

〈Case Report〉

## Surgical retrieval under general anesthesia of an inadvertent denture ingestion causing cervical esophageal perforation

Jiro HAYASHI<sup>1)</sup>, Akihisa AKAGI<sup>1)</sup>, Takashi URANO<sup>1)</sup>, Masaki MATSUBARA<sup>1)</sup>  
Naomasa ISHIDA<sup>1)</sup>, Munenori TAKAOKA<sup>1)</sup>, Kazuhiro YOSHIDA<sup>1)</sup>  
Atsushi URAKAMI<sup>1)</sup>, Minoru HAISA<sup>1)</sup>, Tomohiro TANIKAWA<sup>2)</sup>  
Mitsuhiko SUEHIRO<sup>2)</sup>, Hirofumi KAWAMOTO<sup>2)</sup>, Tomoki YAMATSUJI<sup>1)</sup>

1) Department of General Surgery,

2) Department of General Internal Medicine 2, Kawasaki Medical School

**ABSTRACT** Ingesting foreign bodies, such as a partial denture, is a relatively frequent occurrence among elderly patients with dementia and if the esophagus has been perforated, extra care in treatment is required. This case report is about an elderly male patient with dementia who required the surgical removal of a partial denture that was accidentally ingested and caused a cervical perforation.

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Key words : Cervical esophageal perforation, Surgical retrieval, Denture, Accidental ingestion

## INTRODUCTION

In an aging society with an increasing number of dementia patients, foreign body (FB) ingestion by the elderly, especially those with dementia, is frequently encountered in daily clinical practice<sup>1)</sup>. While most ingested FB are reported to be naturally excreted out through the digestive tract, some cases require therapeutic intervention<sup>2)</sup>. The elderly have a higher risk of ingesting FB due to various physical limitations and dementia<sup>3)</sup>. If a partial denture or a press-through package is inadvertently ingested and the diagnosis is belated, a serious condition such as an esophageal perforation could occur<sup>3)</sup>.

As the elderly population increases, more cases of

inadvertent FB ingestion, especially partial dentures lodged in the esophagus, are likely to increase<sup>1–3)</sup>. An endoscopic procedure is often employed to remove esophageal FB<sup>2)</sup>, but when a partial denture or the sharp tip of a fish bone perforates the esophageal wall, surgical treatment may be required.

This report is on the surgical removal of an ingested partial denture that caused a cervical esophageal perforation.

## CASE DETAILS

*Patient:* 78-year-old male

*Presenting complaints:* The patient visited a nearby doctor with a fever and appetite loss.

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Corresponding author

Tomoki Yamatsuji

Department of General Surgery, Kawasaki Medical School, Kawasaki Medical School General Medical Center, 2-6-1 Nakasange, Kita-ku, Okayama, 700-8505, Japan

Phone : 81 86 225 2111

Fax : 81 86 232 8343

E-mail: yama-t@med.kawasaki-m.ac.jp

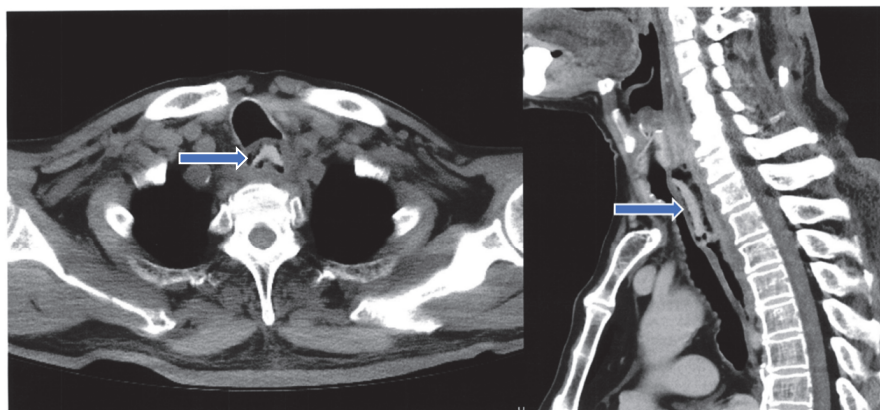


Fig. 1. Chest CT revealed a FB (Arrow) in the cervical and upper thoracic esophagus without metallic components.

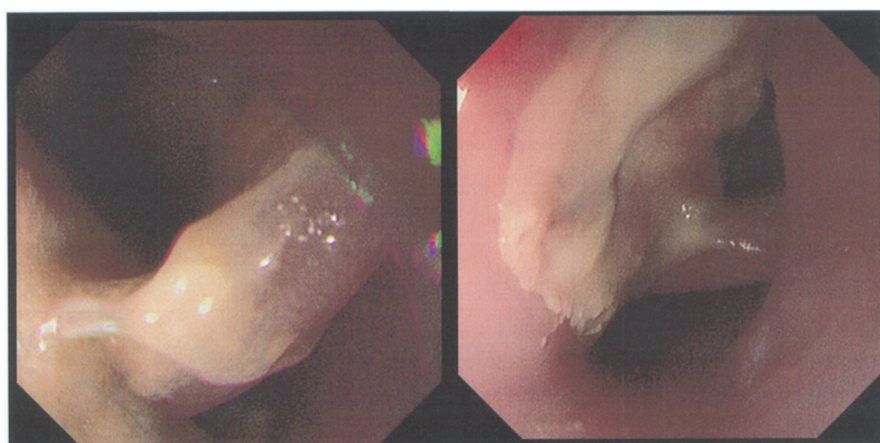


Fig. 2. Upper gastrointestinal endoscopy showed a hard FB in the cervical esophagus.

*Data in referral hospital:* A blood test showed leukocytosis and high c-reactive protein. A computed chest tomography (CT) showed FB in the cervical esophagus and the patient was referred to our facility.

*Anamnestic history:* hypertension, diabetes, stroke at the age of 68 and dementia

*Medication:* Cilostazol, Candesartan Cilexetil, Amlodipine Besilate, Teneligliptin Hydrobromide Hydrate, Luseogliflozin Hydrate, Rivastigmine

*Family history:* Nothing particular

*Condition upon admission:* Relatively lucid with mild disorientation

*Height:* 160 cm

*Weight:* 52 kg

*Vital signs:* body temperature 37.2°C, blood pressure at 154/88 mmHg, pulse 88 bpm

No abnormalities were found in the cervical or thoracic esophagus.

*Blood biochemical findings:* WBC  $11,420 \times 10^3/\mu\text{L}$ , RBC  $3.99 \times 10^6/\mu\text{L}$ , CRP 17.95 mg/dL, blood glucose 179 mg/dL, HbA1c 7.2%

*CT findings:* A 5 cm length was found in the cervical esophagus and the esophageal wall was thickened with inflammation in the soft tissues (Fig. 1).

*Upper gastrointestinal endoscopic findings:* A hard FB and esophageal ulcer were found in the cervical esophagus. Removal with forceps was attempted, but as the FB was already partially

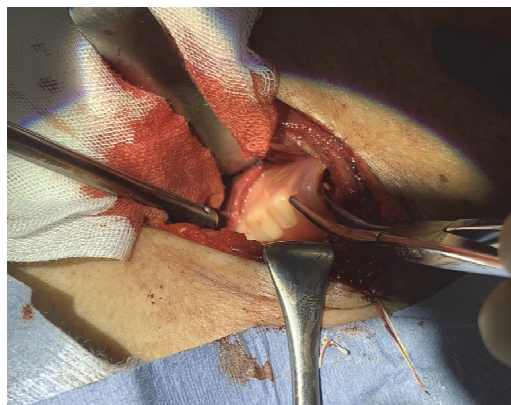


Fig. 3. Surgical findings: A FB was removed surgically via trans-cervical approach.

lodged in the esophageal wall, endoscopic removal was determined to be unfeasible. (Fig. 2).

**Surgery:** Since endoscopic removal of the FB was impractical and the CT showed a suspected esophageal perforation, emergency surgery under general anesthesia was performed. After endotracheal intubation, the left cervical esophagus was incised, then the inner rim of the sternocleidomastoid and the hyoid muscle were incised. The recurrent laryngeal nerve was circumvented on the interior side of the common carotid artery. When the esophagus was reached, a part of the FB was clearly protruding from the anterior wall and was removed with forceps (Fig. 3). The FB was a 5 × 2 cm damaged partial denture (Fig. 4). After removing the denture, it could be seen that the perforated esophageal wall had partial necrosis. Primary closure with sutures was deemed unfeasible and so a sternocleidomastoid flap was sutured onto the damaged wall while leaving space for a drainage tube.

**Postoperative course:** On the fourth day after surgery, an esophageal x-ray with contrast agent confirmed that the esophagus was not leaking, and tube feeding was begun. On the 19<sup>th</sup> day after surgery, an upper gastrointestinal endoscopy showed that the esophageal perforation had healed without stenosis. The patient was having abalienation



Fig. 4. A retrieved FB was a part of damaged denture.

and irritability due to dementia and after an apoplexy and an intervention from the department of psychiatry the patient was transferred to a rehabilitation facility on the 43<sup>rd</sup> day after surgery.

## DISCUSSION

Gastrointestinal foreign bodies (GI FB) can be categorized as either oral or rectal with the cause being either inadvertent or intentional. GI FB are most often found in the upper gastrointestinal tract. As the elderly population increases, accidental ingestion of various medicines, press-through packaging and partial dentures are on the rise<sup>4-10</sup>. This case was an esophageal perforation caused by the accidental and unremembered ingestion of a partial denture by an elderly patient with dementia.

Even when a partial denture has been sized appropriately by a professional, bone structure can change as the body ages, and denture material can erode and deteriorate. These factors can make a denture become ill-fitting, causing damage and an inappropriate bite if not properly managed and maintained. Also, damage to the denture base material or even the clasps themselves can make the clasps less effective<sup>7</sup>. Regular periodic dental treatment can help avoid the accidental ingestion of dislodged crowns or dental prostheses by the elderly<sup>11-17</sup>.

The guidelines for gastroenterological endoscopy in Japan specifically mention partial dentures as an example of an FB that can damage the walls of the gastrointestinal tract<sup>2)</sup>. Also, there is a danger of choking if a dental prosthesis stays in the lower hypopharynx or larynx, or moves into the bronchi. Accidental ingestion can have serious outcomes and therefore careful treatment is required<sup>11, 18)</sup>.

The causes of inadvertent ingestion lie with the person or with the function of the denture itself. For example, if the denture wearer has dysphagia, a denture may easily become dislodged and swallowed while masticating. However, even when there is no problem with mastication or dysphagia, incidental ingestion can occur. Elderly people with physical limitations have a higher chance of accidental ingestion. Conditions such as dementia, Parkinson's disease, cerebrovascular disorder, schizophrenia, psychopathological disorder, head injury, recurrent laryngeal nerve paralysis, and esophageal cancer irradiation treatment can all contribute to a higher risk of inadvertent ingestion. Local factors such as paralysis in the oral cavity and lower sensitivity of the oral membrane can impair the swallowing function.

Some kinds of denture material do not appear clearly in plain x-rays often used for the diagnostic imaging of accidental ingestion, and because this fact is not well-known there is a reported case that a patient died without the partial denture that was ingested being found<sup>4)</sup>. CT can be effective for finding ingested FB. In this case, the denture that was in the cervical esophagus did not have any metal pieces, so the plain x-ray could not assist in diagnosis.

An upper gastrointestinal endoscopy is recommended for diagnosing FB in the esophagus, and often the FB can be removed with forceps during the diagnostic procedure<sup>19–26)</sup>. A transparent cap is used as a supportive aid so that the endoscope does not damage the esophageal membrane at the

time of removal and retrieval. After confirming the FB with the endoscope, the most appropriate retrieval device is selected to attempt a safe removal. In a case of an oversized FB or when endoscopic removal is not feasible, surgical treatment should be considered immediately<sup>22)</sup>.

If the perforation is confirmed to be in the cervical esophagus, as it was in our case, a left cervical incision is a relatively safe approach. If there is damage to the esophageal wall, necrosis, or surrounding infection is suspected when closing the esophagus after the removal of the FB and primary closure with sutures is considered risky, close with a sternocleidomastoid flap. If a perforation is suspected in the thoracic esophagus, the same surgical procedures as in a sudden esophageal rupture in a thoracotomy should be followed, and a closure such as omental implantation can be chosen for the esophageal damage. For patients in a poor general condition, other options to consider are a removal the thoracic esophagus or a secondary esophageal reconstruction for the cervical esophageal fistula.

Once an inadvertent ingestion occurs, early detection and treatment is important because any delay can increase the chance of potentially fatal mediastinitis from an esophageal perforation<sup>22)</sup>. When a patient has Alzheimer's disease, dementia, a cerebral infarction or any other pre-existing disease that can induce inadvertent ingestion, subjective complaints or spontaneous symptom complaints tend to be poor and FB can take a much longer time to diagnose and treat. On the other hand, when patients do not have any mediastinitis caused by an esophageal perforation or obstruction of food, there may not be a diagnosis of an FB in the esophagus. There are reports of FB being found several months to several years after ingestion<sup>6, 8)</sup>.

Family members and caretakers should pay extra attention to denture wearers under their care who have a high chance of accidentally swallowing

it<sup>13)</sup>. The partial denture that was removed in this study was old and damaged, and the timeline of the ingestion was eventually clarified by family members. Periodic dental care to keep dentures in a good condition is one important way to prevent accidental ingestion.

## CONCLUSION

We experienced a surgical removal of a partial denture accidentally ingested by an elderly man with dementia that caused a cervical esophageal perforation. A delayed diagnosis of an esophageal perforation caused by an ingested FB, such as a denture, could have a fatal outcome. Japan is a society with an aging citizenry, and therefore vigilance is needed to prevent similar cases from increasing.

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