Auris Nasus Larynx xxx (2018) xxx–xxx

Contents lists available at ScienceDirect

Auris Nasus Larynx

journal homepage: www.elsevier.com/locate/anl

Predictive value of the Hyodo score in endoscopic evaluation of aspiration during swallowing

Yoshihiro Chiba [a,*], Daisuke Sano [a,b], Yukiko Ikui [a], Goshi Nishimura [a,b], Kenichiro Yabuki [a], Yasuhiro Arai [a], Teruhiko Tanabe [a], Hidetaka Ikemiyagi [a], Hiroshi Hyakusoku [b], Nobuhiko Oridate [a,b]

[a] *Department of Otorhinolaryngology — Head and Neck Surgery, Yokohama City University, School of Medicine, Yokohama, Japan*
[b] *Department of Biology and Function in Head and Neck, Yokohama City University Graduate School of Medicine, Yokohama, Japan*

ARTICLE INFO

Article history:
Accepted 26 March 2018
Available online xxx

Keywords:
Flexible endoscopic evaluation of swallowing (FEES)
Hyodo scoring method
Aspiration
Dysphagia

ABSTRACT

Objective: The Hyodo scoring system during the endoscopic procedure has been proposed as a new tool for evaluating oral intake feasibility. However, the effectiveness of the information obtained from this procedure in predicting aspiration is not fully elucidated. The aim of this study was to assess the significance of clinical factors, including Hyodo scores, for predicting the risk of aspiration.

Methods: Five hundred and twenty-eight endoscopic swallowing examinations were performed. Clinical factors, including age, sex, disease type, history of aspiration pneumonia, cognitive function, presence of tracheostomy, presence of vocal cord paralysis, consciousness level on the Japan Coma Scale, ECOG Performance Status, serum albumin level and Hyodo score, were obtained for each examination. The relationship between each of these factors and the presence of aspiration during endoscopic procedure was evaluated.

Results: Three hundred and thirty-two patients (62.9%) were scored less than 5, 153 (29.0%) were scored between 5 and 8, and 43 (8.1%) were scored above 8. The number of patients with aspiration was 133 (25.2%). ROC analysis revealed that a cut-off point of 6 for Hyodo score was effective for predicting aspiration, with a sensitivity of 0.65 and a specificity of 0.86. History of aspiration pneumonia (OR 1.87, $P < 0.001$), vocal cord paralysis (OR 2.23, $P < 0.001$), PS ≥ 3 (OR 2.47, $P < 0.001$) and Hyodo score > 6 (OR 9.08, $P < 0.001$) were found to be independent predictive factors for aspiration.

Conclusion: The Hyodo scoring method was easy for otolaryngologists to perform and the scores were useful for predicting aspiration with moderate sensitivity and high specificity. Hyodo score > 6, history of aspiration pneumonia, vocal cord paralysis, and PS ≥ 3 were independent predictive factors for aspiration and that a Hyodo score above 6 was the statistically strongest predictor for aspiration.

© 2018 Elsevier B.V. All rights reserved.

1. Introduction

Dysphagia is a critical issue in an aging society as the prevalence of dysphagia is reported to range from 13.8 to 37.6% among adults aged over 65 years [1]. In fact, aspiration pneumonia is one of the major causes of death in that age group

* Corresponding author at: Department of Otorhinolaryngology — Head and Neck Surgery, Yokohama City University, School of Medicine, 3-9 Fukuura, Kanazawa-ku, Yokohama 236-0004, Japan.
E-mail address: chiba_y@yokohama-cu.ac.jp (Y. Chiba).

https://doi.org/10.1016/j.anl.2018.03.005
0385-8146/© 2018 Elsevier B.V. All rights reserved.

Please cite this article in press as: Chiba Y, et al. Predictive value of the Hyodo score in endoscopic evaluation of aspiration during swallowing. Auris Nasus Larynx (2018), https://doi.org/10.1016/j.anl.2018.03.005

[2]. Aspiration is thought to be a clinically important variable in patients with swallowing dysfunction and is likely to be associated with an increased risk of pneumonia. It is therefore important to assess the swallowing function, particularly the presence of aspiration, in elderly patients.

Flexible endoscopic evaluation of swallowing (FEES) and videofluoroscopic swallowing examination (VFSE) have been used to evaluate swallowing and to quantify the risk of aspiration. VFSE is both time- and labor-consuming in that large-scale X-ray equipment, as well as evaluators, assistants, and scheduling of the radiology suite are required [3,4]. Further, patients need to visit to the radiology suite for VFSE [3]. In cases requiring repeated evaluations, radiation exposure might also become a health issue. In addition, whole structures consisting of the swallowing function cannot be observed directly and pharyngeal sensors cannot be evaluated by VFSE. FEES, on the other hand, has a number of advantages, including cost- and time-effectiveness, over VFSE [4]. Further, it does not require large-scale X-ray equipment and even immobile patients can undergo FEES at their bedside.

One of the big issues associated with FEES is the lack of a standardized protocol for the procedure and an objective evaluation formula. Hyodo et al. has proposed a new scoring method (Hyodo scoring method) for evaluating swallowing function based on blue-dyed test water, consisting of four parameters [5]. The total scores of the four parameters can obtained by a simple procedure related to feeding procedures, suggesting that this method could overcome the disadvantages associated with FEES [5].

The reliability of FEES in the assessment of swallowing function has not yet been fully studied and no common criteria for rating the severity of dysphagia based on the FEES procedure have been proposed. In this study, we evaluated the swallowing function of patients with suspected dysphagia by FEES to assess the significance of the Hyodo scoring method for the prediction of aspiration.

2. Materials and methods

2.1. Patients

From January 2013 to July 2016, 407 patients underwent FEES with endoscopic scoring at Yokohama City University Hospital. The total number of FEES examinations was 528 (n = 528, 351 male and 177 female). Some patients were evaluated repeatedly under different conditions. All patients suspected of dysphagia, except those who could not maintain a seated position for over 20 min or could not understand instructions due to diminished consciousness, were included in this study. In addition to FEES examinations, clinical parameters, such as age, sex, disease type, history of aspiration pneumonia, cognitive function, presence of tracheostomy, presence of vocal cord paralysis, consciousness level on the Japan Coma Scale (JCS), ECOG Performance Status (PS) and serum albumin level were obtained at each examination. Cognitive dysfunction was defined as a score below 20 on the revised version of Hasegawa's dementia scale (HDS-R) [6] or were diagnosed with dementia previously. A value of serum albumin one week before and after the FEES examinations was accepted.

2.2. FEES procedure

All patients underwent FEES examination while seated upright in a chair. A nasopharyngo-laryngoscope of 3.1 mm in diameter with an up/down tip deflection capability (ER-270FP, Fuji, Japan) and digital color video monitor were used. The flexible endoscope was inserted into patient's nasal cavity and, after passing the nasal cavity, the distal end of the endoscope was located on above the top of epiglottis to obtain a superior view of the hypopharynx. Evaluation from pre-swallowing to post-swallowing was performed to collect the necessary data. Prior to swallowing evaluation, we observed the entire pharyngeal and laryngeal structures including the entire base of the tongue, epiglottis, posterior and lateral walls of the pharynx, larynx and vocal cord mobility. After swallowing, the distal end of the endoscope was advanced lower into the hypopharynx and the upper portion of the laryngeal vestibule to obtain views of the glottis and trachea below.

For swallowing function evaluation, we adopted the Hyodo scoring method as described previously and as shown in Table 1. This method consists of four parameters; (1) salivary pooling at the vallecula and piriform sinuses, (2) glottal closure reflex induction by touching the epiglottis or arytenoid with the endoscope, (3) swallowing reflex initiation assessed by "white-out" timing ("white-out" is defined as the period during which the endoscopic image is obscured owing to pharyngeal

Table 1
FEES with Hyodo scoring method (proposed in 2010 by Hyodo et al. [5]).

(1) The salivary pooling degree at the vallecula and piriform sinuses
0: No pooling
1: Pooling at the only vallecular
2: Pooling in vallecula and piriform sinuses and no penetration into larynx
3: Pooling in vallecula and piriform sinuses and penetration into larynx
(2) The glottal closure reflex induced by touching the epiglottis or arytenoid with the endoscope
0: Marked reflex by one touching
1: Slow and/or weak reflex by one touching
2: Reflex be two or three touching
3: No reflex despite three touching
(3) The location of the bolus at the swallowing reflex initiation assessed by "white-out" timing
0: Pharyngeal
1: Valleculla
2: Piriform sinuses
3: No swallowing
(4) The extent of pharyngeal clearance after blue-dyed water is swallowed
0: No residue
1: Pharyngeal residues remain, but are absent after swallowing is attempted two or three times
2: Pharyngeal residues remain, but do not penetration into larynx
3: Pharyngeal residues remain and penetration into larynx

The (1) and (2) parameter show motor function in swallowing process. The (3) and (4) parameter show sensory function in swallowing process. These parameters are categorized as 0 for normal, 1 for mildly impaired, 2 for moderately impaired and 3 for severely impaired. The total scores of four parameters shows a level of swallowing function (0 for normal and 12 for worst).

Please cite this article in press as: Chiba Y, et al. Predictive value of the Hyodo score in endoscopic evaluation of aspiration during swallowing. Auris Nasus Larynx (2018), https://doi.org/10.1016/j.anl.2018.03.005

Download English Version:

https://daneshyari.com/en/article/8952219

Download Persian Version:

https://daneshyari.com/article/8952219

Daneshyari.com