



Original Article

Oropharyngeal swallowing function in patients with presbyphagia

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Abstract. [Purpose] This study investigated the characteristics of oropharyngeal swallowing function in patients with presbyphagia. [Participants and Methods] Data for 25 patients with presbyphagia were retrospectively analyzed. The oropharyngeal swallowing function was evaluated using VDS based on videofluoroscopic swallowing study. [Results] Lip closure, mastication, laryngeal elevation, and aspiration showed a relative decrease in function. [Conclusion] This study showed a reduction in oropharyngeal swallowing in patients with presbyphagia. Our results may help in the diagnosis and treatment of presbyphagia.

Key words: Presbyphagia, Sarcopenia, Swallowing

(This article was submitted May 26, 2018, and was accepted Aug. 8, 2018)

INTRODUCTION

Presbyphagia is a common problem associated with normal aging process¹⁾. It is characterized by oropharyngeal muscle weakness and sensory dysfunction that affect normal swallowing function and ability to differentiate taste, respectively²⁾. Muscles associated with swallowing are affected by sarcopenia which causes atrophy and weakening of muscles affecting normal swallowing function³⁾. The difficulty in swallowing results in residues of food in the mouth and pharynx, and aspiration that can lead to pneumonia. Therefore, it is important to characterize swallowing function in elderly people with swallowing difficulties. The purpose of this study was to investigate the characteristics of swallowing process in participants aged ≥ 65 years who complained of swallowing difficulties.

PARTICIPANTS AND METHODS

This study analyzed data for 25 participants, aged ≥ 65 years, from K medical center from January 2009 to March 2013. The participants complained of subjective swallowing disorders. The inclusion criteria were previous diagnosis of dysphagia due to aging, Mini-mental status examination score ≥ 20 and confirmed diagnosis of swallowing disorder from videofluoroscopic swallowing study. The study purpose was explained to the participants before enrollment, and informed consent for participation was obtained in accordance with the principles of the Declaration of Helsinki.

The participants were assessed for swallowing function by videofluoroscopic swallowing study. Videofluoroscopic swallowing study used 5 ml of semi-solid food as described by previous studies. When the amount of aspiration was over 50% during the test, the liquid diet did not proceed. Oropharyngeal swallowing function was evaluated using the videofluoroscopic dysphagia scale (VDS) based on a videofluoroscopic swallowing study. The VDS is a functional evaluation scale that reflects overall swallowing function in stroke survivors based on videofluoroscopic swallowing study findings. The VDS is divided

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into the oral stage (lip closure, bolus formation, tongue-to-palate contact, mastication, apraxia, premature bolus loss, and oral transit time) and the pharyngeal stage⁴) (pharyngeal triggering, vallecular residues, pyriform sinus residues, laryngeal elevation, pharyngeal wall coating, pharyngeal transit time, and aspiration). Total score reliability, in terms of the ICC, was 0.556⁵). The participants were assessed by a blinded therapist with >3 years of clinical experience.

RESULTS

The results of VDS evaluation from 25 participants were as follows: lip closure 0.53 ± 0.92 , bolus formation 2.27 ± 1.22 , mastication 3.2 ± 1.47 , apraxia 0, tongue to palate contact 1.33 ± 2.29 , premature bolus loss 1.8 ± 1.41 , oral transit time 1.40 ± 1.55 , triggering of pharyngeal swallow 1.8 ± 2.28 , vallecular residue 0.53 ± 1.19 , laryngeal elevation 0.20 ± 0.77 , pyriform sinus residue 2.00 ± 2.24 , coating on the pharyngeal wall 5.2 ± 3.44 , pharyngeal transit time 3.2 ± 3.1 , aspiration 3.60 ± 3.04 .

DISCUSSION

The purpose of this study was to evaluate characteristics of oropharyngeal swallowing in participants aged ≥ 65 years who complained of subjective swallowing disorder. We observed that the participants had small lip closure and mastication in the oral phase. In the oral phase, lip closure and mastication are responsible for orbicularis oris muscle and masseter muscle, respectively⁶). These muscles can be affected by muscle weakness. Weakness in the orbicularis oris muscle can cause difficulty in proper lip closure leading to food and/or liquids leaking from the oral cavity. Masseter muscle is the primary muscle involved in chewing food. Previous studies reported that elderly participants showed greater tongue, cheek and lip muscle weakness compared to younger adults^{6,7}). In this study, the participants likely had orofacial muscle dysfunction due to sarcopenia. In the pharyngeal phase, laryngeal elevation and aspiration were relatively low. Laryngeal elevation is responsible for the submental muscle. These muscles pull up the hyoid bone strongly during swallowing, and affect the epiglottis rotation⁸). This has a protective effect on airways. However, in this study, reduction of laryngeal elevation and aspiration were observed. These might be closely related to the decrease in the submental muscle strength caused by sarcopenia. In the present study, elderly patients with presbyphagia showed lip closure and mastication in the oral phase, and decreased laryngeal elevation and aspiration in the pharyngeal phase. These results may help in the diagnosis and treatment of presbyphagia. There are some limitations of our study. The sample size was small, and the findings are difficult to generalize. Moreover, the absence of a follow-up comparison after the interventions did not permit determination of long-term effects.

Conflict of interest

None.

REFERENCES

- 1) Jungheim M, Schwemmler C, Miller S, et al.: [Swallowing and dysphagia in the elderly]. HNO, 2014, 62: 644–651 (In German). [[Medline](#)] [[CrossRef](#)]
- 2) Wang CM, Chen JY, Chuang CC, et al.: Aging-related changes in swallowing, and in the coordination of swallowing and respiration determined by novel non-invasive measurement techniques. Geriatr Gerontol Int, 2015, 15: 736–744. [[Medline](#)] [[CrossRef](#)]
- 3) Wakabayashi H: Presbyphagia and sarcopenic dysphagia: association between aging, sarcopenia, and deglutition disorders. J Frailty Aging, 2014, 3: 97–103. [[Medline](#)]
- 4) Han TR, Paik NJ, Park JW, et al.: The prediction of persistent dysphagia beyond six months after stroke. Dysphagia, 2008, 23: 59–64. [[Medline](#)] [[CrossRef](#)]
- 5) Kim DH, Choi KH, Kim HM, et al.: Inter-rater reliability of videofluoroscopic dysphagia scale. Ann Rehabil Med, 2012, 36: 791–796. [[Medline](#)] [[CrossRef](#)]
- 6) Park JS, You SJ, Kim JY, et al.: Differences in orofacial muscle strength according to age and sex in East Asian healthy adults. Am J Phys Med Rehabil, 2015, 94: 677–686. [[Medline](#)] [[CrossRef](#)]
- 7) Jeong DM, Shin YJ, Lee NR, et al.: Maximal strength and endurance scores of the tongue, lip, and cheek in healthy, normal Koreans. J Korean Assoc Oral Maxillofac Surg, 2017, 43: 221–228. [[Medline](#)] [[CrossRef](#)]
- 8) Pearson WG Jr, Hindson DF, Langmore SE, et al.: Evaluating swallowing muscles essential for hyolaryngeal elevation by using muscle functional magnetic resonance imaging. Int J Radiat Oncol Biol Phys, 2013, 85: 735–740. [[Medline](#)] [[CrossRef](#)]