

The Difference between Ideal and Actual Fasting Duration in the Treatment of Patients with Aspiration Pneumonia: A Nationwide Survey of Clinicians in Japan

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In Japan, aspiration pneumonia is common among the elderly and patients are often treated by temporary discontinuation of meals. However, there are few published studies on the fasting duration for aspiration pneumonia treatment. Therefore, we conducted the present study to assess the opinions of clinicians regarding the fasting duration for the treatment of patients with aspiration pneumonia and the actual medical practice with regard to oral ingestion in hospitalized patients with aspiration pneumonia. We targeted hospitals with internal medicine and respiratory medicine departments across Japan. A questionnaire regarding the fasting duration for aspiration pneumonia treatment and oral ingestion in hospitalized patients with aspiration pneumonia was mailed to physicians treating patients with pneumonia at 2,490 hospitals. We received appropriate responses from 350 facilities (response rate, 14.1%). Most clinicians (78.3%) responded that it best to keep the fasting duration for treatment as short as possible and considered that fasting is absolutely unnecessary. Regarding oral ingestion in hospitalized patients, more than 25% of clinicians restricted oral intake for a certain number of days. The majority of these clinicians (53.3%) preferred prolonged fasting for 3 to 7 days. Although most physicians preferred the fasting duration to be as short as possible, there was a difference between the ideal and actual scenarios in reintroducing oral intake early in patients with aspiration pneumonia. Improving physicians' knowledge and experience will bridge the gap between the ideal situation and what currently occurs. Further studies should investigate the acceptable fasting duration for the treatment of aspiration pneumonia.

Keywords: aspiration pneumonia, fasting, general internal physicians, respiratory specialists, reintroduce oral ingestion

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Introduction

In Japan, the number of deaths from pneumonia has been increasing with the aging of society. Recent statistics excluding cerebrovascular disease revealed that pneumonia is the third leading cause of death after malignant neoplasms and heart diseases (Ministry of Health, Labour and Welfare 2015). Furthermore, the number of deaths from pneumonia is predicted to increase in the future. In particular, aspiration pneumonia is common among the elderly; among patients who are hospitalized due to pneumonia, aspiration pneumonia is observed in one third of patients who are in their 50s, in 50% of patients who are in their

60s, and in 80.1% of patients who are ≥ 70 years old (Teramoto et al. 2008).

A study from the USA reported the clinical events experienced by elderly patients with dementia after institutionalization (Mitchell et al. 2009). In this study, approximately 80% of elderly patients experienced eating disorders within a year of institutionalization, followed by death due to fever and pneumonia. In other words, the natural course of an elderly patient's death begins with swallowing dysfunction due to declining brain function followed by pneumonia.

In Japan, patients with aspiration pneumonia are often treated with temporary discontinuation of meals, which are

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reintroduced after the initiation of various treatments. In addition to antimicrobial therapy, drugs such as angiotensin-converting enzyme inhibitors (Sekizawa et al. 1998), cilostazol (Yamaya et al. 2001b), amantadine (Nakagawa et al. 1999), and theophylline (Ebihara et al. 2004), oral care and swallowing rehabilitation (Yamaya et al. 2001a) are effective for the treatment of aspiration pneumonia and recurrence prevention. Furthermore, olfactory stimulation using black pepper and capsaicin and pain stimulation in the oral cavity, along with the reintroduction of meals, following the protocol, in conjunction with the above described drug treatments, decreases the recurrence of aspiration pneumonia after reintroducing meals (Ebihara et al. 2010).

However, with regard to eating disorders, the reintroduction of oral intake in hospitalized patients who have been instructed to fast is a matter of concern for not only the patient and family but also medical staff (Takayanagi et al. 2013). One study has reported that tentative *nil per os* treatment resulted in poorer daily nutritional intake for one week after admission, a significantly longer treatment duration, and a greater reduction in swallowing ability during the treatment compared to results that were observed in patients who started early oral intake (Maeda et al. 2016). We strongly agree with this result, and we believe that the fasting duration for aspiration pneumonia treatment should be as short as possible. In addition, in our previous study (Kenzaka et al. 2016), we considered several criteria, including the level of consciousness, oxygen saturation (SpO₂), the discretion of the attending physician, body temperature, swallowing function test results, mental state, and respiratory rate, during decision-making regarding oral intake resumption.

However, to the best of our knowledge, there are few published English- or Japanese-language studies with regard to the fasting duration for the treatment of patients with aspiration pneumonia (Koyama et al. 2015; Maeda et al. 2016). Therefore, we conducted the present study to assess the opinions of clinicians regarding the fasting duration for the treatment of patients with aspiration pneumonia and the actual medical practice with regard to oral ingestion in hospitalized patients with aspiration pneumonia by using the same database as in our previous study (Kenzaka et al. 2016).

Materials and Methods

Study design

This study aimed to survey the current status of medical practices related to fasting for patients with aspiration pneumonia using a questionnaire survey. Although we requested an ethical review by the Epidemiology Research Ethics Committee at Jichi Medical University, ethical approval was waived because our study was based on a questionnaire survey. Return of the questionnaire was considered a form of consent by the participants. The questions and results regarding fasting duration and reintroducing oral intake after aspiration pneumonia were described in our previous report (Kenzaka et al.

2016).

Implementation of the survey

Using the roster of all Japanese medical institutions, we targeted hospitals equipped with internal medicine and respiratory medicine departments across Japan. However, there is no list of all the physicians in Japan; therefore, we collected one response from the head of the department at each hospital. Questionnaires regarding the fasting duration for the treatment of aspiration pneumonia were sent to each hospital during September 2014 and were addressed to the physician who oversaw pneumonia treatment. We requested that the participants return the completed questionnaires to our research office by November 2014.

Contents of the questionnaire

Question 1: What is your opinion regarding the fasting duration for aspiration pneumonia treatment? Please choose the closest answer from the following options.

1. It should be sufficiently long (fast is absolutely necessary).
2. It should be as short as possible (fast is absolutely unnecessary).
3. Neither (it should attach importance to other factor excepting length of the fasting duration).
4. Other (please elaborate)

Question 2: This question is regarding the actual medical practice related to oral ingestion in hospitalized patients with aspiration pneumonia. Oral ingestion refers to the oral intake of solid food or liquids. Please choose the closest answer from the following options.

1. Fasting should be avoided as much as possible.
2. Fast temporarily, but reintroduce oral ingestion as fast as possible depending on the situation.
3. Usually fast for a certain period of time (please specify the number of days).
4. Other (please elaborate)

Data analysis

The reliability of our survey instrument was tested using Cronbach's alpha statistics. The responses to questions 1 and 2 were tabulated and compared between respiratory specialists (pneumonia treated by respiratory specialists) and general internal physicians (pneumonia treated by general internal physicians). We compared these because pneumonia patients are mainly treated by respiratory specialists and/or general internal physicians in Japan. The two groups were compared using a Chi-square analysis. All statistical analyses were performed using SPSS for Windows version 22.0 (IBM Inc., New York, NY). A *P*-value of ≤ 0.05 was considered statistically significant.

Results

The questionnaire was mailed to 2,525 medical facilities across Japan. From these, the addresses of 35 facilities were incorrect; consequently, the mail was returned. Of the remaining 2,490 institutions, 350 provided appropriate responses. The overall response rate was 14.1% (one response was collected from the head of department at each hospital). When the two questions were combined, Cronbach's alpha was 0.859, indicating good reliability for the questionnaire items.

There are 709 authorized medical institutions in the Japanese Respiratory Society. From these, 224 facilities employing respiratory specialists responded to our questionnaire (response rate, 31.6%). Among the facilities that responded, pneumonia was not treated by respiratory specialists at 34 facilities. Of the total number of responding facilities (n = 350), pneumonia was treated by respiratory specialists in 190 and general internal physicians in the remaining 160. The mean number of beds in the 350 responding facilities was 337 ± 251 (range, 20-1,505).

Table 1 shows the bed capacities in the responding facilities. The response rate was higher from facilities with a larger bed capacity. Table 2 shows the annual number of inpatients with pneumonia in the responding facilities. The baseline data were similar to those in our previous study (Kanzaka et al. 2016).

Table 3 shows the responses to Question 1 regarding

the fasting duration for the treatment of patients with aspiration pneumonia. The majority of respondents considered it best to keep this duration as short as possible (78.3%). The 13 respondents that chose the “other” option provided the following specific reasons: “depends on individual cases” (seven respondents), “after swallowing function is evaluated” (two respondents), “once an improvement in symptoms has been confirmed” (two respondents), “until the patient feels better” (one respondent), and “no specific reason” (one respondent). There was no significant difference in responses between the respiratory specialists and general internal physicians.

Table 4 shows the responses to Question 2 regarding the actual medical practice with regard to oral ingestion in hospitalized patients with aspiration pneumonia. Only 7.1% responded that “fasting should be avoided as much as possible.” When the responses “fast temporarily, but reintro-

Table 1. Number of responding facilities by bed capacity.

Hospital bed capacity	Number of responding facilities	Number of facilities to which we sent the questionnaire	Response rate
Under 100 beds	52	628	8.3%
100–199 beds	81	753	10.6%
200–299 beds	49	325	15.1%
300–499 beds	85	484	17.6%
≥ 500 beds	83	335	24.8%

Source: Kanzaka et al. (2016).

Table 2. Number of responding facilities by the annual number of inpatients with pneumonia.

Patients with pneumonia (Annual number)	Number of responding facilities
≤ 50	54
51–100	64
101–150	47
151–200	48
> 200	130
Nonresponders	7

Source: Kanzaka et al. (2016).

Table 3. Responses to the question regarding the fasting duration for treating patients with aspiration pneumonia.

Responses	All responses (n = 350)	Respiratory specialists group (n = 190)	General internal physicians group (n = 160)	P-value
1. It should be sufficiently long.	12 (3.4)	8 (4.2)	4 (2.5)	0.346
2. It should be as short as possible.	274 (78.3)	150 (78.9)	124 (77.5)	
3. Neither	44 (12.6)	20 (10.5)	24 (15.0)	
4. Other (please elaborate)	13 (3.7)	9 (4.7)	4 (2.5)	
No response	7 (2.0)	3 (1.6)	4 (2.5)	

Data are expressed as number (%).

Respiratory specialists group: pneumonia was treated by respiratory specialists.

General internal physicians group: pneumonia was treated by general internal physicians.

Table 4. Responses to the question regarding oral ingestion in patients hospitalized with aspiration pneumonia.

Responses	All responses (n = 350)	Respiratory specialists group (n = 190)	General internal physicians group (n = 160)	P-value
1. Fasting should be avoided as much as possible.	25 (7.1)	10 (5.3)	15 (9.4)	0.359
2. Fast temporarily, but reintroduce oral ingestion as fast as possible depending on the situation.	223 (63.7)	126 (66.3)	97 (60.6)	
3. Usually fast for a given amount of time (please specify the number of days).	90 (25.7)	47 (24.7)	43 (26.9)	
4. Other (please elaborate)	12 (3.4)	7 (3.7)	5 (3.1)	

Data are expressed as number (%).

Respiratory specialists group: pneumonia was treated by respiratory specialists.

General internal physicians group: pneumonia was treated by general internal physicians.

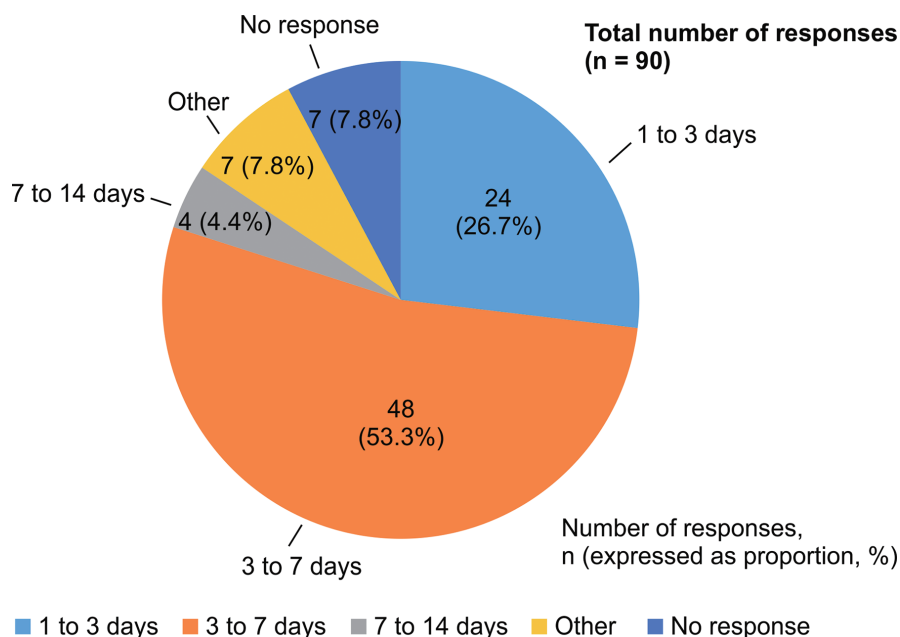


Fig. 1. Specific number of days reported by facilities that responded with “Usually fast for a certain period of time” in Question 2.

duce oral ingestion as fast as possible depending on the situation” (63.7%) and “usually fast for a given amount of time” (25.7%) were combined, we found that 89.4% of clinicians preferred temporary fasting. Twelve clinicians chose the “other” option, and six chose one answer from options 1 to 3 along with specific comments. The specific comments from these 18 respondents included the following: “after evaluating swallowing” (eight respondents), “once the symptoms of pneumonia such as fever and disturbed breathing have alleviated” (five respondents), “depends on the judgment of the attending physician” (two respondents), “depends on each case” (one respondent), “once the level of consciousness has improved” (one respondent), and “depends on the request of the family” (one respondent). There was no significant difference in responses between the respiratory specialists and general internal physicians.

Fig. 1 shows the specific number of days reported by 90 respondents that chose “usually fast for a certain period of time.” The majority of clinicians preferred prolonged fasting for 3 to 7 days (53.3%). When these were combined with 26.7% of clinicians who preferred 1 to 3 days of fasting, a total of 80.0% preferred fasting for ≤ 7 days; only 4.4% preferred a fasting period of > 7 days. Seven respondents chose the “other” option with the following specific comments (one comment per facility): “until pneumonia is cured,” “depends on the condition,” “it is not predetermined, but the attending physician decides the appropriate timing,” “it is not predetermined, but patients usually fast during hospitalization,” “depends on individual cases, but usually until fever comes down and consciousness level improves,” and “until fever comes down.”

Discussion

The first novelty of this study is that we showed the difference between the ideal and actual scenarios with regard to fasting, and confirmed that about two-thirds of physicians preferred patients to fast temporarily. Although most physicians preferred that fasting duration be as short as possible, more than 25% restricted oral intake for a certain number of days. We consider that there are some reasons for this difference. These include a lack of physician knowledge and experience regarding swallowing difficulties and clinical nutrition, as well as the lack of a multidisciplinary nutritional care system in some hospitals. Based on the results of this study, in clinical practice, a certain number of physicians restrict oral intake for a certain length of days. This might reflect a lack of knowledge. As shown in the specific comments for Question 2, evaluation of swallowing function and level of consciousness are important for reintroducing oral feeding. In our other study (Kenzaka et al. 2016), physicians considered several criteria during decision-making regarding resumption of oral intake. The criteria included level of consciousness, the discretion of the attending physician, swallowing function test results, and mental state. It appears that not many patients have consciousness disturbance for 3 or more days after admission to the hospital and this might reflect a lack of experience. In addition, the discretion of the attending physician is based on the physician’s knowledge and experience. Furthermore, clinical nutrition support is important in infectious disease, particularly in the elderly. However, the physicians’ knowledge and multidisciplinary nutritional care system in hospitals in Japan seem insufficient. We consider that improving physicians’ knowledge and experience will

bridge the gap between the ideal and the actual scenarios.

A second novelty of the study is that we confirmed that 63.7% of physicians made patients fast temporarily for treatment of aspiration pneumonia. Although it is best to avoid fasting or minimize the duration of fasting, Ebihara et al. (2010) reported that reintroducing meals according to a comprehensive protocol prevents the recurrence of aspiration pneumonia after oral intake is reintroduced. In addition, Yamamoto (2008) reported that swallowing dysfunction should be evaluated early in patients with eating disorders who are required to fast, with early initiation of training before dry swallowing is impaired. This suggests that short-term fasting is acceptable to improve the cough reflex from the perspective of the recurrence of aspiration pneumonia. Further studies are necessary to build evidence for an acceptable fasting duration and a standard protocol to determine the timing of the reintroduction of meals.

This study has four major limitations. First, the overall response rate for the questionnaire was low (14.1%), with the response rate for authorized medical institutions of the Japanese Respiratory Society being 31.6%. However, Hagihara et al. (2006) reported a response rate of 17.8% for a Japanese questionnaire survey that randomly selected respondents who did not receive a reward. Therefore, we believe that our response rate is acceptable, as we did not offer a reward and did not attempt to follow up with reminders. In addition, the response rate was higher from facilities with a larger bed capacity. Our survey results indicated that general internal physicians and physicians working in hospitals with smaller bed capacities showed limited interest in aspiration pneumonia and surveys. Although we included all hospitals with respiratory medicine departments, a large number may not have full-time physicians in these departments. Such facilities may not have shown much interest in the survey, leading to the low response rate. In addition, facilities that responded to the questionnaire may be biased toward aspiration pneumonia treatment. Therefore, our results do not reflect the current status in Japan as a whole. Second, 89.4% of clinicians preferred temporary fasting for their patients with aspiration pneumonia; however, the validity of this protocol remains unknown in the present study. Accordingly, the present study should be considered a pilot study, with further detailed studies in the pipeline. Third, the data and data analysis did not include the opinion of the neurologist. Stroke is a common risk for aspiration pneumonia. In addition, the stroke specialist may be a neurologist or a general internal physician in Japan, so the neurologist might have enough experience with swallowing dysfunction. However, this result could not be reflected in the neurologists' opinion in this study, because neurologists did not treat patients with pneumonia. Fourth, this study focused solely on "the fasting duration" for aspiration pneumonia treatment.

In conclusion, although most physicians considered that fasting duration would be as short as possible, there is a difference between the ideal and the actual scenarios in

reintroducing oral intake early in patients with aspiration pneumonia. Further studies should investigate the acceptable fasting duration for the treatment of aspiration pneumonia.

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Author Contributions

TK conceived the study, participated in its design and coordination, and drafted the manuscript.

KK, YM, and AN participated in the design of the study and performed data collection.

AK drafted the manuscript, corrected and restructured the manuscript, and performed statistical analyses. All authors read and approved the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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