

Laterality of Bolus Passage through the Pharynx in Patients with Unilateral Medullary Infarction

Shinya Mikushi, DDS, PhD,*† Hitoshi Kagaya, MD, PhD,* Mikoto Baba, MD, PhD,*
Haruka Tohara, DDS, PhD,‡ and Eiichi Saitoh, MD, PhD*

Laterality of bolus passage in the pharynx is often seen in patients with medullary infarction. We evaluated the dominant side of bolus passage in the pharynx and investigated the factors that cause the passage to dominantly occur on the affected side. Forty-one patients (35 men and 6 women, 64 ± 9 years) with unilateral medullary infarction participated in this study. Bolus passage of 4 mL of thick liquid was evaluated in 3 regions (oropharyngeal, thyropharyngeal, and cricopharyngeal) and classified into 4 patterns (dominantly on the unaffected side [UAS], on both sides without clear laterality [BS], dominantly on the affected side [AS], and nonpassage of the bolus [NP]) by videofluoroscopic examination of swallowing. The bolus passages were as follows: UAS, BS, and AS occurred in 2, 32, and 7 patients in the oropharyngeal region; UAS, BS, and AS occurred in 5, 20, and 16 patients in the thyropharyngeal region; and UAS, BS, AS, and NP occurred in 11, 9, 10, and 11 patients in the cricopharyngeal region, respectively. In the thyropharyngeal region, the proportion of patients in whom the swallowing reflex occurred when the bolus was in the oropharynx and the proportion of patients with unilateral pharyngeal constrictor paralysis were greater in patients whose bolus passage was AS than in patients whose passage was BS. This suggests that the bolus predominantly passed through the affected side of the thyropharyngeal portion because of the asymmetry of pharyngeal contraction during swallowing in the early period after onset. **Key Words:** Deglutition—deglutition disorders—bolus passage—medullary infarction—videofluoroscopic examination of swallowing.

© 2014 by National Stroke Association

Dysphagia develops in 44%-65% of patients with medullary infarction,¹⁻⁵ and one of the significant symptoms is insufficient opening of the cricopharyngeal muscle,

From the *Department of Rehabilitation Medicine I, School of Medicine, Fujita Health University, Aichi, Japan; †Department of Gerodontology, Division of Gerontology and Gerodontology, Graduate School, Tokyo Medical and Dental University, Tokyo, Japan; and ‡Department of Dysphagia Rehabilitation, Nihon University School of Dentistry, Tokyo, Japan.

Received January 22, 2013; revision received February 24, 2013; accepted February 25, 2013.

Supported by PhD scholarship through the Tokyo Medical and Dental University.

Address correspondence to Shinya Mikushi, DDS, PhD, Department of Gerodontology, Division of Gerontology and Gerodontology, Graduate School, Tokyo Medical and Dental University, 1-5-45 Yushima, Bunkyo, Tokyo 113-8549, Japan. E-mail: yanngerd@tmd.ac.jp.

1052-3057/\$ - see front matter

© 2014 by National Stroke Association

<http://dx.doi.org/10.1016/j.jstrokecerebrovasdis.2013.02.019>

resulting in laterality of bolus passage through the cricopharynx.^{6,7} Insufficient opening of the cricopharyngeal muscle occurs more frequently on the affected side, suggesting that the bolus may be likely to pass through the unaffected side. Therefore, patients are instructed to follow a compensatory swallowing method during direct exercise and at mealtimes by rotating their head to the affected side or inclining the neck to the unaffected side.⁸⁻¹⁰ However, the side of bolus passage in the cricopharyngeal region changes over time, and some patients experience a period in which the affected side is the dominant side of bolus passage.¹¹ Yaguchi et al¹² reported that, in some patients, the bolus predominantly passed through the affected side of the cricopharyngeal portion. They speculated that the bolus is guided and passes through the affected side of the oropharynx and pharynx because of the greater contraction of the palatal muscles on the unaffected side. Moreover, the bolus is pushed into

the affected side of the pharynx because of the stronger pharyngeal constriction on the unaffected side. Our previous study also showed that the bolus predominantly passed through the affected side of the cricopharyngeal portion in some patients.¹³

However, there have been no studies on the side of bolus passage before reaching the hypopharynx. This study aimed to evaluate the dominant side of bolus passage in the oropharyngeal, thyropharyngeal, and cricopharyngeal regions to investigate the relationships between the side of bolus passage and the days after the onset, between the side of passage and the location of food at the initiation of the swallowing reflex, and between the side of passage and the laterality in pharyngeal contraction.

Methods

Patients

Patients with unilateral medullary infarction who underwent videofluoroscopic examination of swallowing (VF) and videoendoscopic evaluation of swallowing (VE) at the same time between March 1999 and June 2008 were enrolled in this study. All patients gave written informed consent to undergo both VF and VE. The location of the lesion was identified by radiological findings on head magnetic resonance imaging (MRI) and/or computed tomography (CT) images. Patients with cerebellar infarction, infarction on both sides of the medulla oblongata, and a history of stroke were excluded.

A bolus of pudding consistency was made by mixing a 50% barium solution with 2% thickener (Tromelin Hi; Sanwa Kagaku Kenkyusyo Co., Ltd, Nagoya, Japan). Patients were asked to swallow 4 mL of this pudding-thick barium, and posteroanterior images of the side of bolus passage in the pharynx were collected. The patients were instructed to swallow in a sitting position according to cues provided by the examiner. The collected data were evaluated retrospectively. The study protocol was approved by the ethical review board of our institution.

Determination of Affected Side

The affected and unaffected sides of the pharynx were determined based on the findings from the physical examination, VE (including dysfunction of the soft palate, tongue, pharyngeal constrictor, and arytenoid), and head MRI and/or CT images.

Identification of the Side of Bolus Passage

To study the laterality of bolus passage, the pharynx was divided into 3 parts: (1) the oropharyngeal portion, including the region from the palate to the vallecula; (2) the thyropharyngeal portion, from the vallecula to the bottom of the pyriform sinus; and (3) the cricopharyngeal portion, from the bottom of the pyriform sinus to the upper esophagus (Fig 1).

The laterality of bolus passage at the first examination of each subject was investigated and classified into the following 4 patterns: dominantly on the unaffected side (UAS), on both sides without clear laterality (BS), dominantly on the affected side (AS), and nonpassage of the bolus (NP). The bolus passages were evaluated by visual observation using the slow motion and stop-frame functions of Quicktime software (Version 7.7, Apple, Cupertino, CA). Two dentists who had training to evaluation of dysphagia after graduation and have treated dysphagia patients assessed the laterality.

Location of the Leading Edge of the Bolus at the Initiation of Swallowing Reflex

Based on the VF findings, the location of the leading edge of the bolus at the initiation of the swallowing reflex (at the start of the steep elevation of the hyoid bone) was classified as oropharynx or thyropharynx.

Presence or Absence of Unilateral Pharyngeal Constrictor Paralysis

Patients with unilateral medullary infarction sometimes have unilateral pharyngeal constrictor paralysis (UPCP) as upper motor neurons of vagus and glossopharyngeal nerve are affected.^{14,15} The posterior wall of the pharynx shifts to the side without paralysis while attempting to phonate because of paralysis of upper pharyngeal constrictor muscle (signe de Rideau of Venet¹⁶). Also when swallowing, in the affected side of pharynx there remains a cavity because of the insufficient pharyngeal constriction (Fig 2).

We investigated the laterality in pharyngeal contraction by evaluating the presence or absence of the unilateral pharyngeal constrictor paralysis according to neurological examination results using VE preceding the swallowing evaluation.

Statistical Analysis

Cohen kappa coefficient was used to measure the intra-rater and inter-rater reliabilities. The Steel–Dwass test was used to compare the days after onset according to

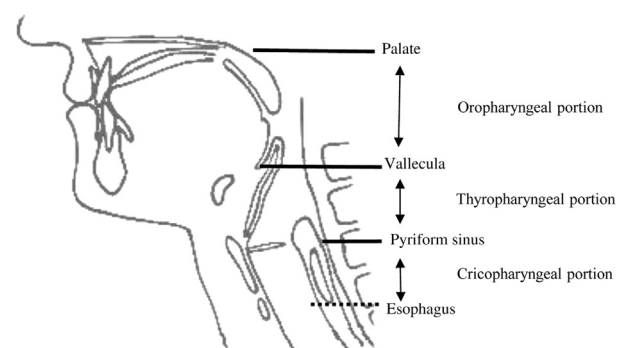


Figure 1. Anatomical landmarks used in the assessment of bolus passage.

Download English Version:

<https://daneshyari.com/en/article/5873427>

Download Persian Version:

<https://daneshyari.com/article/5873427>

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