Factors Associated with Prognosis of Eating and Swallowing Disability after Stroke: A Study from a Community-based Stroke Care System

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Background: The long-term prognosis of eating and swallowing disability has not been fully clarified. As community-based stroke care systems have developed in Japan, these data have become available. *Methods:* We examined changes in nutritional intake using data acquired from a community-based stroke care system. There were 334 stroke patients who were discharged from our acute care hospital and transferred to rehabilitation hospitals with tube feeding. We examined the relationship between the initial bedside swallowing assessment and the method of nutrition delivery at discharge from a rehabilitation hospital. We also calculated the functional independent measure (FIM) to examine the relationship between activities of daily living and nutritional intake. *Results:* There were 291 patients on oral intake and 43 on enteral feeding at discharge from a rehabilitation hospital. Patients with enteral feeding were older than patients with oral intake (69.4 ± 11.4 *v* 75.2 ± 9.9 years; $P = .0016$). The enteral feeding group also had lower FIM gain (27.5 ± 28.3 *v* 16.5 ± 23.5; $P = .0161$) and FIM efficiency (1.10 ± 1.24 *v* 0.65 ± 1.26; $P = .0270$) at the acute care hospital. *Conclusions:* Age, FIM gain, and FIM efficacy in the acute care hospital reliably predicted the long-term prognosis of eating and swallowing disability. **Key Words:** Clinical pathway—dysphagia—regional network—stroke.

Eating and swallowing dysfunction is observed in 40% to 70% of acute stroke patients.[1,2] The majority of these patients recover within a few weeks after onset.[3-5] In acute care hospitals, the outcome of dysphagia must be estimated at the early stage after onset because the duration of hospital stay is short and oral intake status is an important factor that determines whether patients can be discharged home.[6,7]

For acute stroke patients who experience some difficulty with oral intake, it is recommended to start enteral feeding within 7 days after the onset of difficulties because the mortality rate is lower for enteral feeding than for peripheral intravenous infusion.[7,8] Enteral feeding with gastrostomy is advisable when difficulty with oral intake persists for >1 month after onset. However, many Japanese patients and their families are not amenable to undergoing gastrostomy so early in the course of recovery.[7,9]

The medical system in Japan has changed greatly since the beginning of this century.[10] Like the United States and European countries, the functions of medical institutions have been differentiated, and a clear distinction has been made between acute and chronic inpatient care. For stroke treatment, integrated health care services are provided throughout a whole community using a regional clinical pathway that goes from an acute care hospital to home

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via a convalescence rehabilitation hospital. Stroke patients admitted to an acute care hospital are discharged after several weeks and either return home directly, transfer to a convalescence rehabilitation hospital, or stay in a nursing home or similar facility. A patient who has disabilities when arriving at a rehabilitation hospital will have to decide a final destination after receiving several months of rehabilitation treatment. The final destination of patient is reported to the acute care hospital; the state of acute stage can therefore be compared to the final outcome.

Although there have been scattered reports on the mode of nutritional intake in acute care hospitals,[9,11] all such investigations were conducted using patients at one hospital. The objective of this study was to follow the change in stroke patients' method of nutrition delivery throughout acute and rehabilitation hospitals using this community-based stroke care system.

Methods

Our study included 1985 patients in the acute phase of stroke chosen from among 2241 stroke patients who were referred to our rehabilitation department in an acute care hospital between August 2008 and July 2011. Their average duration of stay in an acute care hospital was 29.9 ± 18.5 days (mean ± SD), and 591 patients (29.8%) were discharged home, 1300 were transferred to another facilities (1032 to a rehabilitation hospital; 261 to a general hospital; and 7 to a nursing home), and 94 died. Of the 1032 patients who were transferred to a rehabilitation hospital, 516 replied to a request from the hospital using the clinical pathway. Of these 516 patients, 334 were on enteral feeding at the time of discharge from an acute care hospital (Fig 1). As shown in Figure 1, there were several reasons to lower the response rate. This response was made by rehabilitation hospitals, and the form contained intricate queries, which may be one of the causes of the relatively low response rate. This group of 334 patients was the final cohort for this study. Their ages ranged from 34 to 98 years (mean ± SD 70.1 ± 11.4 years), and the study included 236 men and 98 women. Of the 334 patients, 175 had cerebral infarcts and 159 had cerebral hemorrhage. Their average duration of stay in an acute care hospital was 29.2 ± 12.2 days (range 5-81 days) and in a rehabilitation hospital was 100.2 ± 59.4 days (range 7-317 days).

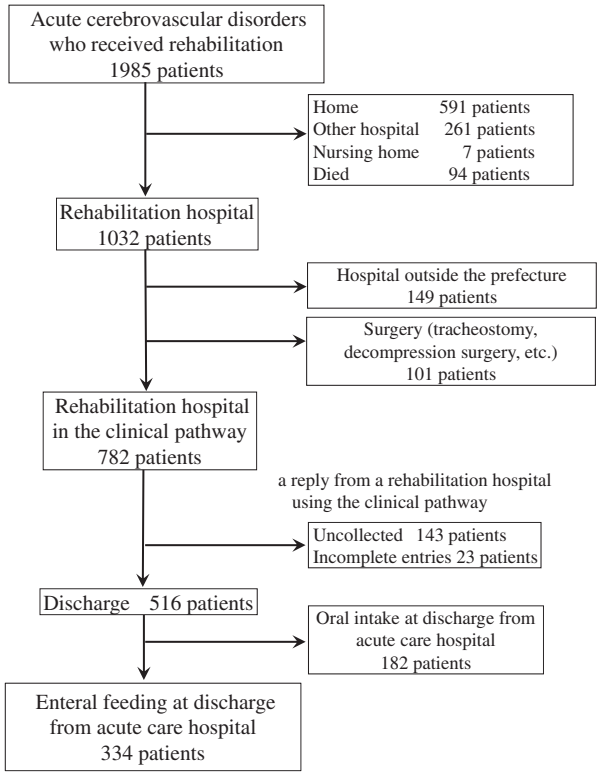

Figure 1. *Flow chart of patient recruitment and study requirement outcome. Of the 516 patients who replied to a request from the hospital, 334 were receiving enteral feeding at the time of discharge from an acute care hospital.*

Bedside Swallowing Assessment

For the initial swallowing evaluation at bedside, the repetitive saliva swallowing test (RSST) and modified water swallowing test (MWST) were performed at 2.3 ± 1.4 days (range 1-14 days) after stroke[12,13] (Appendix; available online at www.strokejournal.org). The number of patients who underwent RSST and MWST were 325 and 290 of the 334 patients, respectively. These are excellent screening methods for assessing swallowing functions without using videofluoroscopy (VF), and their results correlate closely with those obtained using VF.[12] In addition, the RSST and MWST are strongly recommended by the Stroke Management Japanese Guidelines.[14] The RSST and MWST were not performed in subjects with disturbed consciousness or unstable respiration, hypersecretion of sputum, or in those who were coughing intensely on their own saliva. In addition, the MWST was not performed in subjects who were unable to sit at 90° or who had fever or pneumonia.

In this study, patients in the acute phase of stroke were classified as having normal swallowing function if RSST within 30 seconds was ≥3 and the MWST was ≥4; swallowing impairment was defined as a RSST within 30 seconds of ≤2 or a MWST result of ≤3.

Classification of Nutritional Intake

We investigated the nutritional intake at transfer from an acute care hospital to a rehabilitation hospital and at discharge from a rehabilitation hospital. The modes of nutritional intake at these time points were classified into 3 types: enteral feeding, dysphagia diet, and regular diet. A "dysphagia diet' consists of foods with textures that allow easy swallowing compared to a "regular diet," but is not limited to jelly, paste, and mousse. It was difficult to accurately classify the textures because