



An analysis of prognostic factors after percutaneous endoscopic gastrostomy placement in Japanese patients with amyotrophic lateral sclerosis



Kazuaki Nagashima, Natsumi Furuta, Kouki Makioka, Yukio Fujita, Masaki Ikeda, Yoshio Ikeda *

Department of Neurology, Gunma University Graduate School of Medicine, 3-39-22 Showa-machi, Maebashi, Gunma 371-8511, Japan

ARTICLE INFO

Article history:

Received 9 November 2016

Received in revised form 20 February 2017

Accepted 20 March 2017

Available online 21 March 2017

Keywords:

Amyotrophic lateral sclerosis

Percutaneous endoscopic gastrostomy

Aphagia before PEG placement

PaCO₂

Prognostic factors

ABSTRACT

A percutaneous endoscopic gastrostomy (PEG) is a useful intervention for feeding of amyotrophic lateral sclerosis (ALS) patients who have lost oral intake function. The aim of this study was to investigate the risk factors for early death and the survival after PEG placement. A total of 102 ALS patients who underwent PEG placement were enrolled in this study. Patients were divided into two groups; the poor prognosis group included patients who died or needed permanent mechanical ventilation within 30 days after PEG placement, and the good prognosis group included patients who did not meet the criteria of the poor prognosis group. Clinical characteristics, respiratory function, and nutritional parameters were compared for the two groups to assess the correlations between clinical and laboratory variables and early death after PEG placement. Multivariate analysis between two groups revealed that higher arterial carbon dioxide pressure (PaCO₂) and aphagia before PEG placement were significantly associated with the poor prognosis group. Multivariate analysis for survival also revealed that higher PaCO₂ and shorter duration from onset to PEG placement were significantly associated with shorter survival after PEG placement. In conclusion, respiratory and nutritional parameters are revealed to be important prognostic factors for ALS patients who undergo PEG placement.

© 2017 Elsevier B.V. All rights reserved.

1. Introduction

Amyotrophic lateral sclerosis (ALS) is a neurodegenerative disorder that causes death within a few years without artificial respiratory support [1,2]. The major symptoms of ALS include generalized muscle weakness and atrophy due to the degeneration of upper and lower motor neurons. The facial, oropharyngeal, and respiratory muscles are also involved, causing dysarthria, dysphagia, and respiratory failure. ALS patients with severe dysphagia have difficulty maintaining adequate oral nutrition, and may require an alternate means of intake. Percutaneous endoscopic gastrostomy (PEG) is a major alternative procedure for nutritional support of ALS patients with dysphagia, and can help maintain body weight [3]. PEG placement is recommended when the forced vital capacity (FVC) is over 50% of predicted value according to the guidelines of the American Academy of Neurology (AAN), the European Federation of Neurological Societies (EFNS), and the Japanese Society of Neurology (JSN) [4–6]. However, the relevant risk factors at the time of PEG placement in ALS patients are unclear. Poor prognostic factors associated with early death or shorter survival after PEG placement were analyzed in 102 ALS patients in this study.

2. Patients and methods

A total of 102 patients diagnosed with definite, probable, or possible ALS according to the revised El Escorial criteria in whom PEG therapy was instituted between April 1999 and June 2016 in the Department of Neurology, Gunma University Hospital, were enrolled in this study [7]. The subjects were divided into two groups; the poor prognosis group included patients who died or needed permanent mechanical ventilation within 30 days after PEG placement, and the good prognosis group included patients who did not meet the criteria of the poor prognosis group. Clinical characteristics including gender, age at onset, site of onset, disease duration from onset to PEG placement, age at PEG placement, riluzole use, respiratory and nutritional conditions before PEG placement, and survival time from PEG placement to death or permanent mechanical ventilation, were retrospectively analyzed from medical records. These parameters were compared for the poor prognosis and good prognosis groups, and the poor prognostic factors associated with early death or permanent mechanical ventilation were statistically analyzed. This study was approved by the Ethical Committee of Gunma University Graduate School of Medicine. Written informed consent for PEG placement was obtained from all ALS patients.

Quantitative clinical parameters analyzed in this study were as follows. Respiratory function was evaluated with FVC (% of predicted

* Corresponding author.

E-mail address: ikeday006@gunma-u.ac.jp (Y. Ikeda).

value) and PaCO₂. The severity of ALS status was evaluated with the revised ALS functional rating scale (ALSF_{RS}-R) [8]. Nutritional status was evaluated with according to body weight loss (>10% of pre-morbid weight), body mass index (BMI), serum total protein, albumin, total cholesterol, high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol, and triglyceride levels, and aphagia before PEG placement. Aphagia represents the patients who were unable to ingest any food or drink before PEG placement.

2.1. Statistical analysis

Statistical analysis was conducted using SPSS®22 software (IBM Japan, Tokyo, Japan). Quantitative data were expressed as means ± standard deviations. Parameters in the poor prognosis and good prognosis groups were compared using an unpaired Student's *t*-test, and categorical variables were compared using the χ^2 -test. Multivariate analysis was performed between two groups using a logistic regression model. Survival analyses from PEG placement to death or permanent mechanical ventilation were demonstrated using the Kaplan-Meier survival analysis, and compared by log-rank test. Kaplan-Meier survival analysis and log-rank test were performed on each parameter for all patients whose medical information was available for analysis. The prognostic factors for PEG placement were evaluated with a Cox proportional hazards regression model. The level of statistical significance was set at $p < 0.05$.

3. Results

The participants in this study included 56 males and 46 females. The site of onset was bulbar in 46 patients and spinal in 56 patients. Five patients died within 30 days after PEG placement, and two needed permanent mechanical ventilation within 30 days after PEG placement. Seven patients (6.9%) met the criteria of the poor prognosis group.

3.1. Poor prognostic factors within 30 days after PEG placement

Clinical and laboratory characteristics of the two groups are shown in Table 1. Lower ALSF_{RS}-R scores and aphagia before PEG placement were significantly associated with poor prognosis (ALSF_{RS}-R: $p < 0.05$, aphagia before PEG placement: $p < 0.05$). Higher PaCO₂, lower serum

triglyceride, and older age at onset were associated with poor prognosis; however, these were not statistically significant. Multivariate analysis was performed for age at onset, PaCO₂, aphagia before PEG placement, site of onset, and riluzole use using a logistic regression model. PaCO₂ and aphagia before PEG placement were significantly associated with poor prognosis group (Table 2).

3.2. Prognostic risk factors for survival after PEG placement

Kaplan-Meier survival analysis and log-rank test revealed that %FVC (≥ 50 vs. $< 50\%$), age at onset (≥ 60 vs. < 60 years), and duration from onset to PEG placement (≥ 20 vs. < 20 months) were significantly associated with survival (Table 3). On the other hand, gender, site of onset, PaCO₂, aphagia before PEG placement, riluzole use, body weight loss (>10% of pre-morbid weight) and BMI were not significantly associated with survival after PEG placement (Table 3). Lower ALSF_{RS}-R (< 20) and lower serum albumin (< 4.0 g/dl) showed a tendency of having shorter survival after PEG placement, but these were not statistically significant (Table 3). PaCO₂ did not show a statistically significant association with survival from PEG placement to death with the log-rank test, but the Kaplan-Meier survival analysis for PaCO₂ (cut-off levels ranged from 35% to 55%) showed a tendency for shorter median survival in patients with higher PaCO₂ (Table 3). Finally, multivariate analysis of the prognostic factors after PEG placement was performed using a Cox proportional hazards regression model. This analysis demonstrated that PaCO₂ and duration from onset to PEG placement were significantly associated with shorter survival (Table 4).

4. Discussion

PEG placement is a standard alternative method used for feeding of ALS patients with severe dysphagia. In ALS patients, malnutrition is an independent prognostic factor, and nutritional support through a PEG tube helps maintain body weight and enables longer survival [3,9–12]. On the other hand, a subset of ALS patients have early death or respiratory failure immediately after PEG placement. However, poor prognostic factors or favorable timing for PEG placement have not been identified. This study included a large number of Japanese ALS patients in an investigation of prognostic factors after PEG placement. Poor prognosis group corresponds to 6.9% of all ALS patients in this study. This

Table 1
Comparisons of clinical and laboratory items between good and poor prognosis groups.

Variables	Good prognosis (n = 95)	Poor prognosis (n = 7)	p value	Total (n = 102)
Gender (Male/Female)	52/43	4/3	0.90 (χ^2)	56/46
Site of onset (bulbar/spinal)	44/51	2/5	0.66 (χ^2)	46/56
Age at onset (years)	61.2 ± 11.8	68.6 ± 11.6	0.11	61.7 ± 11.8
Age at PEG placement (years)	63.1 ± 11.5	70.1 ± 11.2	0.12	63.6 ± 11.5
Duration from onset to PEG placement (months)	25.2 ± 23.3	17.4 ± 12.5	0.39	24.6 ± 22.7
%FVC (n = 73)	62.8 ± 23.4 (n = 67)	56.2 ± 21.9 (n = 6)	0.51	62.2 ± 23.3
PaCO ₂ (mmHg) (n = 95)	42.5 ± 5.8 (n = 88)	46.7 ± 6.2 (n = 7)	0.07	42.8 ± 5.9
ALSF _{RS} -R (n = 56)	30.3 ± 8.5 (n = 53)	15.0 ± 5.6 (n = 3)	$p < 0.05^*$	29.5 ± 9.0
Serum total protein (g/dl) (n = 102)	6.9 ± 0.6 (n = 95)	6.7 ± 0.5 (n = 7)	0.45	6.9 ± 0.6
Serum albumin (g/dl) (n = 98)	4.0 ± 0.5 (n = 91)	3.9 ± 0.3 (n = 7)	0.82	4.0 ± 0.5
Total cholesterol (mg/dl) (n = 89)	194.5 ± 39.9 (n = 83)	216.7 ± 48.2 (n = 6)	0.20	196.0 ± 40.5
HDL cholesterol (mg/dl) (n = 72)	51.9 ± 13.8 (n = 68)	61.7 ± 18.5 (n = 4)	0.18	52.4 ± 14.1
LDL cholesterol (mg/dl) (n = 82)	118.3 ± 31.2 (n = 77)	119.4 ± 33.0 (n = 5)	0.94	118.3 ± 31.1
Triglyceride (mg/dl) (n = 85)	120.8 ± 60.8 (n = 80)	72.0 ± 22.8 (n = 5)	0.08	117.9 ± 60.3
Riluzole use (Yes/No) (n = 102)	69/26	3/4	0.10 (χ^2)	72/30
Aphagia before PEG placement (Yes/No) (n = 85)	7/71	3/4	$p < 0.05$ (χ^2)*	10/75
BW loss (>10% of pre-morbid weight) (Yes/No) (n = 34)	25/6	3/0	0.36 (χ^2)	28/6
BMI (kg/m ²) (n = 83)	20.0 ± 3.4 (n = 78)	19.2 ± 5.1 (n = 5)	0.62	19.9 ± 3.5

Data are expressed by means ± standard deviations.

PEG: percutaneous endoscopic gastrostomy, FVC: forced vital capacity, PaCO₂: arterial carbon dioxide pressure, ALSF_{RS}-R: revised amyotrophic lateral sclerosis functional rating scale, BW: body weight, BMI: body mass index, n = number, χ^2 : χ^2 test.

Poor prognosis: the patients who died or needed permanent mechanical ventilation within 30 days after PEG placement.

Good prognosis: the patients who did not meet the criteria of the poor group.

Qualitative data were expressed as number, and quantitative data were expressed as means ± standard deviations.

* Indicates statistically significant ($p < 0.05$).

Download English Version:

<https://daneshyari.com/en/article/5502893>

Download Persian Version:

<https://daneshyari.com/article/5502893>

[Daneshyari.com](https://daneshyari.com)