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Original Article

Effect of swallowing rounds on the outcome of dysphagic patients

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ABSTRACT
Toda F, Kagaya H, Baba M, Shibata S, Ozeki Y, Kanamori D, Tanaka T, Miki T, Ishigame K, Nishimura K, Onogi K, Saitoh E. Effect of swallowing rounds on the outcome of dysphagic patients. Jpn J Compr Rehabil Sci 2015; 6: 50–55.
Objective: To retrospectively investigate the effect of ward rounds to check swallowing function (hereafter, swallowing rounds) on the outcome of dysphagic patients.
Methods: Upon requests from ward nurses or clinical departments in our hospital, a full-time certified nurse specialist in dysphagia examines the general condition of patients and performs screening for dysphagia. For patients who require detailed investigations, a transdisciplinary dysphagia care team conducts ward rounds and evaluates these patients in principle by videoendoscopic evaluation of swallowing. We reviewed the records of patients in whom swallowing rounds were conducted between September 2006 and March 2010, and analyzed the food texture and eating status scale (ESS) scores at the first intervention, after the first intervention and at the last observation; dysphagia severity scale (DSS) scores at the first intervention and at the last observation; and onset of pneumonia during intervention.
Results: Among 1,330 patients suspected of dysphagia, 998 were judged to require detailed investigations and swallowing rounds were conducted. As a result of intervention, significant improvements in food texture, ESS score, and DSS score were observed. The incidence of pneumonia was 3.7%.
Discussion: Improvements in food texture, ESS score, and DSS score were achieved by conducting swallowing rounds.
Key words: dysphagia, swallowing rounds, Videoendoscopic evaluation of swallowing

Introduction

Population aging is progressing rapidly in Japan, with the population aged 65 years or above reaching 32.37 million in 2014, or 25.8% of the total population [1]. In 2011, pneumonia was the third leading cause of death among Japanese [2], and over 90% of the deaths due to pneumonia were elderly persons aged 65 years or above [3]. Sixty percent of elderly persons admitted because of pneumonia were found to have aspiration pneumonia [4]. Dysphagia is the condition underlying aspiration pneumonia, and a survey has reported that 13.6% of adult inpatients in general hospitals had dysphagia [5]. Management of dysphagia will become even more important in the future.

A study reported that introduction of a system of evaluating eating/swallowing function using screening tests shortened the hospital stay, time to intervention, and time to oral intake, compared to before introduction of the system [6]. However, to the best of our knowledge, there is no report on constructing a team structure for all dysphagic patients in an acute care hospital, and conducting systematic evaluation using videoendoscopic evaluation of swallowing (VE) or videofluoroscopic examination of swallowing (VF). Unlike screening tests, VE and VF are therapeutic oriented examinations. In addition to detecting the presence or absence of dysphagia, these tests are useful to determine rehabilitation strategy and appropriate food texture as well as to detect inapparent dysphagia. Since September 2006, our hospital has been conducting

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swallowing rounds to manage dysphagia in inpatients. The present study validated retrospectively the effect of these swallowing rounds.

Methods

Our hospital has employed a full-time certified nurse specialist in dysphagia (certified nurse) since the swallowing rounds were started. Ward nurses or attending physicians who had difficulties in managing patients suspected of dysphagia refer these patients directly or through the physiatrist to the certified nurse. The certified nurse examines the general condition of the patient, and conducts dysphagia screening tests and observation during meals if the patient is on oral intake. The screening tests used include repetitive saliva swallowing test (RSST) [7] and modified water swallowing test (MWST) [8]. The RSST test is performed by palpating the laryngeal elevation during swallowing reflex, and the occurrence of three or more swallowing reflexes in 30 seconds is considered normal. In MWST, the patient is asked to swallow 3 ml of cold water delivered into his/her oral cavity, and the absence of choking, wet hoarseness or changes in breathing is regarded as normal [9]. For patients judged to require detailed investigations by the certified nurse, swallowing rounds are conducted by a dysphagia care team composed of physiatrists, dentists, speech-language hearing therapists, nurses in charge of dysphagia in the ward, dietitians, and dental hygienists. In principle, VE is conducted. The result of dysphagia evaluation conducted by the team together with future care policy including appropriate food texture, oral care, and advice on training method are fed back to the attending physician. Moreover, VF as well as eating training by a speech-language hearing therapist and ward nurse are implemented as necessary. Indirect training includes neck relaxation, head and neck range of motion training, breathing training, thermal stimulation [10], Shaker's exercise [11, 12], Mendelsohn maneuver [13, 14] and supraglottic swallow [15], depending on the pathological condition. In direct training, posture adjustments such as reclining sitting posture, head and neck flexion and head rotation are also initiated. For patients not receiving interventions from the speech-language hearing therapist, the certified nurse follows the patients regularly even after the rounds to monitor their condition and to give advice to ward nurses regarding changes in food texture and training methods. For patients who are considered to need reevaluation, the certified nurse and speech-language hearing therapist submit a request to the dysphagia care team for repeated VE and VF examinations. 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 is impeded (Figure 1).

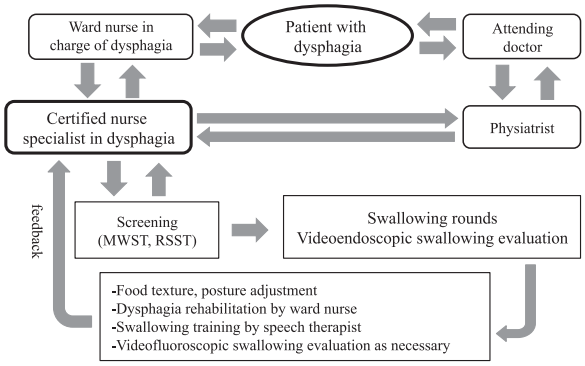

Figure 1. Flow of the swallowing rounds.
After screening by the certified nurse specialist in dysphagia, the dysphagia care team conducts rounds, and evaluates the patients by videoendoscopic evaluation of swallowing.

Among 1,330 patients referred to the certified nurse between September 2006 and March 2010, 332 patients were excluded because they were judged to have no dysphagia or incapable of oral intake due to severe impairment of consciousness (three-digit score on Japan Coma Scale [16]) or sudden change in disease condition necessitating treatment. Finally, 998 patients comprising 638 men and 360 women with a mean age of 74 years (range 2 to 102 years) were analyzed.

The food texture (at the first intervention, after the first intervention, at last observation), eating status scale (ESS) [8] scores (at the first intervention, after first intervention, last evaluation), dysphagia severity scale (DSS) [8] scores (at the first intervention, last evaluation), and whether pneumonia occurred during intervention were reviewed retrospectively. In our hospital, there are six diets for managing dysphagia: jelly diet, paste diet, modified thickened diet, mechanical soft diet, soft diet, and regular diet. For mechanical soft diet, soft diet, and regular diet, the liquid can be thickened with a thickener. For modified thickened diet, a thickener is incorporated into all the food in the meal. Mechanical soft diet contains solid food at a consistency that can be crushed by the gums. In the ESS, nutrient and water intake was classified into (1) tube feeding only, (2) oral $<$ tube, (3) oral $>$ tube, (4) oral feeding (modified), and (5) oral feeding (unmodified). In DSS, severity in descending order was classified into (1) saliva aspiration, (2) food aspiration, (3) water aspiration, (4) occasional aspiration, (5) oral problem, (6) minimum problem, and (7) within normal limit. Pneumonia was diagnosed if two of the following were fulfilled: infiltrative finding on chest X-ray or chest CT, fever of 37.5ºC or above, abnormally high C-reactive protein (CRP) level, peripheral white blood cell count of 9,000/μL or above, respiratory symptoms including productive cough [17].

Statistical analyses were performed by SPSS

Statistics 19 (IBM, Japan) using the Wilcoxon signed rank test with a significance level of 5%. Bonferroni adjustment was conducted for multiple comparison of ESS and food texture among groups. The Chi-squared test was used to compare the incidence of pneumonia between stroke patients and patients with respiratory diseases.

Results

The primary disease was stroke in 455 patients (46%), accounting for almost one-half of all the patients. Other primary diseases included other cerebral diseases in 159 patients (16%), post-surgery in 96 patients (10%), and respiratory disease in 78 patients (8%) (Figure 2). The median duration from admission to intervention was 13 days (range 0–275 days), and the median observation period from the first intervention to end of observation was 24 days (1–337 days). In stroke patients, the median duration from onset to intervention was 14 days (1–1482 days). One hundred and one patients (10.1%) underwent dysphagia rehabilitation, 410 patients (41.1%) underwent eating training given by speech-language hearing therapists, and 149 patients (14.9%) underwent both dysphagia rehabilitation and eating training given by speech-language hearing therapists. The remaining 338 patients (33.9%) were followed by the certified nurse only.

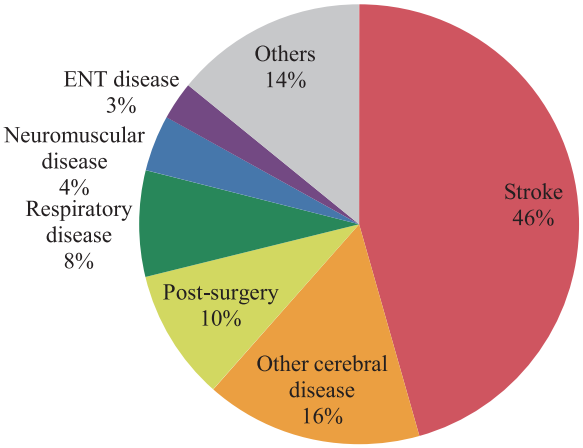

Figure 2. Primary diseases ($n=998$).
455 patients (46%) had stroke, accounting for almost one-half of all patients.

Figure 3 shows the changes in food texture and ESS score. Regarding food texture, when thickening of liquid was required for mechanical soft diet, soft diet or regular diet, the diet was classified as "liquid thickened diet". Both food texture and ESS score showed significant improvements after the first intervention ($p<0.001$) and at the last observation ($p<0.001$) compared to at the first intervention. In addition, significant improvement was observed at the last observation compared to after the first intervention ($p<0.001$). Nothing by mouth was prescribed in 668 patients (66.9%) at the first intervention, and the number was reduced to 289 patients (29.0%) after the first intervention. Compared to at the first intervention, food texture was improved after the first intervention in 490 patients (49.1%), unchanged in 444 patients (44.5%), and deteriorated in 64 patients (6.4%).

In addition, the number of patients (%) with ESS score 1 was 663 (66.4%) at the first intervention, and decreased to 277 (27.8%) after the first intervention. The number of patients (%) on oral feeding only (sum of those with ESS scores 4 and 5) was 467 (46.8%) after the first intervention, and increased to 618 (61.9%) at the last observation. The numbers of patients (%) with improved, unchanged and deteriorated ESS scores after the first intervention were 429 (43.0%), 545 (54.6%) and 24 (2.4%), respectively.

DSS score also improved significantly at the last observation compared to at the first intervention ($p<0.001$) (Figure 4). In 64 patients who had

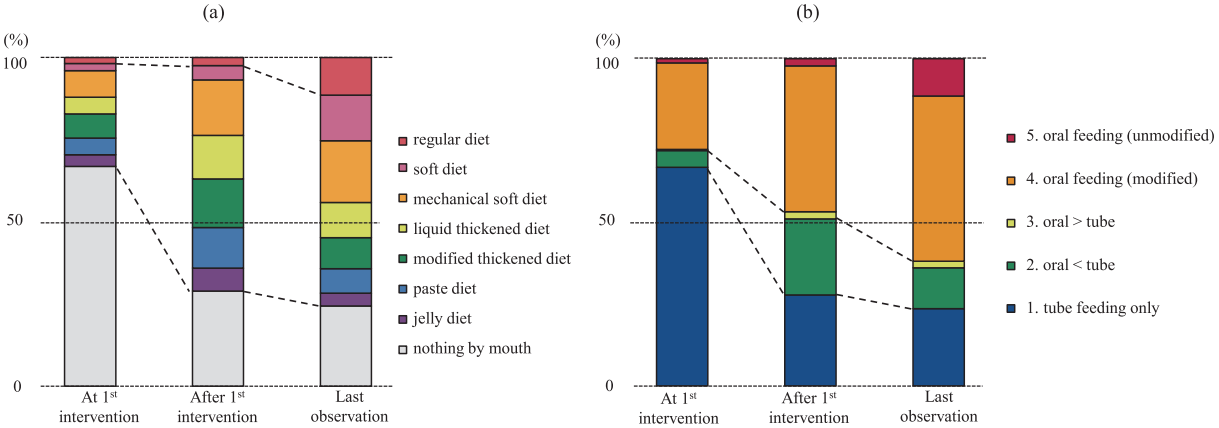

Figure 3. Changes in food texture (a) and eating status scale (ESS) score (b) (Wilcoxon signed-rank test with Bonferroni adjustment).
Both food texture and ESS score improved significantly after the first intervention ($p<0.001$) and at the last observation ($p<0.001$) compared to at the first intervention. Moreover, both improved significantly at the final observation compared to after the first intervention ($p<0.001$).

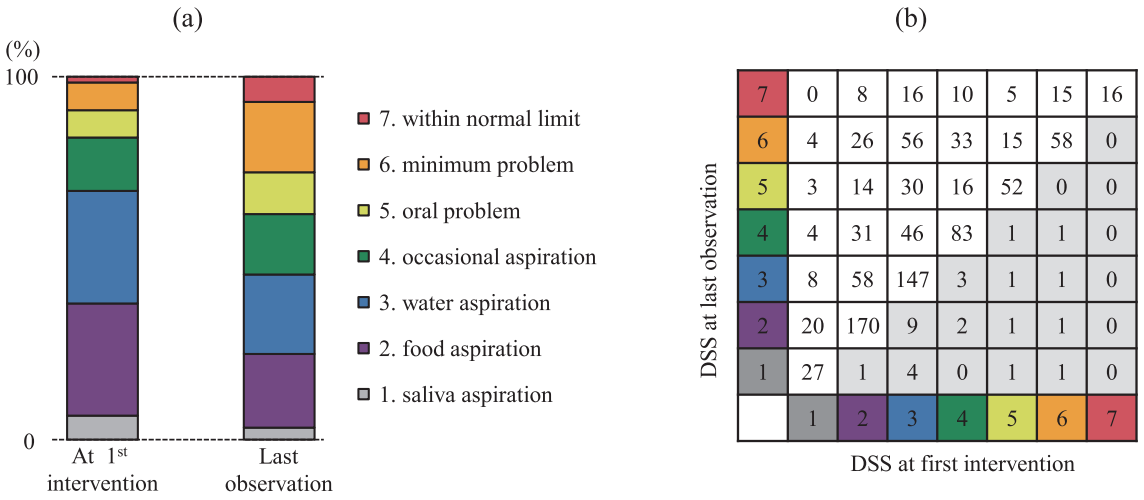

Figure 4. Changes in dysphagia severity scale (DSS) score (a) and distribution of scores (b) (n=998; Wilcoxon signed rank test, $p<0.001$).
DSS score improved significantly at the last observation compared to at the first intervention.

deteriorated food texture after the first intervention, DSS at the last observation improved significantly ($p=0.004$). Only 27 patients (2.7%) showed deteriorated DSS score at the last observation compared to at the first intervention. Among patients with deteriorated DSS, 6 had malignant tumors, including brain tumor in 4. The number of patients (%) showing aspiration (total number of patients with DSS scores 1–4) was 829 (83.1%) at the first intervention, and decreased to 621 (62.2%) at the last observation.

Thirty-seven patients (3.7%) developed pneumonia during the observation period. The most common primary disease was stroke (15 patients), accounting for 3.3% of 455 stroke patients. Among 78 patients with respiratory disease, 11 patients (14.1%) developed pneumonia, and the incidence was significantly higher than that of stroke patients ($p<0.001$). At onset of pneumonia, 12 patients (32.4%) were on nothing by mouth and 25 patients (67.6%) were on oral intake. Patients on nothing by mouth at onset of pneumonia remained in the same status until the last observation. Among 25 patients on oral intake at onset of pneumonia, 14 patients (56.0%) did not recover to the same food texture at pneumonia onset even at the last observation (Figure 5).

Discussion

Using the approach of swallowing rounds, we were able to improve DSS score, ESS score, and food texture, as well as markedly reduce the proportion of patients on nothing by mouth. Although dysphagia in the acute phase of stroke often improves spontaneously [18], the fact that significant improvement was obtained after the first intervention indicates that swallowing rounds allow appropriate evaluation and intervention for patients suspected of having dysphagia. Studies have reported that 12 to 23% of acute-phase stroke patients develop pneumonia [19–23]. In comparison, the 3.3% incidence of pneumonia in stroke patients was very low in the present study. Moreover, 12 of 37 patients (32.4%) were on nothing by mouth at the time of onset of pneumonia. In patients on nothing by mouth, the cause of pneumonia is considered to be saliva aspiration or reflux of tube feeding, and pneumonia is probably unpreventable. The implementation of swallowing rounds resulted in the prevention of pneumonia and at the same time improvements of DSS score, ESS score, and food texture, as well as marked reduction of patients on nothing by mouth. These are presumably the outcome of swallowing evaluation conducted by the dysphagia care team as well as continuous patient monitoring and timely advice such as on change of food texture provided by the certified nurse. Therefore, we consider that our approach succeeded in providing appropriate evaluation and management for patients suspected of having dysphagia.

Food texture deteriorated after the first intervention in 6.4% of the patients, which means that these patients were not prescribed an inappropriate diet that has a risk of causing aspiration or pneumonia. Even in these patients, improvement of DSS at the last observation was possible by conducting appropriate interventions. We consider that appropriate evaluation and training as well as posture adjustment were able to prevent aspiration pneumonia and improve eating/swallowing function.

As limitations of the present study, some of the referred patients did not receive intervention. Patients who were judged not capable of oral intake due to severe conscious impairment or other conditions did not receive intervention, and the incidence of pneumonia might be high in these patients. A future study should examine the incidence of pneumonia including a no intervention group in the analysis.

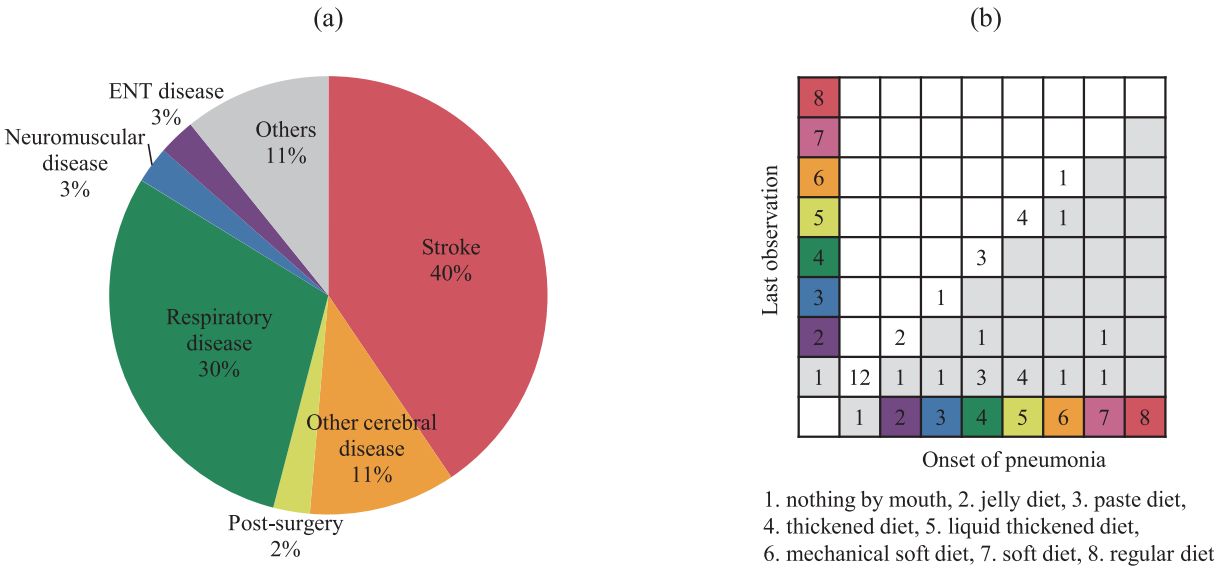

Figure 5. Primary diseases of patients who developed pneumonia (a) and changes in food texture (b) (n=37; Wilcoxon signed rank test, $p<0.001$).
The most common primary disease was stroke (15 patients, 40%), followed by respiratory disease (11 patients, 30%). Patients on nothing by mouth at onset of pneumonia remained on nothing by mouth until the last observation. Among 25 patients on oral intake at onset of pneumonia, 14 patients (56.0%) did not eventually recover to the food texture level at onset of pneumonia.

Moreover, 56% of the patients who developed pneumonia during the observation period failed to recover eventually to the food texture at onset of pneumonia, indicating that rehabilitation is difficult in patients who have developed pneumonia. Furthermore, the incidence of pneumonia was 14.1% in patients with respiratory diseases, and was higher than that in stroke patients, indicating a need to strengthen measures for respiratory disease. At the same time, stringent measures to prevent pneumonia would lead to further improvement of eating/swallowing function.

Conclusions

A wide range of diseases including stroke can cause dysphagia. Our hospital has been conducting swallowing rounds by a dysphagia care team. Actively improving food texture while preventing pneumonia is important also from the viewpoint of improving quality of life. We demonstrated the effectiveness of swallowing rounds. On the other hand, among patients who developed pneumonia during the observation period, 56.0% did not eventually recover to the food texture level at onset of pneumonia. Therefore, a novel approach to prevent the development of pneumonia is needed.

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