Acquisition of oral intake in severely dysphagic patients with acute stroke: A single-center, observational study involving a database of 4972 consecutive stroke patients ☆

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ABSTRACT

Objective: A single-center, observational study was performed to identify the predictors for oral intake 3 months after onset in stroke patients with severe dysphagia.
Methods: Of 4972 consecutive acute stroke patients, 723 could not eat orally on day 10. Three months after onset, a questionnaire was sent to all patients. Those who survived and replied to the questionnaire were divided into 2 groups, and the clinical factors that predicted their acquisition of oral intake were analyzed.
Results: Of the 586 dysphagic patients who responded, 141 (24.2%) achieved oral intake after 3 months. On logistic-regression model analysis, age ≤80 years, hyperlipidemia, non-cardioembolic stroke, modified Rankin Scale score 0 before onset, and National Institutes of Health Stroke Scale (NIHSS) score were independently related to oral intake 3 months after onset. From two different model analyses, NIHSS score ≤17 on day 10 (OR 3.58, 95% CI, 2.35–5.54) was found to be a stronger predictor for oral intake than NIHSS score ≤17 on admission (OR 2.17, 95% CI, 1.40–3.39).
Conclusion: In severely dysphagic acute stroke patients, functional independence at baseline, younger age, absence of hyperlipidemia, non-cardioembolic stroke, and a milder NIHSS score on day 10 are useful predictors of the resumption of oral intake.

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1. Introduction

Dysphagia affects the quality of life of stroke patients themselves, as well as their family or caregivers, for a long period, particularly when the patients need percutaneous endoscopic gastrostomy (PEG) [1–3]. Although PEG placement is widely conducted in these severely dysphagic patients in the acute or subacute phase, early PEG placement has some potential issues [4], such as procedure-related complications [5]; and aspiration pneumonia even after PEG placement [6]. Additionally, swallowing function might recover in not a few patients within a month of stroke onset [7]. Therefore, it is of great importance to understand the prognosis of swallowing function of stroke patients with dysphagia.

In previous studies, several clinical factors were found to have a relationship with dysphagia following stroke such as older age, stroke severity, disturbed consciousness, speech abnormalities, presence of cortical signs, absence of the gag reflex, large cortical or insular lesions, and bihemispheric lesions [7–17]. However, relatively few studies identified the predictors for the long-term prognosis of swallowing function or PEG placement over several months [8,9,14,18].

Recently, we reported that independence before onset and stroke severity 10 days after onset were the important predictors for oral intake 6 months after ischemic stroke [19]. In that study, all consecutive patients with acute ischemic stroke were analyzed to investigate the long-term outcome of nutritional intake. Although the results were useful, the key point that interests most clinicians is whether acute stroke patients with severe dysphagia achieve oral intake in the near future. In previous reports, very few studies have focused on which tube-fed stroke patients can transition to oral feeding [20]. Moreover, recovery of swallowing function is considered to reach a plateau at 1 or 2 months after onset [7,14].

Therefore, a retrospective study, using a prospectively recruited database, was planned to investigate clinical factors that predict acquisition of oral intake in patients who could not eat orally in the acute phase. In this study, dysphagic patients' outcomes were evaluated at 3 months after onset rather than at 6 months.

2. Methods

2.1. Subjects (Fig. 1)

Data were obtained from a prospectively registered database of consecutive patients with a diagnosis of acute ischemic stroke within 7 days of onset. Patients with hemorrhagic stroke and subarachnoid hemorrhage were not included, because they were treated in another department in our hospital. Between October 2002 and March 2011, 4972 patients were admitted to our stroke center. The median length of hospital stay for all patients was 13 days. Patients who died during the hospital stay were excluded from the study. Of all the patients, 723 patients survived but could not eat orally on day 10. Three months after onset, a questionnaire was sent to all patients who survived to be discharged (both those who could eat orally and those who could not). Of the 723 participants, those who survived and replied to the questionnaire at 3 months were divided into two groups (the oral intake group and the non-oral intake group).

2.2. Assessment of swallowing function

Patients' swallowing function was assessed using a standardized bedside swallowing test within 72 h of admission. A nurse, a speech therapist, or the attending physician undertook the test, including the repetitive saliva swallowing test and a water swallow test. The method for the standard assessment was described in a previous paper [19]. The mode of nutritional intake of the patients was selected according to the results of the first assessment: normal food, thickened food, training food, or enteral tube feeding. Patients' consciousness level, neurological symptoms, and swallowing status were carefully observed every day, and the mode of intake was modified flexibly. The attending physician recorded eating and swallowing status based on Fujishima's grade (Appendix) [21] on day 10. Only patients with Fujishima's grades 1–6 (those who needed enteral nutrition) were analyzed in the present study. Most of them received nasogastric tube feeding, whereas one received naso-jejunal tube feeding.

2.3. Clinical data recruitment

In addition to the swallowing function described above, the following clinical data were collected from all participants: 1) age and sex; 2) year of admission (from October to March in 2002; from April to March in the other years); 3) vascular risk factors (hypertension, diabetes mellitus, hypercholesterolemia, current smoking habit); 4) atrial fibrillation; 5) previous history of stroke or transient ischemic attack; 6) ischemic heart disease; 7) modified Rankin Scale (mRS) score before onset of the index stroke; 8) stroke subtype based on Trial of Org 10172 in Acute Stroke Treatment (TOAST) criteria (small vessel occlusion, large artery atherosclerosis, cardioembolism, other determined etiology, or undetermined etiology); 9) site of index lesions (supratentorial (left, right, and bilateral), infratentorial); 10) National Institutes of Health Stroke Scale (NIHSS) score on admission; 11) NIHSS score on day 10 (or NIHSS score on discharge in patients discharged earlier); 12) length of hospital stay; 13) mRS score on discharge; and 14) Barthel index on discharge.

2.4. Questionnaire

A questionnaire was sent to all surviving patients by mail 3 months after onset and then again to non-responders. The questionnaire included the following data: 1) place where patients lived (home, hospital, or nursing home); 2) independence in daily life based on the mRS score; and 3) the mode of nutritional intake (oral intake, nasogastric tube feeding, PEG, peripheral parenteral nutrition, or total parenteral nutrition). Questionnaires were completed and returned by the patient or the patient's family.

2.5. Statistical analysis

Because of the potential low response rate in patients with severe stroke [19], clinical characteristics were first compared between the survivors who replied to the questionnaire and those who did not. Moreover, among the severely dysphagic patients who could not eat orally on day 10, clinical factors were compared between the patients who could eat orally 3 months after onset and those who could not. Patients who died within 3 months of onset of the index stroke were excluded from the analysis.

On univariate analysis, the Mann–Whitney U test was used for analysis of continuous variables, and the Chi-square test (or Fisher's exact test, if applicable) was used for analysis of categorical variables. Continuous variables were dichotomized to identify the most sensitive predictors for oral intake after 3 months; the cutoff values were investigated by receiver-operating characteristic (ROC) curve analysis.

To identify independent predictors for oral intake 3 months after stroke, logistic regression analysis was performed using the factors with a p value <0.1 on univariate analysis as dependent variables. To avoid confounding the NIHSS score on admission and the NIHSS score on day 10, these factors were entered into two different models, respectively. Factors associated with patients' status on hospital discharge (above-mentioned factors 12–14) were excluded from the independent variables, because the length of hospital stay varied markedly among the participants. p values <0.05 were considered significant.

All statistical analyses were performed using a commercially available software package (JMP 9, SAS Institute Inc., Cary, NC, USA).
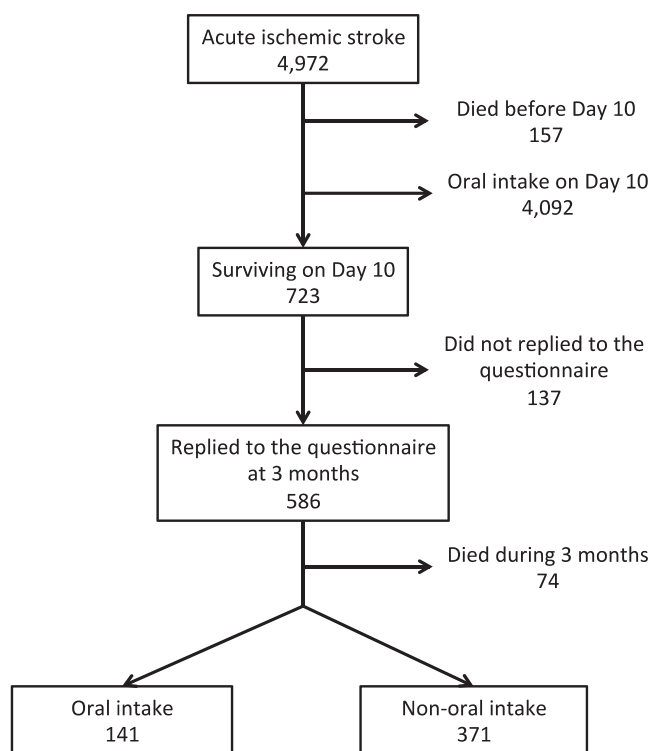

Fig. 1. Patient selection. In the analysis, 586 patients who replied to the questionnaire were divided into an oral intake group and a non-oral intake group according to the mode of nutrition 3 months after onset.