

*Original Article***Usefulness of swallowing rounds in acute general hospital**

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**ABSTRACT**

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**Objective:** To investigate the usefulness of swallowing rounds using videoendoscopic evaluation of swallowing in patients with suspected dysphagia admitted to an acute general hospital.

**Methods:** 473 patients (mean age 79 years) in whom swallowing rounds were conducted in 2013 were analyzed retrospectively. The parameters analyzed were disease at admission, eating status scale (ESS) score, dysphagia severity scale (DSS) score, food texture, onset of pneumonia during hospitalization, discharge destination, and nutrition method at discharge.

**Results:** The most common diseases at admission were pneumonia (48%) and stroke (20%). Compared to the first swallowing round, significant ( $p < 0.001$ ) improvements in ESS score, DSS score, and food texture were achieved at discharge or end of intervention in all patients, pneumonia patients, and stroke patients. The incidence of pneumonia onset during hospitalization was 4.9%. The incidence of pneumonia was significantly ( $p = 0.045$ ) higher in patients with respiratory diseases than in stroke patients.

**Conclusion:** In this study, significant improvements of ESS score, DSS score and food texture were achieved

by conducting swallowing rounds, indicating their usefulness in acute general hospital.

**Key words:** dysphagia, swallowing rounds, videoendoscopic evaluation of swallowing, pneumonia, acute general hospital.

**Introduction**

The prevalence of dysphagia in the elderly is high, and dysphagia has been reported to be a predictor of mortality and impaired activities of daily living [1], and to be closely associated with the severity of stroke [2]. In addition, dysphagia is a frequent complication in patients with dementia, and is associated with high mortality rate [3]. Dysphagia is highly prevalent in patients with pneumonia [4, 5], and the presence of dysphagia is associated with low functional state before pneumonia onset and low survival rate after onset [5, 6]. In the elderly, dysphagia increases the risks of low nutritional status and onset of pneumonia, while dysphagia rehabilitation has a positive impact in lowering these risks [7]. In one report, 13.6% of adult patients admitted to general wards had dysphagia [8]. Once aspiration pneumonia develops, various complications such as impaired swallowing related to disuse and impaired activity of daily living occur [6]. Therefore, appropriate evaluation and management of dysphagia are important in Japan which has already become an aging society.

Toda et al. [9] conducted swallowing rounds in patients admitted to an acute hospital, and reported significant improvements in food texture, eating status scale (ESS) score [10], and dysphagia severity scale (DSS) score [10]. However, there are very few reports of large-scale studies on the evaluation and management of dysphagia in acute hospitals. Therefore, we validated the usefulness of swallowing rounds using videoendoscopic evaluation of swallowing (VE) in an acute general hospital.

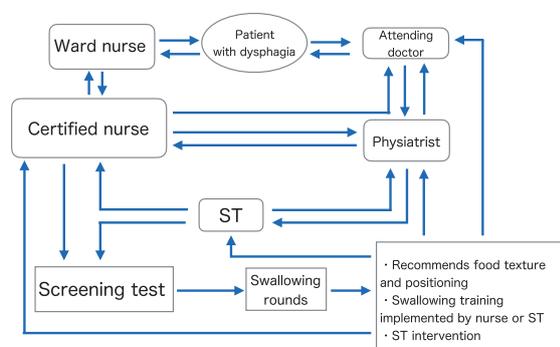
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## Methods

This study was conducted in Kariya Toyota General Hospital, a 672-bed acute general hospital in Japan. The Department of Rehabilitation Medicine of the hospital has been conducting swallowing rounds in inpatients with suspected dysphagia, mainly by evaluation using VE. The flow of swallowing rounds is shown in Figure 1. During hospitalization, patients suspected of having dysphagia are referred by the ward nurse to the certified nurse specialist in dysphagia (certified nurse), or by the attending physician to the physiatrist. Based on the information provided by the certified nurse or speech-language hearing therapist (ST), swallowing rounds are planned mainly by the physiatrist. Before the swallowing rounds, the certified nurse or ST observes the general conditions of the patients. After excluding patients with severe impairment of consciousness, screening tests including repetitive saliva swallowing test (RSST) [11] and modified water swallowing test revised (MWST) [10], together with mealtime observation are conducted. Swallowing rounds are conducted by a team composed of physiatrist, ST, certified nurse, ward nurse in charge, and dietitian. Swallowing rounds are conducted twice a week, about 6 to 7 patients per round that takes 2.5 to 3 hours. Based on the evaluation result obtained from the swallowing round, the team discusses and recommends food texture, methods of care on the ward, and future care policy. These are then communicated to the attending physician. Furthermore, swallowing training is implemented by the ward nurse or ST as necessary. The training includes neck relaxation, head and neck range of motion training, breathing training, thermal stimulation [12], Shaker's exercise [13, 14], Mendelsohn maneuver [15, 16], and supraglottic swallow [17], depending on the disease condition. During mealtime observation, instructions of posture adjustments including reclining posture and head rotation are also given based on the VE result. Regular follow-up observations are conducted mainly by the attending



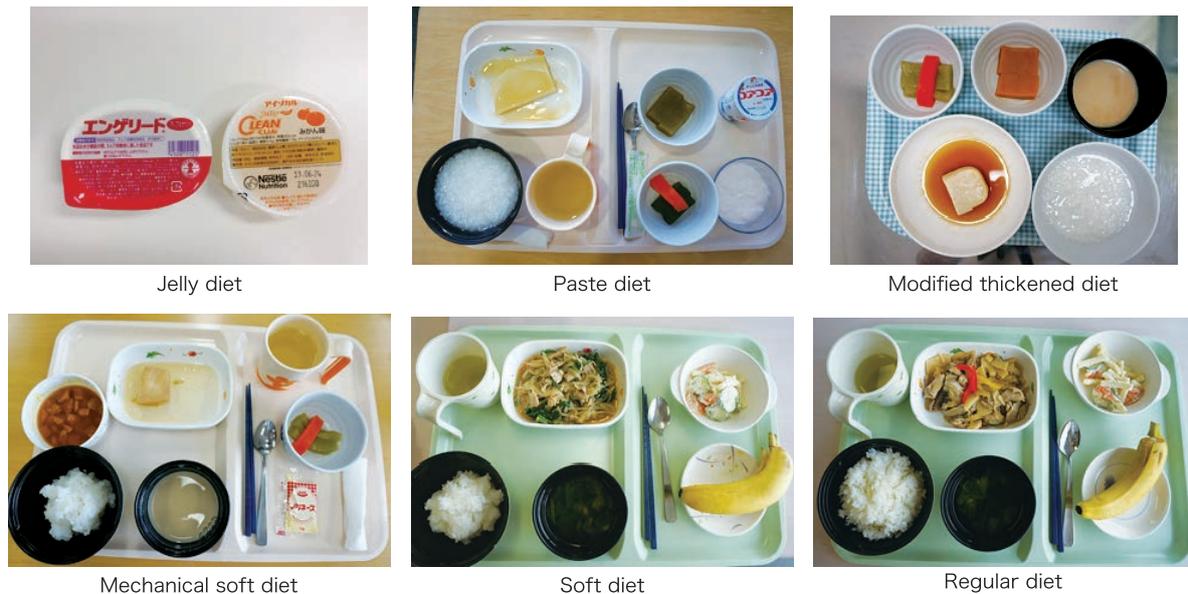
**Figure 1.** Flow of swallowing rounds.

Based on the information provided by the certified nurse or speech-language hearing therapist, swallowing rounds are planned mainly by the physiatrist.

ST for patients who need ST intervention, and mainly by the certified nurse for patients who do not require ST intervention. When repeated assessments over time are judged necessary during swallowing round or follow-up observation, the timing of repeated testing is decided mainly by the physiatrist. Intervention is terminated when the patient is discharged, when the goal of swallowing function is reached, or when the general condition deteriorates such that intervention cannot be conducted.

In this study, 473 patients (245 males, 228 females) who were evaluated in swallowing rounds at the Kariya Toyota General Hospital between January and December 2013 were analyzed retrospectively. The mean age of the patients was 79 years (range 29 to 101 years). The median duration from admission to the first swallowing round was 8 days (range 2 to 140 days). The median observation period in swallowing rounds was 15 days (range 1 to 174 days). The parameters analyzed were disease at admission, ESS score, DSS score, food texture, onset of pneumonia during hospitalization, discharge destination, and nutrition method at discharge. The ESS is a 5-point scale that assesses the method of nutrient and water intake: 1. tube feeding only; 2. oral < tube; 3. oral > tube; 4. oral feeding (modified); 5. oral feeding (unmodified). The DSS is a 7-point scale consisting of: 1. saliva aspiration; 2. food aspiration; 3. water aspiration; 4. occasional aspiration; 5. oral problem; 6. minimum problem; 7. within normal limit [10]. In our hospital, there are six forms of diets: jelly diet, paste diet, modified thickened diet, mechanical soft diet, soft diet, and regular diet (Figure 2). Food texture and ESS were evaluated before admission, at the first swallowing round, after the first round, and at discharge. DSS score was obtained from the data at the first swallowing round and at the end of intervention. The diagnostic criteria of pneumonia were the presence of infiltrative finding on chest X-ray or chest CT, and the presence of two of the following: fever of 37.5°C or above, abnormally elevated C-reactive protein (CRP) level, peripheral white blood cell count of 9,000 $\mu$ /L or above, and respiratory tract symptoms including productive cough [18]. For patients who were dead at discharge, the main feeding method before death was used as the feeding method at discharge. Furthermore, the results obtained from this study were compared with those reported by Toda et al. [9].

The statistical software SPSS Statistics 19 (IBM, Japan) was used for statistical analyses. Wilcoxon signed rank test was performed to compare ESS score, DSS score and food texture, while Mann-Whitney *U* test was performed to compare ESS score and food texture between pneumonia and stroke. Bonferroni adjustment was conducted for multiple comparisons. Fisher's exact test was used to compare the incidence of pneumonia between stroke patients and patients



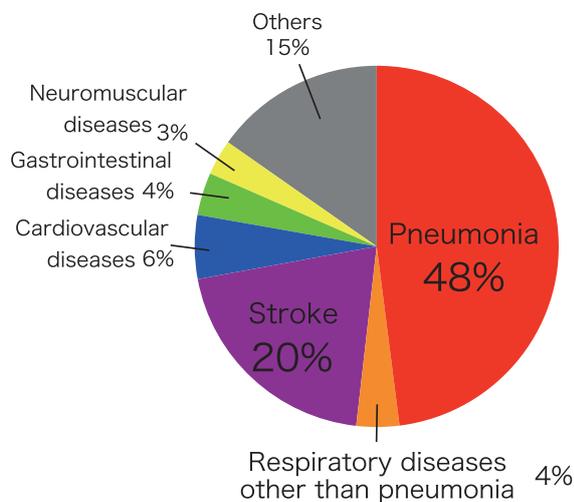
**Figure 2.** The forms of diet available at the Kariya Toyota General Hospital.

Six forms are available: jelly diet, paste diet, thickened diet, mechanical soft diet, soft diet, and regular diet.

with respiratory diseases. The  $\chi^2$  test or Fisher's exact test was used to compare the present results with those reported by Toda et al. [9]. For all analyses, the significance level was set at 5%.

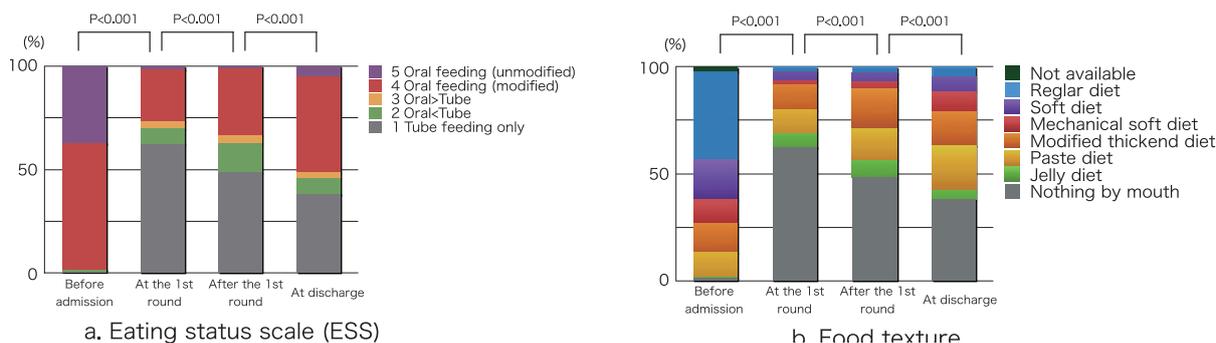
### Results

The most common disease at admission was pneumonia (227 patients, 48%) followed by stroke (96 patients, 20%), cardiovascular diseases (27 patients, 6%), respiratory diseases other than pneumonia (18 patients, 4%), and gastrointestinal diseases (18 patients, 4%), in that order (Figure 3). ST intervention was implemented in 296 patients (62.5%). Before admission, the ESS evaluation results in all patients were score 1 in 3 patients, score 2 in 3 patients, score 3 in 2 patients, and score 4 in 465 patients (98.3%). At

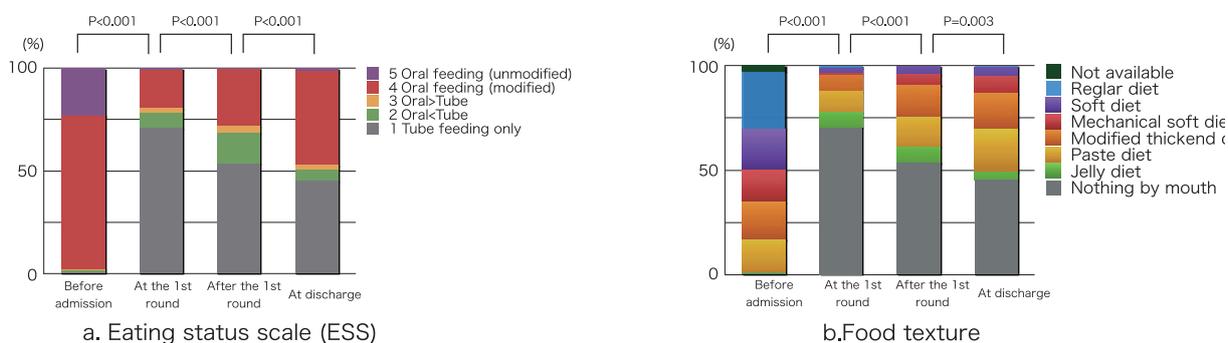


**Figure 3.** Primary diseases at admission ( $n = 473$ ). Pneumonia occupied 48% (227 patients).

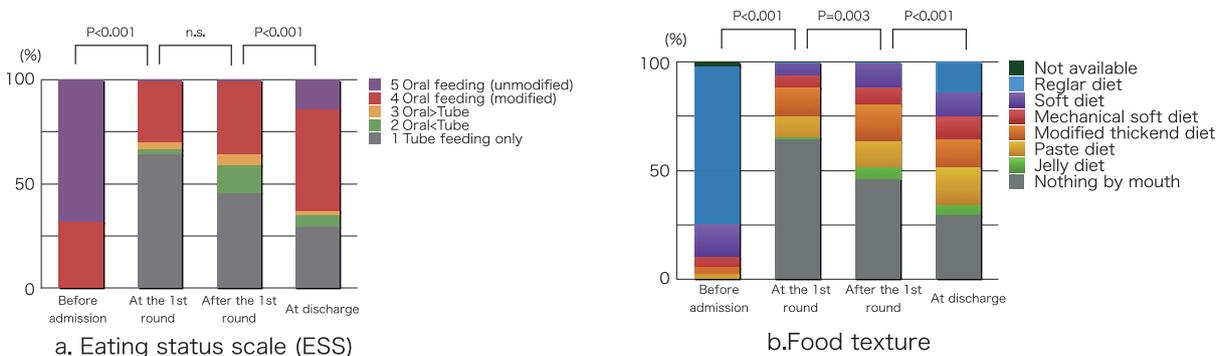
the first swallowing round, the ESS scores were score 1 in 295 patients (62.4%), score 2 in 34 patients (7.2%), and score 3 in 18 patients (3.8%), with over one-half of the patients requiring tube feeding, showing significant worsening of eating status compared to before admission ( $p < 0.001$ ). Significant improvement in ESS score was observed after the first round ( $p < 0.001$ ), and further significant improvement in ESS score was achieved at discharge ( $p < 0.001$ ) (Figure 4a). Food texture also worsened significantly at the first swallowing round compared to before admission ( $p < 0.001$ ), with over one-half of the patients receiving nothing by mouth. However, significantly improvement was observed both after the first round and at discharge ( $p < 0.001$  for both) (Figure 4b). Pneumonia, which constituted the largest proportion of cases, showed the same trends in ESS score and food texture as those in all patients (Figure 5a and 5b). For stroke that had the second largest proportion, no significant difference in ESS score was observed between the first swallowing round and after the first round. However, food texture improved significantly after the first round, and significant improvements in both ESS score and food texture were achieved at discharge (Figure 6a and 6b). Comparing pneumonia and stroke, no significant differences in ESS score and food texture were observed between the two diseases at the first swallowing round and after the first round, but ESS score and food texture both before admission and at discharge were significantly better in stroke ( $p < 0.001$ ). DSS evaluation at the first swallowing round showed many cases of food aspiration and water aspiration, indicating moderate or severe dysphagia. Although the largest number of patients showed no change, DSS score improved significantly at



**Figure 4.** Changes in (a) eating status scale (ESS) score and (b) food texture in all patients. Data were analyzed by Wilcoxon sign rank test with Bonferroni adjustment. ESS score worsened significantly at the first swallowing round, but improved significantly after the first round and at discharge. For food texture, although over one-half of the patients were receiving nothing by mouth at the first swallowing round, significant improvement was observed both after the first round and at discharge.



**Figure 5.** Changes in (a) eating status scale (ESS) score and (b) food texture in patients with pneumonia at admission. Data were analyzed by Wilcoxon sign rank test with Bonferroni adjustment. ESS score and food texture showed the same trends as those in all patients.

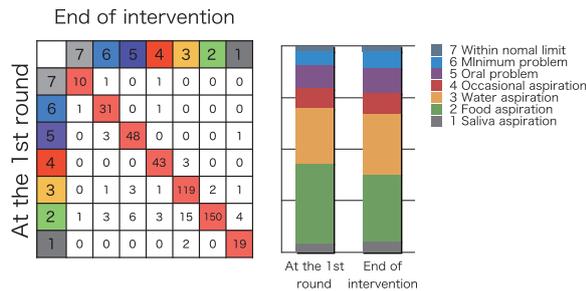


**Figure 6.** Changes in (a) eating status scale (ESS) score and (b) food texture in stroke patients. Data were analyzed by Wilcoxon sign rank test with Bonferroni adjustment. No significant changes in ESS score were observed at the first swallowing round and after the first round. However, food texture improved significantly after the first round, and significant improvements in both ESS score and food texture were observed at discharge compared to after the first swallowing round.

the end of intervention ( $p<0.001$ ). Only 14 patients (2.9%) had worsened DSS score (Figure 7).

Twenty-three patients (4.9%) had onset of pneumonia during hospitalization. When analyzed by disease at admission, 13 patients (57%) had pneumonia, constituting the largest number (Figure 8). In addition, pneumonia onset was observed in 14 of 245 patients

(5.7%) who had respiratory diseases including pneumonia, and in 1 of 96 patients (1.0%) who had stroke. The incidence of pneumonia onset was significantly higher in patients with respiratory diseases than in stroke patients ( $p=0.045$ ). None of the patients who had onset of pneumonia used tube feeding before admission, while 10 patients (43.5%)



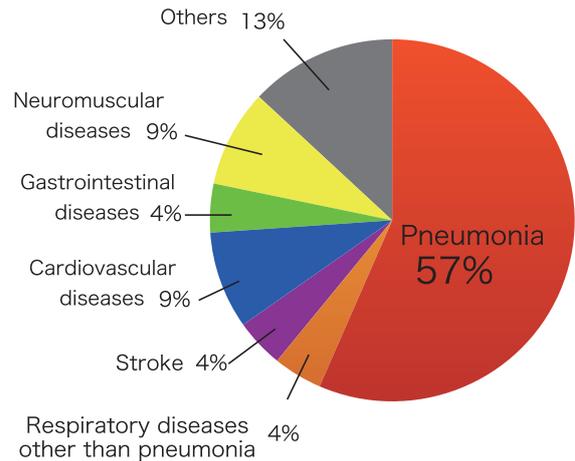
**Figure 7.** Distribution and changes in dysphagia severity scale (DSS) score.

Data were analyzed by Wilcoxon sign rank test. Although the largest number of patients showed no change, the DSS score improved significantly at the end of intervention compared to at the first swallowing round.

received nothing by mouth at pneumonia onset. None of the patients had ESS score 5 at discharge. In patients who had pneumonia onset during hospitalization, no significant changes in ESS score, DSS score and food texture were observed at the first swallowing round, after the first round, at pneumonia onset, and at discharge or end of intervention.

Discharge destination was other hospital in 171 patients (36%), home in 129 patients, (27%), institution in 121 patients (26%), while 52 patients (11%) were dead at discharge. The nutrition method at discharge was oral intake only in 260 patients (55%), peripheral vein nutrition in 77 patients (16%), nasogastric tube nutrition in 70 patients (15%), gastrostomy in 40 patients (8%), and central vein nutrition in 26 patients (6%).

Compared to the study of Toda et al. [9], the ratio of respiratory diseases to stroke was significantly higher in our cohort ( $p < 0.001$ ). The overall incidence of pneumonia onset was apparently higher than the 3.7% reported by Toda et al. [9] with no significant difference, while the incidence of pneumonia among patients with respiratory diseases was significantly lower ( $p=0.016$ ). In stroke patients, no significant differences in the incidence of pneumonia and rate of nothing by mouth at pneumonia onset were observed between the two studies (Table 1).



**Figure 8.** The distribution of diseases at admission for patients who had onset of pneumonia during hospitalization ( $n = 23$ ).

Twenty-three patients (4.9%) had onset of pneumonia during hospitalization. Pneumonia was the most common disease at admission (13 patients, 57%).

### Discussion

In the present study, ESS score and food texture both worsened at the first swallowing round compared to before admission, and swallowing rounds resulted in improvements of both parameters with marked decrease in the proportion receiving nothing by mouth. The improvements after the first round were achieved presumably because swallowing rounds allow accurate evaluation of dysphagia by VE and instructions of appropriate compensatory methods such as reclining posture and head rotation. Further improvements until discharge likely reflect the effectiveness of training provided by the ST and nurses. Moreover, DSS score also improved significantly during a relatively short period of 15 days (median). For respiratory diseases including pneumonia, improvement of the respiratory status through treatment of the primary disease may have improved swallowing and respiration timing. In stroke patients, it is well known that the prevalence of dysphagia is high during the acute stage, but decreases over time [19, 20]. In stroke patients, although ESS score did not improve significantly after the first swallowing round, definitive improvement was achieved at discharge. These findings suggest that in acute hospital, improvement in dysphagia is achieved

**Table1.** Primary disease at admission and the incidence of pneumonia.

|                    | Number of patients | Respiratory diseases (%) | Stroke (%) | Incidence of pneumonia (%) |                      |        | Tube feeding only at onset of pneumonia (%) | Median observation period (day) |
|--------------------|--------------------|--------------------------|------------|----------------------------|----------------------|--------|---|---------------------------------|
|                    |                    |                          |            | Total                      | Respiratory diseases | Stroke |   |                                 |
| Toda et al. (2015) | 998                | 7.8                      | 45.6       | 3.7                        | 14.1                 | 3.3    | 32.4  | 24                              |
| This study         | 473                | 51.8                     | 20.3       | 4.9                        | 5.7                  | 1.0    | 43.5  | 15                              |

in a certain number of patients.

Prior to admission, over 98% of the patients were on oral intake only and the majority were taking regular diet. At the first swallowing round, however, over one-half of the patients were prescribed nothing by mouth and receiving tube feeding. In acute hospitals, treatment of the primary disease has the top priority. Patients on tube feeding may include those with suspected dysphagia who were prescribed nothing by mouth for safety, and others who although permitted the same diet as before admission were changed to nothing by mouth due to choking or other problems during observation of actual mealtime. Due to the retrospective design of the present study, this issue cannot be studied in detail. Further studies are required.

Among patients who developed pneumonia during hospitalization, 43.5% were receiving nothing by mouth at the onset of pneumonia. Saliva aspiration and reflux of tube feeding are conceivably the causes of pneumonia despite receiving nothing by mouth. The possibility that problems other than dysphagia cause pneumonia cannot be denied, although this issue cannot be confirmed in the present study. The facts that the proportion of nothing by mouth at pneumonia onset did not differ significantly from that reported by Toda et al. [9] and that 30 to 40% of patients who had new onset of pneumonia during hospitalization were receiving nothing by mouth indicate the need for renewed emphasis that discontinuing oral intake alone cannot prevent pneumonia. Since patients who developed pneumonia in the clinical course did not achieve significant improvement in ESS score, DSS score or food texture, preventing the development of pneumonia during hospitalization is very important.

In this study, more than one-half of the patients had respiratory diseases while stroke patients constituted approximately 20%, and this disease composition was considerable different from that of Toda et al. [9]. Comparing pneumonia and stroke, there were no differences in ESS score and food texture at the first swallowing round and after the first round, although these parameters before admission and at discharge were better in stroke. Disease attributes and the pre-admission conditions may have great influence on dysphagia. Further studies are required. In addition, the diagnostic criteria for pneumonia were identical to those used by Toda et al. [9]. The significantly higher incidence of pneumonia in patients with respiratory diseases than in stroke patients in the present study may explain the apparently higher incidence of pneumonia (although not significantly different) during hospitalization at the Kariya Toyota General Hospital compared to the incidence reported by Toda et al. [9]. The incidence of pneumonia in respiratory diseases was 5.7%, and was significantly lower than that reported by Toda et al [9]. However the median follow-up period of this study was 15 days, and was

shorter than that (24 days) in the study of Toda et al. [9]. Since the incidence of pneumonia may increase with longer observation period, when comparing the incidence of pneumonia among different hospitals or institutions, the diagnostic criteria, disease composition, observation period and other relevant clinical variables have to be addressed. Because of these variations, a large volume of data from multiple centers have to be collected to evaluate the effectiveness of swallowing rounds in acute general hospital.

In conclusion, we performed swallowing rounds using VE in an acute general hospital and achieved significant improvements in ESS score, DSS score, and food texture. While attention should be given to the prevention of pneumonia during hospitalization, our findings indicate that swallowing rounds for patients with dysphagia are very effective.

### References

1. Paciaroni M, Mazzotta G, Corea F, Caso V, Venti M, Milla P, et al. Dysphagia following Stroke. *Eur Neurol* 2005; 51: 162–7.
2. Crary MA, Carnaby-Mann GD, Miller L, Antonions N, Silliman S. Dysphagia and nutritional status at the time of hospital admission for ischemic stroke. *J Stroke Cerebrovasc Dis* 2006; 15: 164–71.
3. Mitchell SL, Teno JM, Kiely DK, Shaffer ML, Jones RN, Prigerson HG, et al. The clinical course of advanced dementia. *N Engl J Med* 2009; 361: 1529–38.
4. Tokuda Y, Kisa T, Nagata T, Hara J. A comparative study of ingestion and swallowing in patients with choke, aspiration pneumonia and signs of dysphagia. *Jpn J Dysphagia Rehabil* 2005; 9: 159–65. Japanese.
5. Cabre M, Serra-Prat M, Palomera E, Almirall J, Pallares R, Clave P. Prevalence and prognostic implications of dysphagia in elderly patients with pneumonia. *Age Aging* 2010; 39: 39–45.
6. Kozu R, Fujishima I, Kojima C, Asai M, Yokoda M, Ohkuma R, et al. Clinical characteristics and outcome of dysphagia rehabilitation in patients with aspiration pneumonia. *J Jpn Soc Resp Care* 2000; 9: 293–8. Japanese.
7. Sura L, Madhavan A, Canaby G, Crary MA. Dysphagia in the elderly: management and nutritional considerations. *Clin Interv Aging* 2012; 7: 287–98.
8. National Center for Geriatrics and Gerontology. 2011–2012 Project of Geriatric Health: Survey Report of Patients with Dysphasia. Available from: [http://www.ncgg.go.jp/research/pdf/topics/cl\\_hokoku1\\_23.pdf](http://www.ncgg.go.jp/research/pdf/topics/cl_hokoku1_23.pdf) (cited 2016 June 21).
9. Toda F, Kagaya H, Baba M, Shibata S, Ozeki Y, Kanamori D, et al. Effect of swallowing rounds on the outcome of dysphagic patients. *Jpn J Compr Rehabil Sci* 2015; 6: 50–5.
10. Baba M, Saitoh E, Takeda S, Onogi K. Swallowing evaluation for accommodation of oral feeding. *Sogo Rehabil* 2002; 30: 1309–16. Japanese.
11. Oguchi K, Saitoh E, Baba M, Kusudo S, Tanaka T,

- Onogi K. The repetitive saliva swallowing test (RSST) as a screening test of functional dysphagia (2) validity of RSST. *Jpn J Rehabil Med* 2000; 37: 383–8. Japanese.
12. Logemann JA. Evaluation and treatment of swallowing disorder. 2nd ed. Austin: PRO-ED; 1998.
  13. Shaker R, Kern M, Bardan E, Taylor A, Stewart ET, Hoffmann RG, et al. Augmentation of deglutitive upper esophageal sphincter opening in the elderly by exercise. *Am J Physiol* 1997; 272: G1518–22.
  14. Shaker R, Easterling C, Kern M, Nitschke K, Massey B, Daniels S, et al. Rehabilitation of swallowing by exercise in tube-fed patients with pharyngeal dysphagia secondary to abnormal UES opening. *Gastroenterology* 2002; 122: 1314–21.
  15. Logemann JA, Kahrilas PJ. Relearning to swallow after stroke—application of maneuvers and indirect biofeedback: a case study. *Neurology* 1990; 40: 1136–8.
  16. Kahrilas PJ, Logemann JA, Krugler C, Flanagan E. Volitional augmentation of upper esophageal sphincter opening during swallowing. *Am J Physiol* 1991; 260: G450–6.
  17. Logemann JA. Evaluation and treatment of swallowing disorders. Austin: PRO-ED; 1983.
  18. Inada H. Aspiration pneumonia—diagnosis, treatment and prevention. *Japan-Germany Med Rep* 2001; 46: 66–73. Japanese.
  19. Smithard DG, O’Neill PA, England RE, Park CL, Wyatt R, Martin DF, et al. The natural history of dysphagia following a stroke. *Dysphagia* 1997; 12: 188–93.
  20. Nilsson H, Ekberg O, Olsson R, Hindfelt B. Dysphagia in stroke: a prospective study of quantitative aspects of swallowing in dysphagic patients. *Dysphagia* 1998; 13: 32–8.