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CASE REPORT

Removal of press-through-packs impacted in the upper esophagus using an overtube

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Abstract

Foreign bodies in the upper esophagus should be removed as soon as possible to avoid serious complications. However, removals of foreign bodies in the upper esophagus are very difficult, especially if they have sharp edges, such as press-through-packs (PTPs). We experienced four cases of the impacted PTPs in the upper esophagus which was successfully extracted endoscopically with the overtube. Because two edges of PTPs were so firmly impacted in the esophageal wall in all cases, the PTPs were not movable in the upper esophagus. However, after insertion of the overtube, PTPs became movable and were successfully extracted and no serious complications occurred after extraction of PTPs. In one case, insertion of the overtube rapidly expanded the upper esophagus and PTP progressed to the gastric cavity and it could be extracted with the endoscopic protector hood. The endoscopic removal with the overtube was a simple, safe and effective technique for the removal of the impacted PTPs in upper esophagus.

Key words: Esophagus; Foreign body; Endoscopy

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INTRODUCTION

Foreign bodies in the esophagus should be removed to avoid serious complications, such as bleeding, mediastinitis, esophageal perforation and pulmonary aspiration[1-5]. Esophageal impaction of a foreign body with sharp edges is considered a medical emergency because it is often associated with perforation or hemorrhage, the likelihood of which increases with the passage of time[6-8]. Therefore, such objects should be removed as soon as possible after ingestion[9]. However, the removal of foreign bodies with sharp edges that are located in the upper esophagus is difficult. Furthermore, complications, such as mediastinitis, pneumothorax and aorto-esophageal fistula, can develop during or after removal of a foreign body from the esophagus[10-12]. The absence of a serosal layer in the esophageal wall increases the potential for serious complications[13].

Press-through-packs (PTPs) are widely used in Korea for packaging drugs, and cases of impaction of PTPs in the esophagus have been reported[14,15]. Because PTPs have three or four edges that may be razor-sharp, esophageal perforation or bleeding could develop during their removal. We experienced four cases of the impacted PTPs in the upper esophagus, which were successfully extracted endoscopically with the overtube.

CASE REPORT

Four patients who accidentally swallowed PTPs visited the Emergency Room of the Korea University Guro Hospital from October 2004 to December 2005 (Table 1). The median age of the four patients was 51 years (range, 34-76 years). All patients complained of severe dysphagia. They had upper respiratory tract infections and had taken several pills such as antibiotics, analgesics, etc., one of which was contained in a PTP. The patients had no history of dementia or psychological disease. One patient (case 4) had hypothyroidism, but the others had no comorbidities. Physical examinations revealed smooth breathing sounds, soft abdomens that were not tender, and active bowel sounds. Chest and neck radiograms were unrevealing.

After intravenous injection of 25 mg of pethidine for sedation, urgent endoscopic examinations were performed on each patient using a conventional Olympus video endoscope (Olympus Optical Co. Ltd., Tokyo, Japan), which revealed a PTP impacted in the upper esophagus (Figure 1). Attempts to extract the PTPs using forceps were unsuccessful because the edges of the PTPs were firmly impacted in the esophageal walls.

After the tip of the endoscope had been placed close

Table 1 Baseline characteristics of 4 cases with impacted press-through-packs in the upper esophagus

	Sex	Age	Duration from swallowing of PTP to endoscopy (h)	Distance of impacted PTP from incisor (cm)	Size of impacted PTP (length × width; mm)
Case 1	F	50	4	18	33 × 20
Case 2	F	35	1	19	25 × 17
Case 3	M	78	3	20	31 × 21
Case 4	F	52	8	19	23 × 21

Figure 1 Endoscopic image showing a press-through-pack impacted in the upper esophageal wall.

to the PTP, a flexible overtube (length, 195 mm; inside diameter, 15 mm; outside diameter, 18 mm) was passed over the endoscope to a position just proximal to the edge of the PTP (Figure 2). Insertion of the overtube resulted in relaxation of the upper esophagus, which enabled the impacted PTP to be moved (Figure 3). We used endoscopic forceps to grasp the PTP and pull it into the overtube (Figure 4). After confirming that the edges of the PTP were within the overtube, the overtube and the PTP were removed simultaneously. In all four cases, insertion of the overtube enabled movement of the PTP and successful extraction without complications, such as mediastinitis, hemorrhage, perforation, or death. After removal, erosions were visible at the sites of impactions.

In one case (case 2), insertion of the overtube expanded the upper esophagus so rapidly that the PTP progressed to the gastric cavity before it could be grasped with the forceps. After locating the PTP in the middle of the stomach lumen, we removed the overtube and extracted the PTP using the endoscopic protector hood to prevent injury to the stomach and esophagus.

After extraction of the PTPs, the patients' dysphagia improved and no other symptoms developed. The results of chest radiographies after extraction of the PTPs were unrevealing. All patients were observed overnight and discharged. Prophylactic antibiotics were not prescribed. The patients were asymptomatic during follow-up consultations one week after the procedures.

DISCUSSION

Although esophageal foreign bodies in adults usually occur in prisoners and patients with underlying esophageal diseases, mental retardation, or psychiatric illnesses[16], esophageal impactions of PTPs frequently occur in senile

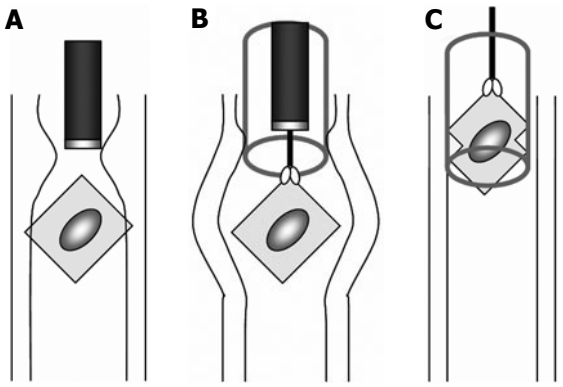

Figure 2 Method for removal of a press-through-pack impacted in the upper esophagus. **A**: The press-through-pack was located using a diagnostic endoscope; **B**: an overtube was inserted and resulted in relaxation of the upper esophagus, which enabled the impacted press-through-pack to be moved; **C**: forceful pulling of the press-through-pack using forceps caused the edges of the PTP to bend, enabling it to enter the overtube.

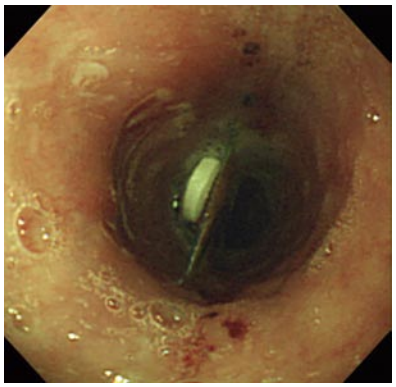

Figure 3 Endoscopic image showing distal relocation of a press-through-pack that was previously impacted and immovable. Erosions proximal to the press-through-pack indicate the site at which the press-through-pack was impacted until insertion of the overtube.

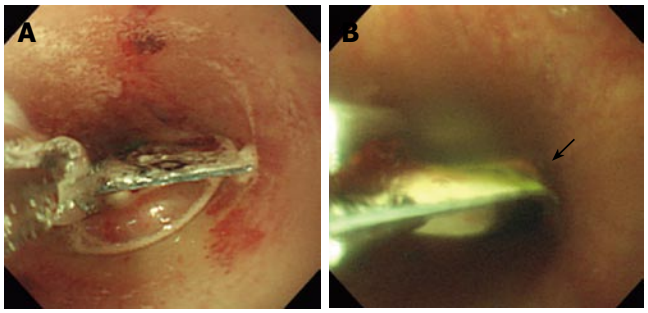

Figure 4 **A**: Endoscopic image showing forceful retraction of the press-through-pack by a forceps; **B** shows how the edges of the press-through-pack were bent (arrow) during entry into the overtube.

people who are not members of these high-risk groups[17], and the incidence thereof is increasing rapidly and in proportion to the ageing of the population[17].

Because PTPs usually have sharp edges, care is needed to prevent esophageal or posterior pharyngeal injuries during endoscopic removal of PTPs from the upper esophagus. The endoscopic protector hood reportedly permits easy and safe removal of sharp or pointed foreign bodies[18]. However, the foreign body must be moved to the gastric cavity to flip the protector's hood back to its original shape for withdrawal through the lower esophageal sphincter[18]. Such devices cannot be used when the foreign body is so

firmly impacted that it cannot be moved. In our patients, the PTPs could not be moved until the overtube was inserted. Tsutsui *et al*[15] reported a case in which removal of a PTP from the esophagus was accomplished using two flexible endoscopes. However, this procedure requires two endoscopists and the insertion of additional equipment, which may cause more discomfort to the patient than an overtube. Recently, Jeen *et al*[8] used an oral side-balloon that is generally used in esophageal variceal sclerotherapy; it was attached to the distal part of an endoscope to release impacted sharp foreign bodies, including PTPs, from the esophageal wall. However, in our patients, the impacted PTPs were so proximal that we would have been unable to progress the endoscope far enough down the esophagus to permit ballooning. In addition, this method does not prevent pharyngeal mucosal injury. A soft large cap (18 mm in tip diameter, D-206 series, Olympus) may be used for removal of esophageal foreign bodies[8]. However, it might not be able to cover all length of the PTPs and this incomplete coverage may lead to pharyngeal and upper esophageal mucosal injury.

We used overtubes to remove the impacted PTPs. Although the overtubes were placed just above the proximal tips of the PTPs, they relaxed the esophageal lumens to the extent that the impacted PTPs were movable. This may have been caused by expansion of the proximal esophageal lumen or induction of esophageal peristalsis by the overtube. Swallowing movements induced by insertion of the overtube may initiate primary peristalsis, and the presence of the overtube in the esophagus after primary peristalsis may stimulate sensory receptors in the esophagus to initiate secondary peristalsis[19].

The overtube technique cannot be used for the removal of foreign bodies that are wider than the internal diameter of the overtube. Although the PTPs in all four of our cases were wider than the internal diameter of the overtube, their flexibility enabled them to be pulled into the overtube using forceps. However, care should be taken not to cause mucosal injury by pinching the mucosa between the PTP and the overtube. Such injury can be avoided by changing the site at which the PTP is grasped.

The use of an overtube during removal of an impacted PTP has several merits. Firstly, it causes expansion of the upper esophagus, which releases the impacted PTP. Although esophageal relaxation resulted in progression of the PTP to the gastric cavity in one case, it was easily extracted using the endoscopic protector hood. Secondly, it prevents aspiration and esophageal or pharyngeal injury[4,9,20,21].

However, the overtube must be used with caution, especially when the esophageal foreign body causes esophageal stricture. In such cases, an overtube could cause esophageal perforation[22-24]. Berkelhammer *et al*[23] reported that the use of an overtube for variceal ligation resulted in cricopharyngeal submucosal dissection with pneumomediastinum and proximal variceal bleeding. Therefore, endoscopic evaluation should be performed before passage of the overtube. In addition, because the impacted PTPs could lead serious complications, such as mediastinitis and aortic-esophageal fistula[10,11], careful evaluation should be performed to assess the relationship between PTPs and esophageal wall before endoscopic removal of PTPs. In our cases, chest and neck radiograms as well as physical examination did not show any sign of mediastinitis, and the location of PTPs were upper esophagus (18-20 cm from incisor), which were far from the aorta. Therefore, the possibility of serious complications was estimated to be very low and endoscopic removal for PTPs were performed.

In conclusion, the use of an overtube for endoscopic removal of impacted PTPs from the upper esophagus is simple, effective, and safe.

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