

Table 1
Number of occurrences of communication/recording tasks

	February	August	<i>P</i>
Overall			
Total number of users	400	442	
Occurrences of tasks	2811	4235	<0.001
153 subjects			
Total number of users	232	249	
Occurrences of tasks	1883	2244	0.300

Note: A chi square test was conducted between February and August sessions on the total number of users divided by the number of occurrences of the task.

session and the number of occurrences of communication tasks was 2811 and 4235, respectively. The increase in the number of occurrences of communication tasks was statistically greater than the increase in the number of total users ($P < 0.001$).

In the analysis of the 153 users whose data was obtained in both sessions, no statistical difference was found in the total number of utilized services, nor in the increase in the number of occurrences of tasks in comparison with the increase in the number of times at which they utilized these services.

3.2. Category of services

Table 2 shows the type of utilized in-home nursing service in relation to a particular communication/recording task. In both sessions, more than 80% of all utilized services belonged to one of the three most popular categories, i.e., daycare at clinic, daycare at GICF and short-stay at GICF. In August, both daycare at clinic and daycare at GICF were more often used ($P = 0.002$, <0.001) while short-stay at center was less often used ($P < 0.001$) than in February (Table 3).

Table 2
Number of occurrences of in-home nursing service by category

Service category	February (<i>N</i> = 1883)	August (<i>N</i> = 2244)	<i>P</i>
Daycare at clinic	340	493	0.002
Daycare at GICF	781	1071	<0.001
Short-stay at GICF	558	390	<0.001
In-home helper	102	107	0.381
Visiting care	86	95	0.656
Visiting rehabilitation	8	11	0.938
Home visit	2	2	0.999
Others	2	7	0.282
Unknown	4	68	<0.001

Note: A chi square test was conducted between February and August sessions. GICF: geriatric intermediate care facility.

Table 3
Number of occurrences of in-home nursing service by place

Place	February (N = 1883)	August (N = 2244)	P
Clinic	302	464	<0.001
GICF	1263	1434	0.036
At home	143	67	<0.001
Others	172	192	0.550
Unknown	3	87	<0.001

Note: A chi square test was conducted between February and August sessions. GICF: geriatric intermediate care facility.

3.3. Time of occurrence

Fig. 2 indicates the time of occurrence of communication/recording tasks. Peaks were found in the 8:00–12:00 and 14:00–18:00 periods. Also, the number of occurrences was on the rise between February and August in the 8:00–9:00 and 10:00–11:00 periods.

3.4. Detailed analysis of 8:00–9:00 and 10:00–11:00 time periods

Regarding the communication/recording tasks that occurred in the 8:00–9:00 and 10:00–11:00 time periods, when an increase in tasks was observed, was further analysis was

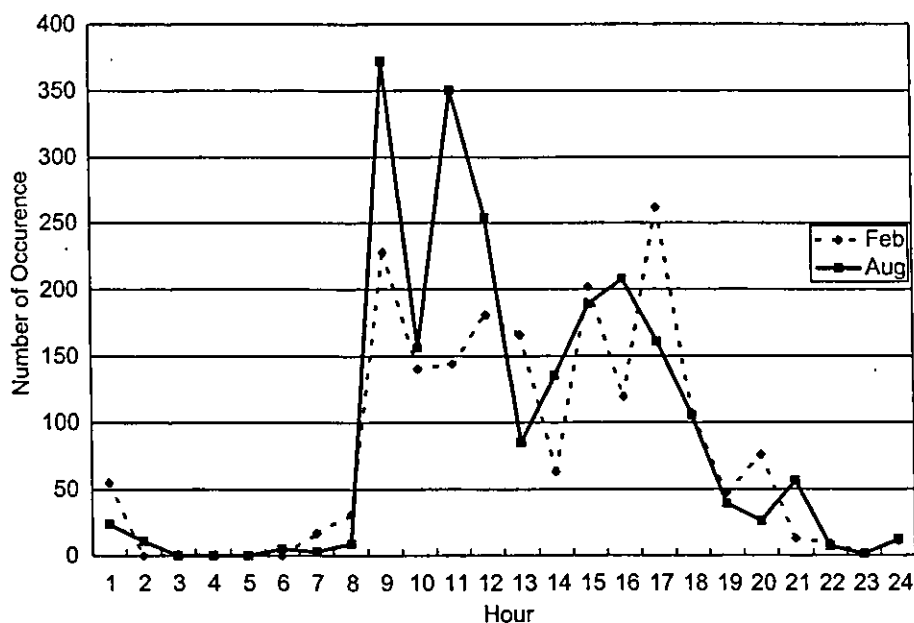


Fig. 2. Time of occurrence of communication/recording tasks. The number of occurrences was on the rise between February and August in the 8:00–9:00 and 10:00–11:00 time periods.

Table 4
Number of occurrences of communication/recording tasks by involved staff's job type

Job type	8:00–9:00		<i>P</i>	10:00–11:00		<i>P</i>
	February (<i>N</i> = 228)	August (<i>N</i> = 372)		February (<i>N</i> = 144)	August (<i>N</i> = 350)	
Physician	3	0	–	0	5	–
Nurse	75	68	<0.001	42	40	<0.001
Pharmacist	0	0	–	0	4	–
Radiological technologist	1	0	–	2	0	–
PT	3	4	0.999	2	5	0.999
OT	0	0	–	0	7	–
Trainer	0	0	–	0	0	–
Professional carer	99	266	<0.001	49	187	<0.001
Consultant	11	7	0.071	20	20	0.004
Secretary	12	12	0.307	9	54	0.009
Nutritionist	0	7	–	14	1	<0.001
Cook	0	0	–	0	1	–
Driver	5	2	0.150	4	18	0.359
Others	19	0	–	2	1	0.425
Unknown	0	6	–	0	7	–

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted. PT: physical therapist; OT: occupational therapist.

conducted to determine the possible changes in job types of the staff involved, communication routes, tools or media in use and contents of communication/recording.

Table 4 shows the job types of staff involved in communication/recording tasks that occurred in the 8:00–9:00 and 10:00–11:00 periods. From 8:00 to 9:00, more professional carers were involved in communication/recording tasks in August (71.5%) than in February (43.4%) ($P < 0.001$). A significant decrease in the number of nurses involved in communication/recording tasks was also observed between August and February ($P < 0.001$).

From 10:00 to 11:00, more professional carers carried out some kind of communication/recording task in August (53.4%) than in February (34.0%) ($P < 0.001$), while significantly less nurses and consultants were involved in communication/recording tasks ($P = 0.004$, <0.001).

Table 5 shows the communication routes in relation to the tasks that occurred at various time periods. In the 8:00–9:00 period, more staff-staff communication took place in August (54.3%) than in February (37.7%) ($P < 0.001$), while less staff's recording to forms was observed in August ($P < 0.001$). However, in the 10:00–11:00 period, the rate of staff-staff communication decreased in August ($P = 0.002$).

Table 6 shows the means by which communication was conducted at various time periods. In the 8:00–9:00 period, face-to-face conversations were most frequently seen in both sessions (79.8% in February, 71.2% in August). However, despite the increase in the number of occurrences of direct conversation, the rate of overall communication decreased ($P = 0.025$). Also, in the 10:00–11:00 period, a decreased rate of direct conversation was found ($P < 0.001$), and voicemail was more frequently used ($P = 0.019$). In this period, a prominent increase in the number of staff using forms was observed, jumping from 0 to 74 times.

Table 5
Number of occurrences of communication/recording tasks during the periods of 8:00–9:00 and 10:00–11:00 by communication route

Communication route	8:00–9:00		P	10:00–11:00		P
	February (N = 228)	August (N = 372)		February (N = 144)	August (N = 350)	
Staff ⇒ staff	86	202	<0.001	55	83	0.002
Staff ⇒ records	85	21	<0.001	45	134	0.169
Staff ⇒ others ('What')	19	28	0.841	8	16	0.817
Staff ⇒ user(s)	6	1	0.026	1	7	0.514
Records ⇒ staff	2	9	0.292	0	3	–
User(s) ⇒ staff	2	3	0.999	1	5	0.823
Family ⇒ staff	1	8	0.184	1	4	0.999
Records ⇒ records	1	1	0.999	1	8	0.406
Staff ⇒ family	1	0	–	0	3	–
Staff and/or records ⇒ staff	0	41	–	0	3	–
Staff and/or others ('What') ⇒ staff and/or others ('What')	0	19	–	0	1	–
Staff and/or records ⇒ staff and/or records	0	0	–	0	24	–
Others	22	36	0.999	30	54	0.186
Unknown	3	3	0.853	2	5	0.999

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted. 'What' refers to medium.

Table 6
Number of occurrences of communication/recording tasks during the periods of 8:00–9:00 and 10:00–11:00 by communication tool

Communication tool	8:00–9:00		P	10:00–11:00		P
	February (N = 228)	August (N = 372)		February (N = 144)	August (N = 350)	
Messages	3	3	0.853	3	14	0.429
Direct conversation	182	265	0.025	65	87	<0.001
Voicemails	1	1	0.999	2	25	0.019
Notes	0	0	–	0	0	–
Wiseman Barcode	6	0	–	18	10	<0.001
Wiseman Keyboard	6	3	0.150	4	24	0.117
Extension calls	3	1	0.311	9	0	–
Outside calls	7	10	0.984	1	16	0.061
Facsimiles	0	4	–	0	2	–
Record entries	7	0	–	15	0	–
Reference to forms	9	6	0.131	0	74	–
Others	4	44	<0.001	27	60	0.767
Unknown	0	35	–	0	38	–

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted.

Table 7
Number of occurrences of communication/recording tasks during the periods of 8:00–9:00 and 10:00–11:00 by content

Communication Tool	8:00–9:00		<i>P</i>	10:00–11:00		<i>P</i>
	February (<i>N</i> = 228)	August (<i>N</i> = 372)		February (<i>N</i> = 144)	August (<i>N</i> = 350)	
Instruction	0	1	–	1	17	0.048
Information	180	148	<0.001	58	42	<0.001
Reporting	6	30	0.011	17	17	0.010
Consultation	3	3	0.853	5	5	0.265
Recording	20	13	0.010	51	131	0.750
Confirmation	19	106	<0.001	11	25	0.998
Others	0	33	–	1	9	0.320
Unknown	0	38	–	0	104	–

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted.

Table 7 shows the breakdown of contents of communication that occurred in the various periods. In the 8:00–9:00 period, information decreased from 78.9 to 39.8% ($P < 0.001$), but more reporting and confirmation were observed ($P = 0.011$, <0.001). In the 10:00–11:00 period, information decreased again from 40.3 to 12.0% ($P < 0.001$) while instruction increased ($P = 0.048$). With respect to reporting, the rate in all communication tasks decreased significantly ($P = 0.010$).

4. Discussions

4.1. Background of the increase in total number of users and communication/recording tasks

This research reveals an increase in total number of users after the introduction of Japan's elderly care insurance system. Even before the implementation of the system, a quantitative increase both in number of users and provision of services (Wada, 1996) had been predicted. In fact, traditionally, the administration (Hattori et al., 2000) determined the nursing services to be provided to users (Hashimoto, 1996; Wada, 1996), but under the new system, users are able to chose the nursing services they wish to receive. The findings of this research seem to support this prediction.

On the other hand, although the overall rate of increase in the number of occurrences of communication/recording tasks was greater than that of users, the analysis of the 153 users who had already used some nursing services before the new system was launched did not reveal any significant increase in the number of occurrences of communication/recording tasks for such users. This suggests that the increase in communication/recording tasks for new users after the adoption of the system was reflected on the overall increase in the number of occurrences of communication tasks. In addition, the possible lack in necessary medical and/or nursing-related information on these new users may have lead to greater information exchange among staff.

Meanwhile, the 153 former users may have benefited from the fact that such information had already been gathered in the institution as they had started using services before the system was launched. However, no trend toward a decrease in the number of communication/recording tasks was observed among these users. The introduction of the elderly care insurance system has undoubtedly brought about some increase in communication tasks. For example, the system requests preciseness in procedure such as the preparation of care plans and the management of nursing service provision, both of which necessarily involve more frequent information exchanges. Also, following the adoption of the system, changes in the type and frequency of services made by users may trigger an increase in communication/recording tasks. According to a report, daycare service provisions increased and short-stay service decreased after the system was introduced in Japan (Miyatake, 2001), and this could also be the case in the subject institution. Changes in users' choices from short-stay service to daycare may prompt an increase of communication/recording tasks because the latter is provided per day and requires more information exchange among staff in comparison with the former. The types and frequency of services in use were not studied in this research. However, an increase in daycare and a decrease in short-stay were observed in the category of utilized services in this research, in agreement with the above-mentioned report.

4.2. Time of occurrence of communication/recording tasks

Firstly, communication tasks were observed more often in the 8:00–11:00 and 14:00–17:00 time periods. The subject institution is open from 9:00 to 16:30, and at 8:30–9:00 and 16:00–16:30, short staff meetings are held for the purpose of exchanging information on short-stay users. The peaks of occurrence of communication/recording tasks in the morning and the afternoon fall respectively around the opening and closing times of this institution, presumably because of these correspond to those times when greater information exchange occurs and patient updates are provided.

Secondly, there are various possible factors behind the steep increase in the number of communication/recording tasks in the 8:00–9:00 and 10:00–11:00 time periods. As mentioned above, these periods fall around the opening time of the institution. In fact, it is inferable that the 8:00–9:00 period corresponds to the time when patient updates and information exchanges take place before opening.

Regarding job types of staff, a more prominent increase in the number of professional carers was noticed as compared to other staff. This suggests that the introduction of the new insurance system may have increased the number of communication/recording tasks performed by the professional carers during specific periods of time. Meanwhile, some reports have indicated that a greater number of inpatient falls occurred during those periods of time when the nurses were busy performing a communication or recording task (Taira et al., 1999; Kanemura et al., 2000). In facilities where nursing care services are also provided, the rush of communication tasks may deteriorate the quality of nursing services and increase the risk of accidents on the part of users. It thus appears necessary to take some measures to prevent such concentration of communication tasks. However, this study is limited in the sense that it does not shed adequate light on the burden put on the professional carers for the following reasons: (1) the study focused on the number of communication

tasks, not the needed time for a task to be performed, (2) the study did not take into account the number of such tasks performed by each professional carer, and (3) the number of professional carers rose from 72 to 78 between the two sessions of this research.

Regarding communication route, significantly more staff-staff communication and less staff-form recording were observed in the 8:00–9:00 period. In terms of tools, including form of communication, a prominent increase in face-to-face conversation was recorded. This suggests that information exchange in the form of direct conversation among the staff increased. In the 10:00–11:00 period, however, the rate of staff-staff communication decreased. The use of voicemail, keyboard and reference to records seemed to decrease the rate of direct conversation and staff-staff communication. In terms of tools, a significant increase was seen in the use of voicemail and keyboard as well as reference to records, and the rate of direct conversation in all communication/recording declined. The promotion of the use of such tools in the 8:00–9:00 period also can be expected to curb the rate of increase of communication/recording tasks.

With respect to contents, the following were observed: a decrease of information and an increase of report and confirmation in the 8:00–9:00 period, as well as a decrease of information and an increase of instruction in the 10:00–11:00 period. The possible reasons for the decrease of information in both periods are: (1) the call for a more precise implementation of care plans following the introduction of the system, (2) the increased number of reports and confirmation in place of information, and (3) the diminished necessity for simultaneous communication such as short staff meetings to share information thanks to IT driven devices. Meanwhile, the increase of report, confirmation and instruction around the opening time is presumably due to the preciseness requested by the new insurance system both in the contents of tasks and the time to provide services.

4.3. Possibility of applying information technology

The outcome of this research highlights the necessity for greater operating efficiency of communication/recording tasks. IT driven devices such as groupware are effective as they facilitate sharing, storage, retrieval and reutilization of information (Shintani, 2000; Nishimura, 2001; Rowe and Brimacombe, 2003). In this research, an increase of report, confirmation and instruction was observed in terms of content of communication. The use of IT driven devices on users and individual progress reports may help reduce the need for report and confirmation (Rowe and Brimacombe, 2003). Also, instruction can be more efficiently conducted when past instructions have been easily stored and can be retrieved and reutilized as needed.

Moreover, when IT driven devices are used, the staff can work more freely with less restrictions of time or space (Nishigaki, 1994; Nishimura, 2001). IT devices also contribute to alleviate the rush of communication/recording tasks, as previously suggested in this research.

Other benefits of IT systems can also be expected for users as the time normally devoted to communication tasks may be spent on the nursing service itself.

Although the use of IT is undoubtedly beneficial, as demonstrated above, we should nevertheless solve some of the most pressing disincentives which include cost, safety, staff

education, and delayed development of user-friendly peripheral tools, in order to efficiently apply IT driven devices.

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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 esophagogastroduodenoscopy 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

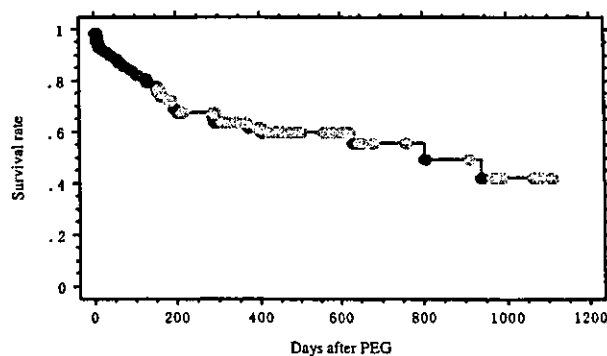


Figure 1 Kaplan-Meier's survival curve after percutaneous endoscopic gastrostomy (PEG). (●, censored (dead) cases ○, uncensored (alive) cases.)

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り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。

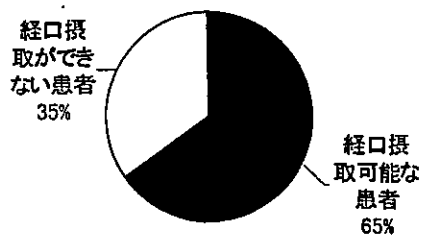
経管栄養を受けている患者の受け入れ状況は、経鼻経管は1施設を除きすべて受け入れ可能との回答であった。また胃瘻経管の受け入れ状況は受け入れないとした施設は7%であった。入院中の患者で経口摂取可能な患者の割合は各施設を平均すると65%が経口摂取可能な患者で、35%が経口摂取できない患者であった(図1)。経口摂取が自立している患者が全患者の50%以上いる施設は50%存在したが、逆に経口摂取自立者が10%に満たない病院が24%存在していた(図1)。また食事全介助者の割合は10%未満の病院が全体の39%と多かつたが、50%以上の患者が全介助である病院も10%存在していた(図1)。

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)。

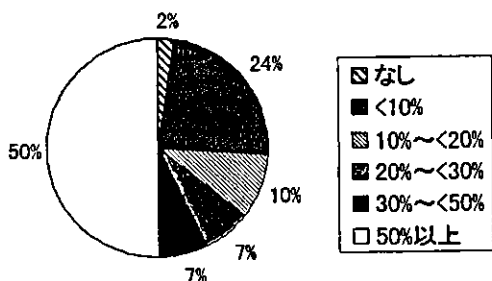
入院患者の内、栄養不良と思われる患者は「いない」と回答した施設が存在したが、10%未満と回答した施設が36%ともっとも多かつたが、50%以上の入院患者は栄養不良であると回答した施設が5%存在していた(図3)。一方血清アルブミン値が3.5 g/dl 未満の割合は施設ごとに相違があるが、19%の施設が約3割から5割の患者が3.5 g/dl 未満であると回答した。また27%の病院では血清アルブミンの測定がなされていなかった(図3)。

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

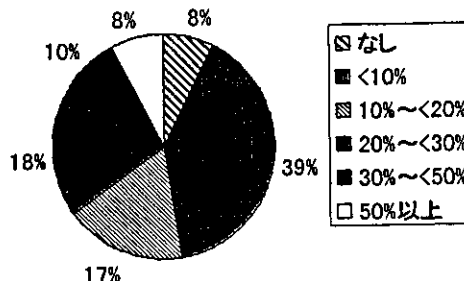
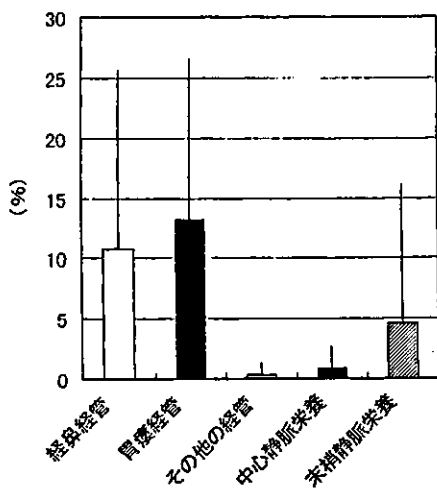


図1 経口摂取可能・不可能患者の割合ならびに経口摂取自立者・全介助患者の割合。

A



B

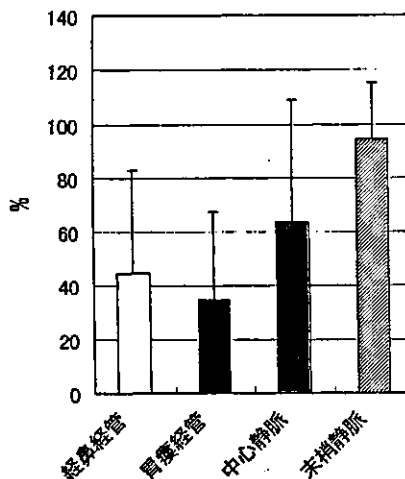


図2 療養型病床における経管栄養，静脈栄養。

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

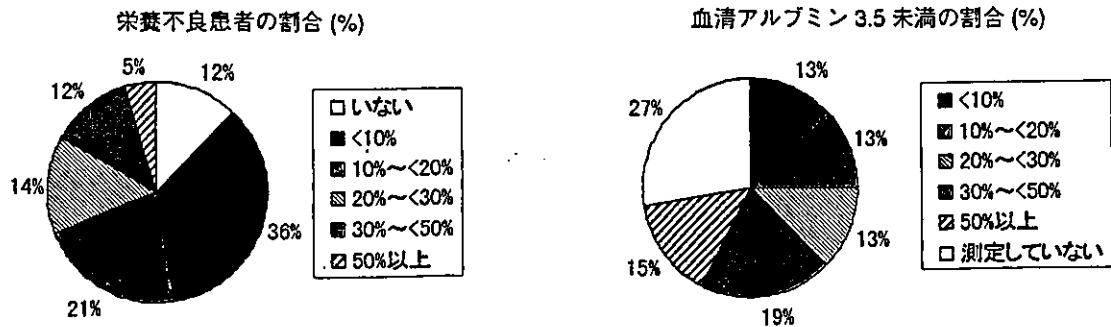


図3 栄養不良患者ならびに低アルブミン患者の割合。

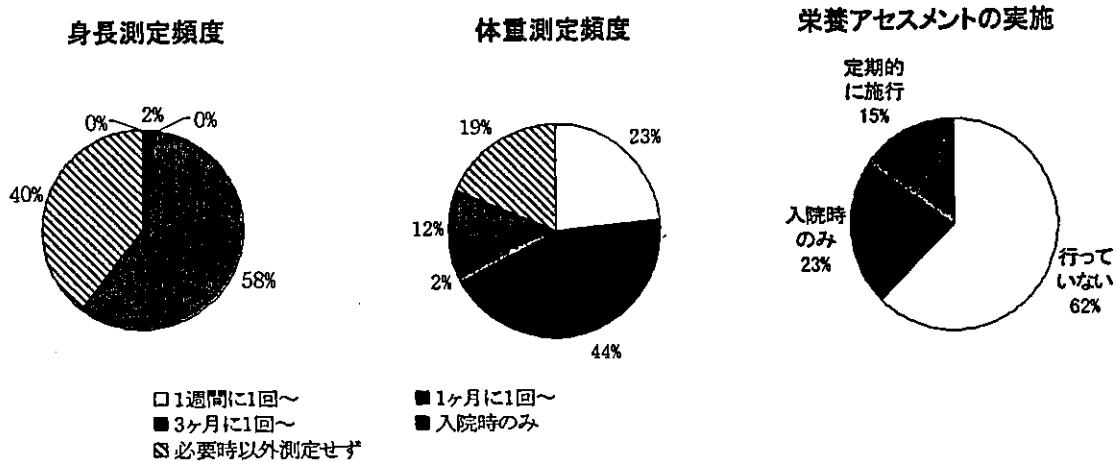


図4 療養型病床における身体測定、栄養アセスメントの頻度。

という施設が 18%存在した。「将来経口摂取不能となった時の栄養療法のあり方に関して本人または家族に事前に希望をきいているか?」の質問に対して 62%の施設であらかじめ希望を聞いているとの回答であった。

III. 考 察

今回の調査では少なくとも愛知県では今やほとんどの長期療養型施設では経管栄養を施行されている患者の入院制限はないことが明らかになった。しかし、入院患者のうち経口摂取障害がある者の割合は高率であり、しかも自立して経口摂取ができるものの割合は驚くほど少なく、その多くは何らかの介助が必要である。それにもかかわらず、栄養アセスメントは半分以上の施設で行われていない。身長計測はともかくとして、体重測定が定期的に行われている施設が少ないのみならず、入院中必要時以外測定していない施設が少なくない。また、栄養指標の簡便なマーカーである血清アルブミンを測定していない施設も 1/4 存在していた。測定している施設の protein energy malnutrition の指標である血清アルブミン 3.5 g/dl 未満の患者の割合も驚くほど高い。実際、低アルブ

ミン血症、栄養不良と思われる患者は驚くほど多い。

杉山らは全国 8 地域 15 病院に入院中の高齢者(女性 722 人;平均年齢 81.8 歳, 男性 326 人;平均年齢 80.0 歳)の女性患者の 39.4%, 男性患者の 42.8%が血清アルブミン値が 3.5 g/dl 以下であったとし、病院高齢入院患者の 30~50%の割合で低アルブミン血症が存在している⁴⁾。また日常生活動作の低下している高齢者ほど血清アルブミン 3.5 g/dl 以下の者の割合が高いとしている。本調査は日常生活動作などの調査を施行していないため、詳細は不明だが、療養型に入院している患者ということもあり、ほとんどが日常生活動作のなんらかの障害を抱えている高齢者が対象になっているものと思われる。

経口摂取可能な患者への食事カロリーは 1600 kcal 前後と十分と思われる食事が提供されているが、一方、経管栄養を受けている患者には 1000 kcal 以下と回答した病院が 18%存在し、またどの患者にも一律のカロリー数を出している病院が多く、その平均投与カロリーは 1012 kcal であった。経口摂取患者に比較し、経管栄養患者のカロリーはかなり低く設定されている。おそら

く、経管栄養に依存している患者は寝たきり状態が多く、消費カロリーも低いことを想定してのことだと思われる。しかし、患者ごとの体格もことなり、代謝性ストレスを受けている患者も存在すると想像され、投与カロリーは栄養アセスメントをして投与カロリーを決め、しかも定期的なモニタリングによる微調整が必要である。しかし、上記のごとくアセスメントを行っている病院は少なく、モニタリングも実施されているか危惧するところである。

今回の調査では療養型病床スタッフへのアンケート調査に過ぎず、今後直接患者の身体計測、血液データの採取などを含む実態調査が必要と思われる。

しかしながら、今回の限られた調査でも明らかなのは療養型病床におけるスタッフの栄養に関する意識は決して高いとはいえず、引き続き障害をもつ脆弱な高齢者に対する栄養アセスメントの重要性などに関する啓蒙活動が必至であると思われる。昨今、急性期一般病院ではNSTが浸透しつつあり、患者の予後、QOL、医療経済的な側面で貢献している。今後はますます需要が増えることが予測される長期療養型病床でのNSTの実施が必要な時期にきている。

ま と め

愛知県医療法人協会所属の医療法人をアンケート調査

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。経口摂取の自立していない患者ならびに経管栄養に依存している入院患者が著しく多く、低栄養患者も高率に存在することが明らかになった。しかしながら、栄養管理に必須と思われる栄養アセスメント実施率はきわめて低く、今後療養病床における栄養療法ならびにアセスメントに関する啓蒙が必要と思われる。

謝辞 本アンケート調査にご協力いただいた愛知県医療法人協会、ならびに愛知県医療法人協会会長下郷宏先生に深謝いたします。

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Malnutrition of the Elderly: Unrecognized Problem in Geriatric Medical care Facilities in Japan

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Although it has been well known that malnutrition is an important predictor of morbidity and mortality in the elderly and that malnutrition is a frequent and serious problem in geriatric patients, it is not fully known how often malnutrition was observed in the elderly in geriatric medical care facilities in Japan. We examine the state of nutritional care for the Japanese elderly at geriatric medical care facilities belong to Association of Aichi Healthcare Corporations by sending questionnaires to the facilities. The results from the 46 facilities showed the high prevalence rate of patients who cannot take in ad-

equated nutrition and are receiving tube feeding. Although the high prevalence rate of malnutrition was recognized in the facilities, the medical staffs do not sufficiently beware of their nutritional problem. Many elderly patients receive less than optimal nutritional care while hospitalized. The adequacy of the nutritional care routinely provided to elderly at geriatric medical care facilities is an important issue.

Key words: malnutrition, elderly, geriatric medical care facilities, nutritional care

臨床
Sarcopenia の対策
- 予防と治療 -

小池 晃彦* 葛谷 雅文* 井口 昭久*

KEY WORD

レジスタントトレーニング
パワーリハビリテーション
栄養療法
テストステロン
ビタミンD

POINT

- レジスタントトレーニングは、超高齢者でもその有効性が示されている。虚弱高齢者に対しては、パワーリハビリテーションとよばれる手法が、近年注目されている。
- 適正なカロリーおよび蛋白質摂取をし、体重を維持することがSarcopenia 予防上肝要である。また、テストステロンなどのホルモンや、ビタミンDが、Sarcopenia に対する薬物療法となる可能性がある。
- 正式なトレーニングができない場合でも、高齢者では、より活発な社会活動を営むことが、Sarcopenia の予防となる。

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はじめに

Sarcopenia とは、加齢に伴って起こる筋肉の量的減少、質的变化による筋力低下や耐久力低下と定義される。しかしながら、Sarcopenia は、加齢(遺伝子)による生理的要因に加えて、慢性疾患罹患や廃用などの病的要因が複雑に作用しあって進行する。高齢者では、廃用性筋萎縮が、安静臥床により急速に起こる。この場合、文字通り筋肉の使用が対策となるが、急性疾患罹患時には、困難なことも多い。急性疾患罹患時にすでに Sarcopenia があれば、予後に大きな影響

を与える。以上のことから、Sarcopenia の予防は、高齢者の予後を決定する重要な因子であり、また、健康な加齢(healthy aging)やQOL の向上にとって重要視すべき課題である。Sarcopenia に対する対策としては、運動療法、栄養療法、薬物療法があるが、現在のところ、レジスタントトレーニングとよばれる筋力改善に焦点をあてた運動が中心となる(図1)。

運動療法

1. レジスタントトレーニング

運動療法には、呼吸・循環器系の改善に焦点をあてた有酸素トレーニングと筋力改善を狙ったレジスタントトレーニングがある。有酸素トレーニングは、心肺機能を高め、最大酸素摂取

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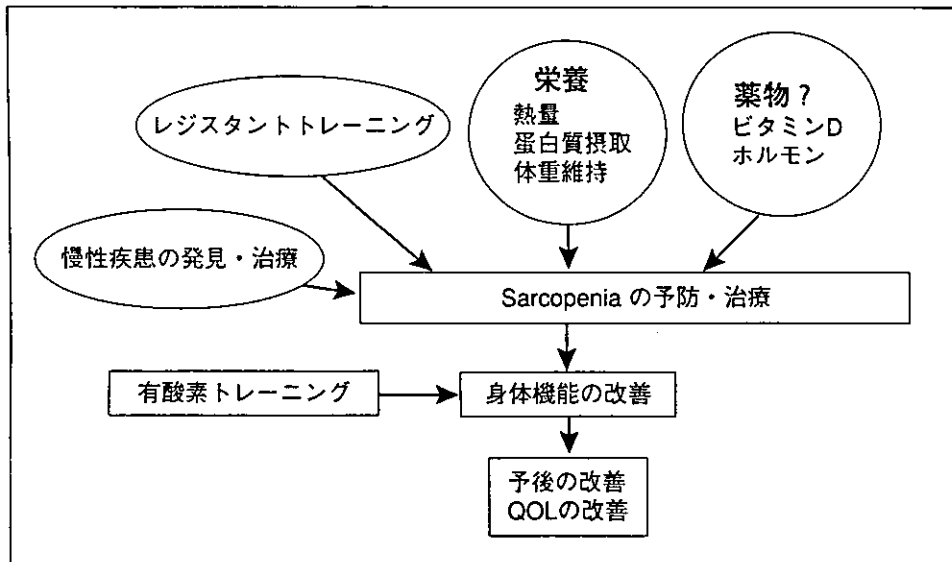


図1 Sarcopeniaの予防・治療のまとめ

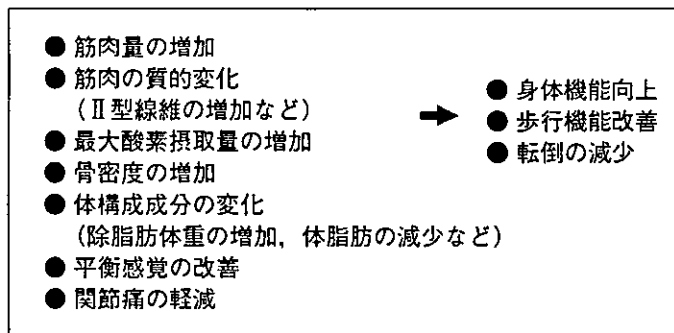


図2 レジスタントトレーニングにより期待される効果

量を高める効果があるが、とくに筋力低下が著明な場合では、レジスタントトレーニングにおける筋力向上が、有酸素トレーニングでの事故防止などの役割を果たす。

レジスタントトレーニングで期待される効果には、筋肉量の増加による筋力の増強に加え、最大酸素摂取量の増加、骨密度の増加、体構成成分の変化、平衡感覚の改善、関節痛の軽減などがあり、歩行、身体機能の改善、転倒の減少から、QOLを上げる(図2)。

レジスタントトレーニングは、超高齢者においても、効果的と報告されている¹⁾。Fiataroneらは、平均87歳の虚弱なナーシングホーム居住者にレジスタントトレーニングをすることで、筋力の増加、歩行速度の上昇、階段を昇る力の向上といった身体機能の向上、ならびに筋肉量

の増加を起こしたことを示した²⁾。また、レジスタントトレーニングにより、主要な筋肉蛋白質であるミオシン重鎖のmRNAレベルを上げることが示されている。Balagopalらは、平均24歳のグループと比較して、平均71歳のグループでは、ミオシン重鎖のI型アイソザイムの転写レベルは、有意な低下を認めなかったが、高齢者ではII型アイソザイムが低下していることを示した。さらに、レジスタントトレーニングは、I型アイソザイムの転写レベルを上げたが、II型アイソザイムのレベルはむしろ下げたと報告している³⁾。

虚弱高齢者を対象としたトレーニングとして、近年、パワーリハビリテーションという手法が注目を浴びている⁴⁾。パワーリハビリテーションは、動けない人に対するトレーニングである。

健康高齢者に対する筋力トレーニングは、筋力強化理論に基づけばよいのであるが、動けない人では、動作学的理論が必要で、筋力だけでなくたとえば神経と筋肉の協調性の問題を重視する必要があることが強調されている。そのためには、準備運動、ストレッチ運動、マシーントレーニング、整理体操という、一連の流れが必要である。筋力強化が、高齢者にとっても有効な手段であることは確立したと考えられるが、対象が虚弱高齢者になれば、複合的な要因を克服しなければ、臨床的な改善にまで至らないということであろう。今後、運動療法も対象者別に、専門的なチームアプローチが要求される。

2. メディカルチェック

運動療法を始める前のメディカルチェックについては、糖尿病などの治療を目的とする場合は、心血管疾患などの合併も多く必須である⁵⁾。無症状の健康高齢者の場合でも、一般採血、検尿、心電図、胸部 X 線などの検査をし、心血管疾患、糖尿病、腎疾患、眼疾患などに関しチェックを受けるべきである。慢性疾患をもつ症例では、適切な治療と、それぞれの疾患の進行を起こすことがないような運動療法を指導する。

3. レジスタントトレーニングの処方

高齢者医療の公理である“start low, and go slow”は、運動トレーニングを開始するにあっても、強調されなくてはならない。レジスタントトレーニング処方では症例の目的に応じて設定されるべきである。処方では、負荷の大きさなどの強度、持続時間(セット数)、頻度が設定される。

強度の基準となるのが、その人の「最大筋力」であり、「1RM(1 Repetition Maximum)」は、その人が1回しか反復できない重さ、つまり、その人にとっての最大負荷重量のことを意味する。低負荷(たとえば、1RMの60%)では、筋持久力が向上し、高負荷(たとえば、1RMの80%)では筋肉肥大が起こり筋力が高まると考えられている。この理由は、高負荷ではⅡ型線維を多く含む速筋が使われるのに対し、低負荷

では、Ⅰ型線維が主体の遅筋が活動することと、トレーニングによる筋肥大効果は、Ⅱ型線維において大きいことによると説明される。このような観点からは、高齢者でもⅡ型線維を鍛えるためには、強度の高いトレーニングが必要になる。しかしながら、高齢者では、息ごらえが必要になるほどの強度の高い運動は避けるべきである。

持続時間は、一定の回数を数セット行う。頻度は、トレーニングにより断裂、破壊された筋線維が回復し、修復される時間に基づき、48~72時間間隔で行う。しかしながら、損傷された筋肉の回復は、高齢者では、若年者と比較し低下していることもあり、トレーニング効果を評価しながら調整していく。

栄養療法

一般に、加齢により摂取量は低下する。この生理的な食欲低下は、胃内容排出能の低下やコレシストキニンの作用が関連すると考えられている。また、男性ではテストステロンの低下によりレプチンレベルが上昇することが示されているし、加齢による高齢者の虚弱化を引き起こすサイトカイン(たとえばIL-6)も生理的な食欲低下においては作用することが知られている⁶⁾。このような加齢に関わる食欲低下促進因子に加えて、様々な病的な要因、たとえば、うつは高齢者の食欲低下と体重減少の原因として重要である。外来通院中の高齢男性で、意図的でない4%以上の体重減少がみられた群(全体の約13%)では、体重を維持した群と比較し、有意に死亡率が高かったことが報告されており、体重減少は、独立した生命予後危険因子であることが示唆されている⁷⁾。

カロリー不足、とくに不十分な蛋白質の摂取は、窒素バランスが負となり筋肉の崩壊と喪失につながる。高齢者で体重減少を目的とし、食事を制限すると、脂肪のみならず筋肉量の低下を起こし、結果的に脂肪優位な体構成となってしまうことになるので注意を要する。高齢者でのダイエットは、明確に治療を目的とする場合