted to clarify the structure of depression by performing a factor analysis of the GDS-15.

METHODS

Subjects

Among 355 consecutive patients aged 65 and older (mean age \pm SD: 77.3 \pm 6.8) who were admitted to Nagoya University Hospital between July 1998 and August 2001, patients who were admitted to nongeriatric wards were not included due to the absence of experienced CGA assessment team in the wards. Also, patients with communication impairments due to problems such as severe dementia or consciousness disturbance and patients under intensive care were not included in the study. If a patient was admitted more than once during the study period, only the data from the first admission was used for this analysis. As a result, 198 older adult patients in total were included in the study.

Measurements

The CGA was administered within a week after admission. The CGA included height; weight; Body Mass Index (BMI); blood pressure; basic activities of daily living (BADL), which were measured with the Barthel Index¹⁵; instrumental activities of daily living (IADL) using Lawton's scale¹⁶; Mini-Mental State Examination (MMSE)¹⁷; GDS-15; hearing ability and vision; communicative competence; and living environment including socioeconomic status. We scored IADL by 5 items (IADL-5), excluding food preparation, housekeeping, and laundry items from the Lawton's scale because the study samples included male patients, who did not normally perform these activities. The low scores of BADL and IADL-5 indicate greater functional disability. The GDS-15 is scored so that higher scores indicate a greater degree of depressive mood. The recent research clarified that the sensitivity of the GDS-15 was 97.3% and the specificity was 95.9% for screening major and minor depression when the cut-off score was set at 6/6+ in the Japanese geriatric population.¹⁸ Socioenvironmen-

tal status was assessed by Ozawa's scale,¹⁹ which includes items on economic, marital, family status, and the relationship between the patient and his or her family. The GDS-15 was self-administered by the patient. The attending nurse collected all other information by interview and/or assessment.

Statistical Analysis

Correlation coefficients were calculated by Pearson's method for parametric data and Spearman's for nonparametric data. We used the chi-square test with Yates correction and Fisher's exact test for categorical comparisons of the data. Differences in the means of continuous measurements between genders were tested using the Student's *t* test. In addition, after nonparametric data in the CGA were categorized into 2 groups (subjects with and those without a problem with respect to each parameter measured), the means of the continuous measurements between the groups were also compared by Student's *t* test. The internal consistency of the GDS-15 was calculated with Cronbach's alpha. Principal component analysis for the GDS-15 was performed with an eigenvalue of 1.0 or more as the extraction criterion, and factors were identified after Varimax rotation. The factor score, which shows the power of a factor's contribution, was calculated by regression method, which cumulated factor loadings of all items of GDS-15. In the present study, a higher score indicates a greater contribution of the factor to depressive mood. Differences in continuous variables among the disease groups were determined by 1-way analysis of variance (ANOVA). Tukey's test was used for multiple comparisons when homoskedasticity was assumed by Levene's method, and Dunnett's test was performed when homoskedasticity was not assumed. Multiple regression analysis, using the equation-building method with the variables of significant measures detected in the univariate analysis, was conducted to identify the variables contributing to GDS-15 scores. Values of $P < .05$ were considered to indicate statistical significance; all tests were 2-tailed. All statistical analyses were performed on a personal computer with the statistical package SPSS for Windows (Version 11.0 SPSS, Chicago).

RESULTS

Table 1 reports CGA variables for all patients, according to their diagnostic category. The mean GDS-15 score of all patients was 5.9 \pm 3.8 SD, and 39.3% of the patients had scores above 6. The homoskedasticities were assumed in age, systolic blood pressure, BADL, IADL-5, and GDS-15, but not in BMI or MMSE. Significant intergroup differences were observed on the BADL and IADL-5, but not in BMI, MMSE, or GDS-15. The BADL score in patients with diabetes mellitus was higher than that in patients with collagen disease ($P = .005$), and the IADL-5 score in patients with diabetes mellitus was higher than that in patients

Table 1. Mean Values ± Standard Deviation of Comprehensive Geriatric Assessment (CGA) Variables by Admitting Diagnosis

Admitting Diagnosis	n (%)	Age	BMI (kg/m ²)	sBP (mm Hg)	BADL	IADL-5	MMSE	GDS-15	GDS > 6
Neurological disease	40 (20%)	76.5 ± 6.6	20.9 ± 3.9	128.5 ± 23.7	16.9 ± 4.1	4.0 ± 1.3	24.9 ± 4.5	6.3 ± 3.7	42%
Cardiovascular disease	36 (18%)	77.7 ± 8.4	23.5 ± 3.8	132.8 ± 20.0	18.0 ± 3.7	4.0 ± 1.3	26.0 ± 4.3	5.7 ± 4.0	38%
Diabetes mellitus	34 (17%)	74.2 ± 5.3	23.5 ± 3.1	138.3 ± 19.4	19.0 ± 3.0*	4.5 ± 0.9*	26.6 ± 3.5	4.6 ± 3.5	27%
Psychological disease	20 (10%)	78.5 ± 6.5	20.0 ± 3.4	138.5 ± 22.3	17.9 ± 3.0*	3.1 ± 1.9*	22.4 ± 4.9	7.6 ± 3.8	15%
Gastroenterological disease	14 (7%)	78.9 ± 6.8	21.1 ± 4.8	132.3 ± 14.1	18.2 ± 3.2*	4.2 ± 0.9	25.9 ± 3.8	5.9 ± 4.7	64%
Collagen disease	12 (6%)	77.7 ± 5.1	21.6 ± 4.0	133.5 ± 20.6	14.2 ± 6.5*	3.3 ± 1.7	23.7 ± 4.7	5.4 ± 2.7	17%
Infectious disease	11 (6%)	83.1 ± 4.7	19.9 ± 3.0	122.0 ± 15.7	19.5 ± 0.8	4.8 ± 0.4	27.3 ± 2.8	2.8 ± 1.8	0%
Others	31 (16%)	78.0 ± 7.6	20.7 ± 3.5	142.4 ± 29.0	18.0 ± 3.9	4.3 ± 1.1	26.1 ± 4.1	6.3 ± 4.0	43%
Total	198 (100%)	77.3 ± 6.8	21.9 ± 3.8	133.9 ± 21.7	17.8 ± 3.8	4.1 ± 1.3	25.5 ± 4.3	5.9 ± 3.8	39%

Note: BMI = body mass index, sBP = systolic blood pressure, BADL = basic activities of daily living, IADL = instrumental activities of daily living, MMSE = Mini-Mental State Examination, GDS = Geriatric Depression Scale.

*P < .05.

Table 2. Principal Components (Varimax) Factor Analysis of the Geriatric Depression Scale-15

Items	Factor 1 Unhappiness	Factor 2 Apathy and Anxiety	Factor 3 Loss of Hope and Morale	Factor 4 Memory Loss and Reduction of Social Activity
1. Satisfied	0.708	0.270	0.061	-0.266
2. Dropped activities	0.058	0.646	0.350	-0.020
3. Emptiness	0.299	0.621	-0.134	0.179
4. Often bored	0.151	0.675	0.140	0.233
5. In good spirits	0.627	0.216	0.129	0.216
6. Afraid something bad will happen	0.336	0.572	0.163	-0.100
7. Feels happy	0.769	0.027	0.128	0.101
8. Often feels helpless	-0.186	0.536	0.493	0.013
9. Prefers to stay in	0.009	0.095	0.385	0.445
10. More problems with memory than most	0.082	0.074	0.043	0.805
11. Wonderful to be alive	0.553	0.077	0.458	0.033
12. Feels worthless	0.348	0.108	0.605	0.242
13. Full of energy	0.061	0.063	0.753	0.002
14. Feels situation is hopeless	0.270	0.235	0.679	0.090
15. Most people better off than self	0.487	0.396	0.013	0.368
Explained variance	2.4	2.2	2.2	1.2
Cumulative percentage of variance explained	16.6	31.5	46.3	54.8

Note: The factor score was calculated by regression method, which cumulated factor loadings of all items of GDS-15. Loadings in italic bold indicate those selected to define the factor.

with psychological disease ($P = .009$). The patients with psychological disease showed the highest mean score of GDS-15, (7.6 ± 3.8 SD). No significant intersex difference was observed in all parameters examined. Antidepressants had been administered to 7.2% of all patients, and to 9.0% of the patients with a GDS-15 score greater than 6.

The internal consistency of GDS-15 was found to be satisfactory, Cronbach's alpha being .83. Factor analysis of GDS-15 extracted 4 factors, whose loading values are shown in Table 2. The cumulative percentage of variance

Table 3. Correlation Between Geriatric Depression Scale-15, Extracted Factors, and Parametric Data

Measure	GDS-15	Factor 1 Unhappiness	Factor 2 Apathy and Anxiety	Factor 3 Loss of Hope and Morale	Factor 4 Memory Loss and Reduction of Social Activity
Age	0.123	-0.001	-0.108	0.250**	0.166*
BMI	-0.141	0.006	-0.135	-0.121	-0.036
sBP	-0.038	-0.260	-0.040	-0.009	-0.101
BADL	-0.168*	-0.033	-0.044	-0.191*	-0.055
IADL5	-0.201**	-0.076	0.023	-0.235**	-0.066
MMSE	-0.151*	-0.034	0.050	-0.167*	-0.214**

Note: Pearson's rho used for correlations. BMI = body mass index, sBP = systolic blood pressure, BADL = basic activities of daily living, IADL = instrumental activities of daily living, MMSE = Mini-Mental State Examination.

*P < .05. **P < .01.

explained was 57.3%. Factor 1 represented "unhappiness," which included the items satisfied, in good spirits, feels happy, wonderful to be alive, and most people better off than self. Factor 2, "apathy and anxiety," was made up of the items, dropped activities, emptiness, often bored, afraid something bad will happen, and often feels helpless. Factor 3, "loss of hope and morale," included the items feels worthless, full of energy, and feels situation is hopeless. Finally, factor 4, "memory loss and reduction of social activity," included the items prefers to stay in and more problems with memory than most.

Pearson's coefficients of continuous variables are shown in Table 3. The total GDS-15 score had a significant negative correlation with IADL-5 ($r = -.201, P = .005$), BADL ($r = -.168, P = .021$), and MMSE ($r = -.151, P = .034$). However, there was no significant relationship between the GDS-15 score and age, BMI, or systolic blood pressure.

The score of factor 3 (loss of hope and morale) correlated positively with age and negatively with IADL-5, BADL, and MMSE scores, whereas factor 4 (memory loss and reduction of social activity) showed a significant positive correlation with age and a significant negative correlation with MMSE score. However, there was no significant relationship between the scores of factor 1

Table 4. Relationship of Nonparametric Data in Comprehensive Geriatric Assessment With the Geriatric Depression Scale-15 and Extracted Factors

Measurement	Percent With Problem	Spearman's ρ With GDS-15	<i>t</i> Test for Mean Score GDS-15	Factor 1 Unhappiness	Factor 2 Apathy and Anxiety	Factor 3 Loss of Hope and Morale	Factor 4 Memory Loss and Reduction of Social Activity
Gender (male/female)	—	—	NS	NS	NS	-0.22/0.17**	NS
BADL (with/without problem)							
Grooming	7.1%	—	NS	NS	NS	0.75/-0.08**	NS
Feeding	8.1%	-0.087	NS	NS	NS	NS	NS
Bowel continence	12.2%	-0.062	NS	NS	NS	NS	NS
Using toilet	14.2%	-0.122	NS	NS	NS	NS	NS
Ambulation	16.8%	-0.102	NS	NS	NS	0.31/-0.09*	NS
Chair/bed transfer	16.8%	-0.142	7.1/5.6*	NS	NS	NS	NS
Dressing	17.8%	-0.122	NS	NS	NS	NS	NS
Bladder control	19.8%	-0.097	NS	NS	NS	NS	NS
Bathing	25.0%	—	6.9/5.5*	NS	NS	0.27/-0.12*	NS
Using staircase	29.9%	-0.271*	7.4/5.2**	NS	NS	0.33/-0.17**	NS
IADL (with/without problem)							
Going outside	10.4%	—	NS	NS	-0.41/0.10*	NS	NS
Using telephone	11.4%	—	NS	NS	NS	NS	NS
Managing money	20.3%	—	NS	NS	NS	NS	NS
Medication	37.1%	—	NS	NS	-0.14/0.15*	NS	NS
Shopping	39.4%	—	NS	NS	NS	0.21/-0.15*	NS
Physical (with/without problem)							
Seeing	23.1%	-0.141	NS	NS	NS	NS	NS
Hearing	23.0%	-0.091	NS	NS	NS	NS	NS
Communication	7.0%	-0.152*	8.2/5.7*	NS	NS	NS	0.51/-0.48*
Social							
Economic status (dependent/independent)	—	-0.163*	NS	NS	NS	NS	NS
Marital status (with/without spouse)	—	-0.148*	NS	NS	NS	0.20/-0.21**	NS
Familial status (alone/not alone)	—	-0.136	7.2/5.6*	0.50/-0.08*	NS	NS	NS
Family relation (with/without interaction)	—	-0.220*	NS	NS	NS	0.71/-0.03*	NS

Note: NS = not significant. *t*-test for mean score compared between 2 groups with or without problem for each item.

* $P < .05$. ** $P < .01$. Dashes indicate not calculated because the items have less than 3 alternatives

(unhappiness) or factor 2 (apathy and anxiety) and other CGA variables.

The patients were divided into 2 groups depending on their score for CGA variables. Then we compared the difference between the GDS-15 factor scores and these 2 groups using Student's *t* test. The correlations of nonparametric data with the score of GDS-15 and the extracted factors are shown in Table 4. The GDS-15 score had a significant negative correlation with BADL (using staircase), communicative ability, economic and marital status, and family relationship. Patients having problems in using the staircase, bathing, chair/bed transfer, and communication showed a significantly higher GDS-15 score than the patients without these problems ($P < .001$, $P = .041$, $P = .034$, $P = .028$, respectively). Also, patients living alone showed a significantly higher GDS-15 score than those not living alone ($P = .043$). The statistical analysis revealed that the score of factor 3 (loss of hope and morale) was significantly higher among women ($P = .007$). Factor 3 had a much stronger relationship with some variables of BADL and IADL-5, such as grooming, using staircase, ambulation, bathing, and shopping, than it did with other factors. On the other hand, factor 2 (apathy and anxiety) was

inversely correlated with going outside and managing medication.

Multiple regression analysis was performed to predict the score of GDS-15 with significant variables, which were using stairs, bathing, communicative ability, economic status, marital status, familial status, and the total score of MMSE. This analysis elicited a model with an adjusted R^2 of .144 ($P < .001$) (Table 5).

DISCUSSION

The mean GDS-15 score in this study was 5.9, which was higher than those in previous studies. In a recent study of 1343 Japanese community-dwelling older adults, the mean GDS-15 score was 2.0 and 23.7% scored 6 or higher.²⁰ Meanwhile, Patrick et al reported that the mean score of hospitalized patients in their geriatric rehabilitation unit was 3.8 ± 2.8 SD.²¹ The higher GDS-15 scores obtained in this study may imply that worsening medical conditions resulting in admission to the hospital relate to increased depressive symptoms. In particular, the neurological disease group showed the highest mean GDS-15 score, which is in line with findings in previous studies that depression

Table 5. Coefficients of Regression Model for Geriatric Depression Scale-15

Variable	β	Standardized	T	P Value
		β		
Using stairs	-2.48	-0.48	-4.27	< .001
Bathing	2.59	0.29	2.44	< .001
Communicative ability	-0.57	-0.04	-0.558	.016
Economic status	-0.48	-0.07	-0.917	.577
Marital status	-0.34	-0.09	-1.25	.360
Familial status	-1.02	-0.17	-2.17	.211
MMSE	-0.04	-0.04	-0.55	.584

Note: MMSE = Mini-Mental State Examination. GDS-15 = $-2.48 \times (\text{Using stairs}) + 2.59 \times (\text{Bathing}) - 0.57 \times (\text{Communication}) - 0.48 \times (\text{Economic status}) - 0.34 \times (\text{Marital status}) - 1.02 \times (\text{Family status}) - 0.04 \times \text{MMSE}$. Total adjusted $R^2 = 0.144$, $P < .001$.

frequently occurs after stroke.^{10,22,23} In the present study, antidepressants were administered to only 9.0% of the patients who had a GDS-15 score of greater than 6, which supports claims that depression is overlooked by clinicians, or is not treated adequately.⁴

The results of this study are consistent with previous findings that physical disabilities relate to depressive symptoms.²⁴⁻²⁷ In the present study, the GDS-15 score was negatively correlated with the BADL and IADL. Three BADL items in particular, using staircase, chair/bed transfer, and bathing, had strong negative correlations with the GDS-15 score. These results indicate that loss of lower body strength and impaired mobility may affect patient's mood. A possible explanation for the difference is that depressive mood may be associated with impaired abilities to maintain normality in life such as immobility, rather than the severity of disabilities.

We also found a weak but significantly negative correlation between the GDS-15 and MMSE scores. The findings of previous studies regarding the relationship between depression and the severity of dementia are varying, which may be attributable to differences in study design.²⁸ Although many investigators have reported a decrease in the frequency of depression in advanced dementia,^{29,30} no such association was found in this study probably because the cognitive impairment of the patients in this study was rather mild with mean MMSE score of 25.5 ± 4.3 SD, and no patients with advanced dementia were included.

Liu et al reported that being female, older, and without spouse were related to depressive symptoms among Chinese older adults.³¹ Our results did not demonstrate a significant relationship between the GDS-15 score and either gender or age, but a higher GDS-15 score was significantly related with economic dependence, absence of spouse, and poor family relationship particularly with "living alone."

Thus far, many researchers have reported on the factor analysis of GDS-15, but the relationship between the factors extracted and the physical, psychological, and socioenvironmental status of the older adults has not been extensively investigated. We found that factor 3, "loss of

morale and hope," was highly related with BADL and IADL. Meanwhile, factor 4, "memory loss and reduction of social activity," was related with age and MMSE, although factor 1 (unhappiness) and factor 2 (apathy and anxiety) were not correlated with any of those parameters examined, which means they may be normal aspects of disabled state and hospitalization. Some investigators have reported that sense of loss or environmental change can induce depression in the aged.^{32,33}

GDS-15 is often included in CGA, which is a useful tool to comprehensively assess older adult patients. The meta-analysis conducted by Stuck et al demonstrated that CGA was effective in improving mortality and in reducing hospitalization.³⁴ However, there have been few studies using CGA results to identify specific clinical strategies for patient care. The present study demonstrates that factor analysis of GDS-15 helps health care staffs establish better therapeutic strategies for depressive mood of older patients. For example, the present findings suggest that intervention to assist in coping with the functional impairment may decrease depressive symptoms in subjects suffering from them. However, pharmacological interventions may be more appropriate for nondisabled patients.

In conclusion, we carried out a structural analysis of the GDS-15 in older adult inpatients and extracted 4 factors related with functional disabilities. Factor 3, "loss of morale and hope," and factor 4, "memory loss and reduction of social activity," were highly related with ADL, social variables, and cognitive impairment. In addition, the results suggest that factor analysis will allow improved assessment and medical support of older adult inpatients. Thus, we believe that the results have indicated an extended utility of the GDS-15 not only as a simple screening method for depressive mood but also as a tool for better therapeutic approaches.

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ORIGINAL ARTICLE

Long-term prognosis and satisfaction after percutaneous endoscopic gastrostomy in a general hospital*

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Background: Percutaneous endoscopic gastrostomy (PEG) has been widely acknowledged as a safer method for enteral feeding; however, its long-term impact on prognosis and quality of life in elderly patients is not sufficiently understood. There are issues still to be studied regarding the indications for PEG, due to the lack of convincing evidence that it reduces expected complications such as aspiration pneumonia or for improving the prognosis of patients with severe dementia.

Method: In this study we investigated the survival rate after PEG and the families' satisfaction in 78 inpatients who underwent PEG. We conducted the investigation by sending questionnaires to the families.

Results: The results for the 69 cases (88%) in which the patient recovered showed that the 1-year survival rate was 64.0%, and the 2-year survival rate was 55.5%. Fifty-three per cent of patients' families indicated overall satisfaction regarding of PEG.

Conclusions: The survival rates were relatively higher than those from previously reported studies. This may be attributed to variations in patients' clinical, socio-economic, or cultural backgrounds in therapeutic interventions. We recognized the importance of clarifying factors that would affect the living and functional prognosis and quality of life in elderly patients who underwent PEG. The indications for PEG are based on a comprehensive assessment of the relevant factors in individual cases, and by taking patients' and families' wishes into consideration.

Keywords: gastrostomy, personal satisfaction, survival rate.

Introduction

Recently, as the technique of enteral nutrition has developed, it has helped patients with dysphagia caused by stroke, neurological degenerative disorders etc., to sur-

vive longer. Percutaneous endoscopic gastrostomy (PEG) is a widely-used method for introducing a gastrostomy tube to enable enteral feeding in patients who are unable to eat. Since it was first described by Gauderer *et al.* in 1980,¹ PEG has spread widely and rapidly, including in Japan. The operation is comparatively safe and once successfully performed, nutrition can be administered in a reliable way. Although many reports regarding the utility of PEG have been published, some studies have indicated that PEG did not reduce the risk of aspiration pneumonia and did not improve the life expectancy of patients with high cognitive disorders. Because PEG is an invasive therapy, physicians should consider the risks and benefits of the operation carefully

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and should confer with the patient and the patient's family, giving them adequate information before obtaining their agreement to the operation.

Although the short-term benefits have been well documented, the long-term survival rate is still unclear. In the present study we investigated the long-term survival rate and the families' satisfaction after PEG retrospectively in a general hospital.

Materials and methods

The data were collected in Anjo-Kosei Hospital, which is a key general hospital in the west Mikawa area. The hospital has 680 beds, and is mainly used for the treatment of acute diseases. We collected data retrospectively from patients who underwent PEG from February 1998 to August 2000. The questionnaire was sent to patients or their families in February 2001. The shortest period of follow-up for the dead cases and survivors, were 4 days and 157 days respectively. The longest period of follow-up was 1078 days among survivors. The questionnaire consisted of five questions: (i) Is the patient alive or dead? (ii) (If the patient is already dead) When did the patient die? (iii) Was the patient admitted to the hospital because of pneumonia after PEG? (iv) Are family satisfied with PEG placement? (v) Who is the main caregiver?

In all cases, PEG ($n = 78$) was performed on patients who were unable to eat due to dysphagia or highly cognitive impairment. In every patient, PEG was inserted by a pull-through method, using the BARD Fastrack PEG kit (Medicone Inc., Osaka). A complete esophagogastrroduodenoscopy was performed with PEG in each patient. The point at which to perform gastrostomy was chosen by finger-pushing and transillumination of the abdominal wall, and confirmed by X-ray.

Statistical analysis was performed by using Statview (SAS Inc., Cary, NC). The non-parametric data were analyzed by the Mann-Whitney test for more than two groups, and by Fisher's exact test between two groups. Survival rates were analyzed by Kaplan-Meier's survival curve, and differences between the groups in survival curves were assessed with the log-rank test.

Results

We received 69 replies out of 78 questionnaires (88%). All of the 69 answered the question as to whether the patient was alive or dead, with 40 patients still alive and 29 patients dead. We learned from their charts that three of the nine patients who did not reply were alive and five were dead, but one had no follow up information whatever. The mean age of the patients when PEGs were performed was 75.7 ± 14.1 (mean \pm SD) years.

In the present study, the most common disease leading to the performance of PEG was cerebrovascular dis-

ease. Fifty-one of 69 patients (65%) had suffered from this disease. As for the rest, there were 11 patients (14%) with neurodegenerative disorders (two with Parkinson's disease, two with amyotrophic lateral sclerosis, two with senile dementia of the Alzheimer's type, one each with olivopontocerebellar atrophy/Creutzfeldt-Jakob disease/Pick's disease/adrenoleukodystrophy, six patients (8%) with hypoxemia due to cardiac arrest or complications from heart surgery, three patients (4%) with brain tumors, two patients with (2%) malignancy, two patients (2%) with pneumonia, and three (4%) suffering from other diseases (polymyositis/dermatomyositis, renal failure, Down's disease). In two cases, the patient suffered from peritonitis during the perioperative period, but in both cases the peritonitis subsided soon after the tube was withdrawn. One of these two became able to ingest food orally, while the other's nasogastric tube is still in place. Both were alive at the time of the investigation. No deaths were attributable to the PEG procedure. Three of the 78 patients died in the first 14 days.

Prognosis

The rate of survival, according to the questionnaire, was 91.3% after 30 days, 64.0% at 1 year, and 55.5% at 2 years. Figure 1 shows Kaplan-Meier's survival curve after PEG. There were no significant differences in survival rates between genders ($P = 0.764$), diseases; stroke versus non-stroke ($P = 0.604$), or the presence of pneumonia ($P = 0.430$).

We received 62 answers regarding hospitalization due to pneumonia after PEG, and among these, 17 patients (27%) had been admitted.

Satisfaction

We received 64 answers regarding the families' satisfaction after PEG. Of these 34 families (53%) answered 'yes', six families (9%) answered 'no', and 24 families (38%) answered 'cannot say yes or no.' There were no

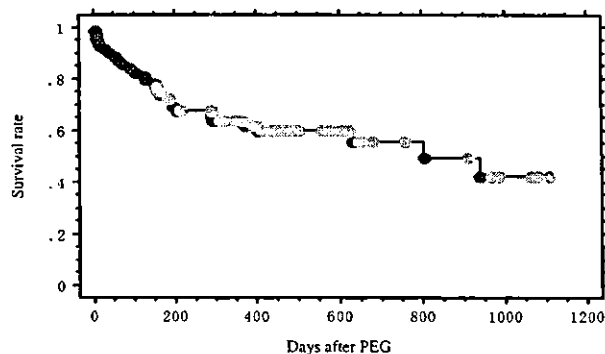


Figure 1 Kaplan-Meier's survival curve after percutaneous endoscopic gastrostomy (PEG). (●, censored (dead) cases ○, uncensored (alive) cases.)

Table 1 Summary of the literature about survival rates after percutaneous endoscopic gastrostomy (PEG)

Author	Year	Nationality	n	Age (mean ± SD)	Prior diagnoses	Treatment	1-Year survival rate (%)	2-Year survival rate (%)
Ciocon <i>et al.</i> ³	1988	USA	70	82.0	Refusal to swallow 50%, dysphagia 47%, esophageal obstruction 3%	Nasogastric tubes, Gastrostomy	60 (11 month)	NA
Taylor <i>et al.</i> ⁴	1992	USA	97	76.5 (median)	stroke 48%, other neurological disease 25%	PEG	35 (1.5 yr)	NA
Chowdhury <i>et al.</i> ⁵	1996	Australia	50	Male 50, Female 61 (median)	Neurological disease 52%	PEG	38	NA
Rabeneck <i>et al.</i> ⁶	1996	USA	7 369	68.1	Stroke 19%, other neurological disease 29%	PEG	41	29
Howard <i>et al.</i> ⁷	1997	USA	786	79.1 ± 7.6	Not described	Home enteral nutrition	45	NA
Loser <i>et al.</i> ⁸	1998	Germany	210	61.3 ± 15.3	Neurological diseases 47%, ear-nose-throat disease 29%	PEG	34	NA
Grant <i>et al.</i> ⁹	1998	USA	81 105	65-74 (25%), 75-84 (41%), 85 (33%)	Stroke 18%, neoplasms 9%, fluid and electrolyte disorders 9%	Gastrostomy	37	NA
James <i>et al.</i> ¹⁰	1998	UK	126	80 (median)	Stroke	PEG	47	NA
Fisman <i>et al.</i> ¹¹	1999	USA	175	65-74 (64%), 75-84 (18%), 85 (18%)	Stroke 36%, neoplasms 31%, pneumonia 23%	PEG	39	NA
Callahan <i>et al.</i> ¹²	2000	USA	150	78.9 ± 8.1	Stroke 41%, other neurological disease 25%, neoplasms 13%	PEG	50	NA
Verhoef <i>et al.</i> ¹³	2001	Canada	112	66.0 ± 17.9	Head injury or stroke 62%, neoplasms 17%	PEG	61	NA

significant differences in the families' satisfaction among the groups according to patients' age ($P = 0.690$), gender ($P = 0.329$), the occurrence of pneumonia ($P = 0.268$) or the patients' life or death at the time of the research ($P = 0.060$).

Discussion

Recently PEG has become more popular for patients with dysphagia. PEG is effective for preventing patients with severe dysphagia from starving; however, it is possible that some patients undergo the operation against their desire not to prolong their lives, which causes controversy over the indication of PEG.

Finucane *et al.* meta-analyzed the prognosis of patients with severe dementia after PEG, from reports completed before March 1999.² They insisted on physicians' modesty in performing PEG, as their analysis could not show a reduction in the occurrence of pneumonia or the prolongation of life after PEG. However, this study was no more than an outline, as their analysis did not consider the reasons for dementia, the degree of medication, the type of hospital or other details.

Table 1 shows the results of some leading reports showing more than a 1-year prognosis.³⁻¹³ These showed that 1-year survival rates after PEG were 34-67%. A few reports of this kind can be found in Japan. Ishimura *et al.* analyzed the data from 87 of 95 patients who underwent PEG between 1993 and 1998 in a general hospital, and they reported that the 1-year survival rate was 38.2%, and the 2-year survival rate was 22.2%.¹⁴ We sent a questionnaire to the families of patients who had undergone PEG, and we received a high response rate of 88%. Even though the subjects of the present study were old, the mean age was 75.7 years, the 1-year and 2-year survival rates were 64.0% and 55.5%, respectively, which are higher than those found in previous studies. This finding is likely related to the development of the operation technique or the kind of medicine used.

Norberg *et al.* compared the thoughts of nurses on enteral nutrition for people with severe dementia in the United States, Australia, Canada, China, Finland, Israel and Sweden.¹⁵ There were a few cultural differences in the results, as most of the nurses except those from China deemed autonomy the most important factor. Though it is unclear how the kind of medical practice may differ among these countries and Japan, it is possible that such a difference might affect the indication of PEG or the prognosis after PEG.

Additionally, we investigated the families' satisfaction after PEG. Families were asked the question 'Are you satisfied that your family underwent PEG?' and over half of the families answered 'Yes'. But among the responses there were some additional negative remarks, such as, 'it was inevitable because the patient could not

eat.' Because some families visited Anjo-Kosei Hospital in order to take treatments for themselves, we have to interpret the results carefully. In particular, it is difficult to determine the feelings of the patients after PEG because most of them are not able to communicate due to the disease. In 1996, Matsushita *et al.* asked outpatients whether they would be willing to take enteral nutrition in the case that they should become unable to eat or communicate due to severe disease.¹⁶ They reported that only 8.7% of the outpatients showed that they were willing to take enteral nutrition in such a state. Although it is not clear how many patients take enteral nutrition against their will, it is possibly not a small number. The dissociation between the rate of patients taking enteral nutrition and their willingness to accept it might be due to clinical and ethical problems or to a lack of knowledge about enteral nutrition among the patients, but there are many clinical and ethical points to be clarified, such as the effect of enteral nutrition on patients' quality of life. Just as Kanie *et al.* investigated and were able to report an improvement of the quality of life of patients after PEG,¹⁷ we should make more of an effort to clarify the effects on patients of enteral nutrition, including PEG, with a view to determining not only their prognosis of life expectancy but also their functional prognosis and their quality of life.

In conclusion, we investigated the survival rates of patients after PEG and their families' satisfaction. The 1-year and 2-year survival rates were relatively higher than those from previous studies, being 64.0% and 55.5%, respectively. Fifty-three percent of the patients' families showed overall satisfaction regarding the taking of PEG. The higher survival rates observed in this study may be attributed to variations in patients' clinical, socio-economic or cultural backgrounds in therapeutic interventions. We recognize the importance of clarifying factors that would affect the living and functional prognoses and quality of life of elderly patients who have undergone PEG. The indication for PEG can be made based on a comprehensive assessment of the relevant factors in individual cases, and by taking the patient's and the patient's family's wishes into consideration.

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高齢者医療の現場における低栄養ならびに栄養管理の認知度の調査

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はじめに

脆弱な高齢者では頻繁に栄養不良が認められ、予後に大きく影響していることが明らかにされている¹⁻³⁾。特に長期療養型病床や老人保健施設などの介護施設入所高齢者では30%から40%近くが栄養不良状態と報告されている⁴⁾。近年急性期一般病棟での栄養管理の重要性は認識され、多くの病院で nutritional support team (NST) が立ち上がり、実績を積みつつある。今後日本では益々高齢化が進み、病床の半分以上を担うことが想定されている療養型病床ならびに介護施設での栄養管理推進が望まれるところである。しかし、今のところそれらの病床における栄養管理の実態については多くが不明のままである。今回我々は愛知県下の長期療養型病床群へのアンケート調査を行い長期療養型病床における栄養管理の実態を調査した。

I. 方 法

愛知県医療法人協会の強力の下、194の法人理事長あてにアンケートの依頼を行った。このうち療養型病床をもつ施設は計93法人であり、アンケートは46法人より回収された。

アンケート内容は以下の通りである。

1. 療養病床数, 2. 経管栄養患者の受け入れ状況, 3. 入院患者の食事摂取および栄養の状況, 4. 入院患者の食事摂取の自立, ならびに介助の必要状況, 5. 経管栄養ならびに点滴を受けている患者数, 6. 経管栄養, 中心静脈栄養の施行場所, 7. 栄養不良患者数, 8. 栄養士数, 9. 入院患者身体計測(身長・体重)頻度, 10. 栄養アセスメント評価の有無, 11. 食事(経管栄養)カロリー数, 12. 認知機能障害者数, 13. 栄養療法の事前指示。アンケート内容の集計は46施設中の%で表し、小数点以下は四捨五入して表示した。

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II. 成 績

アンケートの回答のあった施設の長期療養型病床数は平均 69.8 ± 75.0 (平均 \pm 標準偏差)であり、病床合計の内訳は介護保険型が24%, 医療保険型が76%であった。またアンケートに回答いただいた職種は看護師が50%, 医師が22%, 事務職が20%, ソシヤル・ワーカーが4%であった。

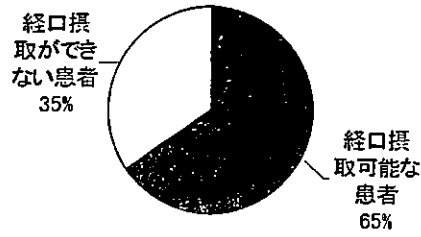
経管栄養を受けている患者の受け入れ状況は、経鼻経管は1施設を除きすべて受け入れ可能との回答であった。また胃瘻経管の受け入れ状況は受け入れないとした施設は7%であった。入院中の患者で経口摂取可能な患者の割合は各施設を平均すると65%が経口摂取可能な患者で、35%が経口摂取できない患者であった(図1)。経口摂取が自立している患者が全患者の50%以上いる施設は50%存在したが、逆に経口摂取自立者が10%に満たない病院が24%存在していた(図1)。また食事全介助者の割合は10%未満の病院が全体の39%と最も多かったが、50%以上の患者が全介助である病院も10%存在していた(図1)。

経管・経静脈栄養を受けている患者は施設によりばらつきがあるが、平均すると経鼻経管、胃瘻経管とも10~13%程度存在していた(図2)。一方中心静脈栄養を受けている患者の割合は1%にも満たなかった。またそれらの栄養療法を自院で開始した率は経鼻経管が44%, 胃瘻経管が35%, 中心静脈栄養が64%, 末梢静脈栄養が95%であった(図2)。

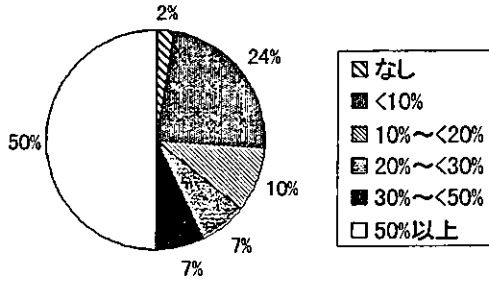
入院患者の内、栄養不良と思われる患者は「いない」と回答した施設が存在したが、10%未満と回答した施設が36%と最も多かったが、50%以上の入院患者は栄養不良であると回答した施設が5%存在していた(図3)。一方血清アルブミン値が3.5 g/dl 未満の割合は施設ごとに相違があるが、19%の施設が約3割から5割の患者が3.5 g/dl 未満であると回答した。また27%の病院では血清アルブミンの測定がなされていなかった(図3)。

身体計測の測定頻度に関しては、身長は入院時のみの

経口摂取可能・不可能な割合



経口摂取自立患者の割合



経口摂取全介助患者の割合

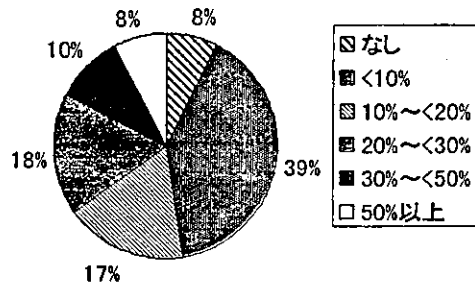
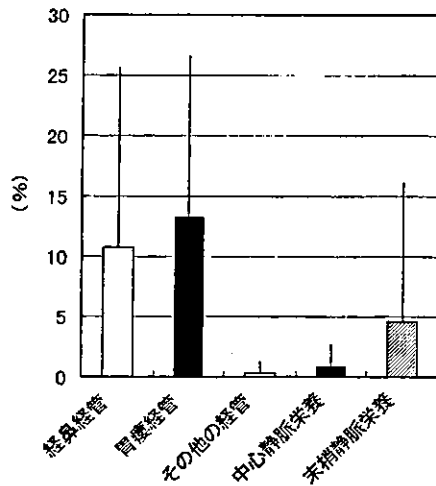


図1 経口摂取可能・不可能患者の割合ならびに経口摂取自立者・全介助患者の割合。

A



B

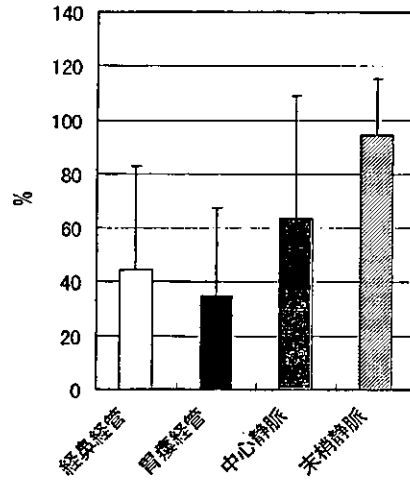


図2 療養型病床における経管栄養，静脈栄養。

A: 経管栄養，静脈栄養に依存している患者の割合。B: 経管栄養，静脈栄養療法を自院で開始した割合。グラフは全て平均値±標準偏差で表す。

測定が58%と最も多かったが、40%が必要時以外測定しないと回答した(図4)。体重測定に関しては多くの施設(44%)が1ヶ月に一度測定していたが、必要以外測定せずが19%、入院時のみが23%であった。栄養アセスメントの実施率は入院時のみ行っているのが23%、定期的に行っている病院が15%存在したが、半分以上の施設(62%)ではアセスメント自体が行われていなかった。

経口摂取可能な患者への一日の食事によるカロリーは平均すると1460.9±213.3 kcalであった。しかし、経管栄養を使用した投与カロリーは施設によりさまざま、ほぼ3/4(75%)の施設で全て一定のカロリーを投与していた。その時の平均投与カロリーは1012.5±164.2 kcalであった。経管を介する投与カロリーは施設によりさまざまであったが、1000 kcal未滿しか投与していな