

The outcome of dysphagia rehabilitation in post-surgical patients with head and neck cancer: Investigation before widespread use of PEG

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ABSTRACT We investigated the outcomes of patients with head and neck cancers who were confirmed to have eating and swallowing disorders by VF and who underwent dysphagia rehabilitation, focusing on changes in the nutrient ingestion method. The disease course was investigated retrospectively in 82 inpatients who, after surgery for head and neck cancers, visited the rehabilitation department of our hospital for treatment of eating and swallowing disorders and who underwent swallowing evaluation by VF between August 1990 and December 1999. The mean duration of the dysphagia rehabilitation was 59.7 ± 36.5 days (7–300 days). Overall, the nutrient ingestion method of 22 patients (71%) was oral ingestion alone at the time of discharge, and the mean duration of training in the aspiration-on-VF group was 65.5 ± 35.4 days. In the group without aspiration on VF, the nutrient ingestion method before training was oral ingestion or CNG. After training, all patients were capable of oral ingestion, with the exception of one patient whose ingestion method remained oral ingestion + IOE because of small oral intake. The mean duration of training in this group was 30.2 ± 16.4 days. Most patients became able to ingest by oral ingestion, IOE, or a combination of these methods.

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Key words : dysphagia rehabilitation, post-surgical patients with head and neck cancer, oral ingestion, videofluoroscopic examination of swallowing (VF)

INTRODUCTION

Organic passage disorders due to inflammation and tumors of the oral cavity, pharynx, and esophagus, or functional disorders of the swallowing muscle associated with central nervous disorders and neuromuscular diseases are considered to be the main causes of eating and swallowing disorders¹⁾. Although recent widespread use of videofluoroscopic examinations of swallowing (VF)

has gradually led to the establishment of functional evaluation and therapeutic methods, studies on rehabilitation for eating and swallowing disorders that occur after surgery for head and neck cancers have lagged behind. There have been fewer reports in Japan because only general hospitals with specific clinical departments, such as surgery (dental/oral surgery, otolaryngology, neurosurgery, and plastic surgery), radiology, and rehabilitation departments,

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can perform these procedures.

We investigated the outcomes of patients with head and neck cancers who were confirmed to have eating and swallowing disorders by VF and who underwent dysphagia rehabilitation, focusing on changes in the nutrient ingestion method. Since the use of a percutaneous endoscopic gastrostomy tube (PEG) may have some influence on the outcomes eating and swallowing outcomes in head and neck cancer patients, patients who were treated in the 1990s, before widespread use, were investigated.

SUBJECTS AND METHODS

The disease course was investigated retrospectively in 82 inpatients who, after surgery for neck and head cancers, visited the rehabilitation department of our hospital for treatment of eating and swallowing disorders and who underwent swallowing evaluation by VF between August 1990 and December 1999.

Excluding those who were not with a chosen for training, 43 patients (31 men and 12 women) with a mean age of 62.0 ± 8.6 years (48-75 years) were selected.

The items investigated were the disease name, the results of VF, the nutrient ingestion method at the time of the initial examination and after training, the dysphagia rehabilitation method and period, and the presence or absence of other treatment for swallowing (posturing, total laryngectomy, others). The patient's diseases included oral cavity cancers, such as tongue cancer and gingival cancer, in 26 patients, esophageal cancer in 5, pharyngeal cancer in 4, laryngeal cancer in 2, nasal cavity cancer in 2, and thyroid cancer, temporal bone cancer, thymoma, and neck cancer in 1 patient each, respectively. For VF evaluation, the assessment table shown in Table 1 was used²⁾. From among the main evaluation items, we focused on the presence or absence of aspiration of jelly or water, and the

Table 1 Main evaluation items of VF

	Lateral view	Frontal view
Oral cavity	<ul style="list-style-type: none"> • Uptake • Retention in the mouth • The presence or absence and site of residues • Mastication • Food bolus formation • Sending food to the deep tongue and pharynx • Oral passage time 	<ul style="list-style-type: none"> • Symmetry • Site of residues • Mastication • Food bolus formation
Pharynx	<ul style="list-style-type: none"> • Swallowing reflex • Movement of the soft palate (Influx to the postnasal cavity) • Movement of the tongue base • Movement of the hyoid bone • Elevation of the larynx • Movement of the epiglottis • Peristalsis of the pharynx • Opening of the cricopharyngeal muscle • Retention <ul style="list-style-type: none"> • Site of residue Piriform fossa • Epiglottic vallecula (Influx into the larynx) • Laryngeal passage time 	<ul style="list-style-type: none"> • Closure of the glottis and its vestibule • Peristalsis of the pharyngeal wall • Opening of the cricopharyngeal muscle (Laterality) • Laterality of the pharyngeal passage • Piriform fossa • Epiglottic vallecula Aspiration
Esophagus	<ul style="list-style-type: none"> • Retention in the esophagus • Narrowing/dilation of the lower esophagus • Gastroesophageal reflux 	<ul style="list-style-type: none"> • Peristalsis • Retention in the esophagus • Meandering, narrowing, diverticulum • Esophageal passage time

patients were divided into groups with and without aspiration on VF. The nutrient ingestion methods at the time of the initial examination and after training were classified as oral ingestion, continuous nasogastric catheter feeding (CNG), intermittent oesophageal feeding (IOE), or a combination of these. Dysphagia rehabilitation was roughly divided into indirect and direct dysphagia rehabilitation, and presence or absence of the training was assessed. Since patients who underwent direct swallowing training had undergone indirect dysphagia rehabilitation beforehand as a preparatory step, direct dysphagia rehabilitation was regarded as including such indirect training.

RESULTS

The mean duration of the dysphagia rehabilitation was 59.7 ± 36.5 days (7-300 days). Regarding the dysphagia rehabilitation method, all patients initially underwent indirect dysphagia rehabilitation and 40 patients (93%) concomitantly underwent direct dysphagia rehabilitation including those who received appropriate instruction in eating and swallowing. The content of the indirect dysphagia rehabilitation varied slightly among the patients. The training approaches utilized are shown in Table 2. No apparent aspiration was noted on VF in the majority of patients who did not require direct dysphagia rehabilitation (excluding those who received instruction alone). Training for the preparatory and oral stages, such as exercises to strengthen the muscles around the mouth and range

of motion exercises were performed. Additional approaches for the pharyngeal step, including pushing exercise and swallowing pattern exercise, were also performed.

During the initial evaluation, the nutrient ingestion methods before training were oral ingestion, CNG, or a combination of these in the group with aspiration on VF (31 patients). Five patients (16%) were capable of oral ingestion before training and continued oral ingestion after investigating safe food forms and the appropriate ingestion posture. Six patients whose ingestion method before exercise was CNG + oral ingestion finally became capable of oral ingestion, excluding one patient whose method became IOE + oral ingestion. Twenty patients whose ingestion method was CNG became capable of ingestion orally, by IOE or by a combination of these methods, after dysphagia rehabilitation, with the exception of two patients who died of aggravation of their general condition due to recurrence of cancer for whom the ingestion method remained as CNG. Overall, the nutrient ingestion method of 22 patients (71%) was oral ingestion alone at the time of discharge, and the mean duration of training in this group was 65.5 ± 35.4 days.

In the group without aspiration on VF (12 patients), the nutrient ingestion method before training was oral ingestion or CNG. After training, all patients were capable of oral ingestion, with the exception of one patient whose ingestion method remained oral ingestion + IOE because of small oral intake. The mean duration of training in this group was 30.2 ± 16.4 days.

Table 2 Indirect swallowing training

Preparatory stage	Training of the cervical and trunk
Oral stage	Flexible movement of perioral muscles
	Resistive movement
	Passive exercise, sensory stimulation
Pharyngeal stage	Articulation/phonation training
	Cold stimulation Mendelson method
	Swallowing pattern training
	Pushing exercise
	Tube swallowing training

DISCUSSION

By means of dysphagia rehabilitation, it has been reported that about half of cerebrovascular disorder patients with severe eating and swallowing disorders can learn to ingest³⁾. Although a simple comparison could not be made because many mild

cases were included in our study, it was confirmed that the means of nutrient ingestion could be improved by training in a high proportion of head and neck cancer patients. In swallowing disorders associated with head and neck cancers, coordination of the tongue, pharyngeal wall, hyoid bone, and cricopharyngeal muscle are impaired⁴⁻⁷⁾, and aspiration occurs early after surgery in most cases⁵⁾. A high degree of efficacy of postoperative rehabilitation has been reported^{8,9)}, which is consistent with our results.

Unlike in cerebrovascular disorder patients, greater control of the swallowing reflex is retained in many head and neck cancer cases, and impairment of swallowing function is limited to organic impairment of the head and neck region in many cases. Therefore, accurate evaluation of swallowing function and reliable training may lead to early acquisition of safe eating and swallowing. Cognitive disorders and impairment of higher brain function, which are noted in cerebrovascular disorder patients, are absent in head and neck cancer patients, and the learning effect is high. This may be a factor related to the effective training. Mastering the instructed methods for oral movement and swallowing may have led to the high training effect.

IOE is superior to CNG with regard to aesthetic problems, cleanliness of the oral cavity, improvement of swallowing function, shortening of infusion time, and prevention of diarrhea and vomiting¹⁰⁾, and mastering its technique by training is very beneficial. In the 1990s, before the widespread use of PEG, IOE was considered the best choice, and was widely used by our hospital. Patients whose ingestion method continued to be IOE after training included those in whom food intake was insufficient due to anorexia and those in whom aspiration could not be anatomically prevented despite the use of training and various measures.

Dysphagia rehabilitation improved the food form,

amount, and ingestion speed in many patients who were able to eat orally before training and without aspiration on VF, suggesting that dysphagia rehabilitation is beneficial. Oral ingestion was permitted for some patients without adequate evaluation prior to referral to our department, and aspiration was detected by VF in several patients. Since leaving aspiration untreated may lead to pneumonia, to subsequent aggravation of the general condition, and in the worst case, death, it should be a focus clinically. For head and neck cancer patients, particularly those at high risk of aspiration, such as post-surgical patients, it is necessary to perform early and adequate evaluation and training, followed by selection of food form and appropriate instruction in a safe posture to incorporate a safe ingestion method. To achieve this, cooperation among departments and the selection of adequate training based on systematic evaluation from the initiation of dysphagia rehabilitation are important.

In this study, the effect of dysphagia rehabilitation was investigated retrospectively in a survey of the disease course of patients who had undergone head and neck cancer surgery. However, due to the fact that the items described in the medical forms were not consistent, detailed problems and the eating and swallowing grades of individual patients could not be investigated. It was necessary to establish consistent evaluation items and elucidate factors that lead to good outcomes in individual cases. Differences between diseases and the influence of radiotherapy and anticancer drug therapy on eating and swallowing function should also be investigated, but this could not be done in the present study because the number of patients was insufficient. As for radiotherapy, radical irradiation at about 60-70 Gy has been performed in many cases¹¹⁾, and can cause problematic adverse reactions: local mucitis and erosion, as local acute symptoms, dry mouth due to atrophy of the salivary glands, opening disorder accompanying fibrosis of

the irradiated region, and laryngeal elevation failure as chronic symptoms. Regarding anticancer drugs, platinum preparation, 5FU, and bleomycins are frequently used¹²⁾, and adverse effects that may affect eating and swallowing include the pain and nausea associated with mucitis. Investigation of the relationship between these adverse effects and swallowing training may be important.

CONCLUSION

A retrospective survey of the disease course with regard to food ingestion after swallowing training in post-surgical patients with head and neck cancers was performed. Most patients became able to ingest by oral ingestion, IOE, or a combination of these methods. The proportions of patients with oral ingestion alone at the time of discharge were 70% and 92% in the groups with and without aspiration on VF, respectively. Although swallowing disorder training is always accompanied by a risk of aspiration, adequate evaluation allows early acquisition of safe eating and swallowing. For head and neck cancer patients, active eating and dysphagia rehabilitation from the early phase are necessary in consideration not only of physical function but also of QOL. Since the causes, sites, and degrees of eating and swallowing disorders vary among patients, individual approaches including functional evaluation and training are important. Approaches should be investigated for individual patients by sufficient evaluation and elucidation of the problems. Long-term medically stable management by periodical follow-up after discharge may be important¹³⁾. We are planning to compare the findings with cases prior to intervention by the Rehabilitation Department to evaluate the effect of training.

REFERENCES

- 1) Tsubahara A: Dysphagia rehabilitation. Tokyo, Isiyaku Syuppan. 1998, pp72-83 (in Japanese)
- 2) Hiraoka T, Tsubahara A: dysphagia in acute stage stroke. Sogo Rehabilitation 28: 415-421, 2000 (in Japanese)
- 3) Hujishima I: Dysphagia of stroke. Tokyo, Isiyaku Syuppan. 1998, pp1-18 (in Japanese)
- 4) McConnel FM, O'Connor A : Dysphagia secondary to head and neck cancer surgery. Acta Otorhinolaryngol Belg 48 : 165~170, 1994
- 5) Kronenberger MB, Meyers AD : Dysphagia following head and neck cancer surgery. Dysphagia 9 : 236-244, 1994
- 6) Pauloski BR, Logemann JA, Fox JC, *et al.* : Biomechanical analysis of the pharyngeal swallow in postsurgical patients with anterior tongue and floor of mouth resection and distal flap reconstruction. J Speech Hear Res 38 : 110~123, 1995
- 7) Walther EK : Dysphagia after pharyngolaryngeal cancer surgery. Part I : Pathophysiology of postsurgical deglutition. Dysphagia 10 : 275~278, 1995
- 8) Fujimoto Y : Evaluation of swallowing function after oral cavity cancers and pharyngeal cancer - Validity of Swallowing Ability Scale. J otolaryngol Jpn 100: 1401-1407, 1997
- 9) Denk D-M, Swoboda H, Schima W, *et al.* :Prognostic factors for swallowing rehabilitation following head and neck cancer surgery.Acta Otolaryngol(Stockh) 117: 769-774, 1997
- 10) Kisa T, Tominaga S, Fukada M, *et al.* :A therapy and management with an application of intermittent use of oral catheter for feeding dysphagia in hemiparetic stroke patients. Sogo rihabiriteshon 20 : 235~239, 1992
- 11) Inoue T: Radiation therapy No11 head and neck cancer. Tokyo, Medical view. 1987,pp30-39 (in Japanese)
- 12) Inuyama I : Chemotherapy before operation of head and neck cancer. Japanese journal of cancer and chemotherapy 12 : 992 - 1002, 1985
- 13) Hiraoka T : Dysphagia rehabilitation-Rehabilitation of eating- history, Physical findings. Tokyo, Shinkoh Igaku Shuppan. 2008, pp 13-15