

## Original Article

Endoscopic Treatment of Esophageal Foreign Bodies in the Elderly<sup>☆</sup>Hsin-Chang Lin<sup>1,2,3</sup>, Chih-Jen Chen<sup>1,2</sup>, Hsiang-Hung Lin<sup>1,2</sup>, Jung-Tang Huang<sup>3</sup>, Ming-Jen Chen<sup>1,2,4\*</sup><sup>1</sup> Department of Internal Medicine, Mackay Memorial Hospital, <sup>2</sup> Mackay Medicine, Nursing and Management College, <sup>3</sup> Graduate Institute of Mechanical and Electrical Engineering, National Taipei University of Technology, <sup>4</sup> Mackay Medical College, New Taipei, Taiwan

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## SUMMARY

**Background:** Ingestion of a foreign body is a prevalent condition among children and psychiatric patients; however, such an issue has seldom been discussed in the elderly.**Methods:** A retrospective review of medical records of patients more than 60 years of age with a diagnosis of esophageal foreign body (EFB) from December 2007 to December 2010 was performed. A total of 45 elderly patients (24 men and 21 women) were analyzed. Demographic data, impaction level of esophagus, types of EFB, underlying diseases, duration from ingestion to endoscopic intervention, endoscopic managements, and outcomes were analyzed.**Results:** The average age of these patients was 75.0 years (60–95 years). Among the materials that caused esophageal impaction, the most frequent were bones of animal origin (17/45 = 37.8%), followed by meat or food bolus (16/45 = 35.6%), dental prostheses (8/45 = 17.8%), and medicine packing (4/45 = 8.8%). In about half of these patients, the EFBs were entrapped in the cervical esophagus. There was no mortality. The success of removing EFB at an initial stage in these patients was about 88.8% (40/45). The retrieval-associated complications occurred in six patients with mis-swallowing of fish bones and medicine packing; four had wound bleeding, which need endoscopic hemostasis, and the other two had penetrating wounds that needed surgical repair.**Conclusion:** Flexible upper endoscopy is relatively safe and effective for extracting EFB in the elderly. Elderly patients with EFBs had a high rate of underlying diseases. Thus, additional care and considerations must be given to such population.

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## 1. Introduction

The majority of swallowed foreign bodies will pass spontaneously through the gastrointestinal (GI) tract uneventfully in less than 7 days if they are not impacted in the esophagus. The most common site of esophageal foreign body (EFB) impaction is in the upper esophagus at the level of the cricopharyngeus. Ingestion of a foreign body is a prevalent condition that has been well described among children (between the age of 6 months and 6 years) and psychiatric patients<sup>1–4</sup>. However, such an issue has seldom been discussed in case of elderly.

Elderly persons often ingest foreign bodies because of impaired swallowing controls<sup>5</sup> and intraoral sensitivity, or mis-swallowing due to poor vision and tooth loss with carrying dental prostheses.

Impacted foreign bodies in the esophagus, if left without management, may cause mucosal inflammation, deep neck abscess, mediastinitis, and even esophageal perforation<sup>6</sup>. Prompt recognition and retrieval of the ingested EFB can avoid these complications<sup>7</sup>. This study aims at presenting our experience on the management of EFB in the elderly using flexible upper endoscopy. As far as we are aware, a clinical experience focusing on this issue in the elderly has not previously been described.

## 2. Patients and methods

Between December 2007 and December 2010, a total of 45 patients, more than 60 years old, suffering from EFB were treated in our department. The majority of the patients had a history or symptoms strongly suggestive of EFB and were referred for endoscopic evaluation. The initially approach was to retrieve the EFB in our endoscopy room using a flexible upper endoscopy within 24 hours from visiting. The Institutional Review Board at Mackay Memorial Hospital approved this retrospective study (11MMHIS165).

<sup>☆</sup> All contributing authors declare no conflicts of interest.

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### 3. Procedures of endoscopic managements

Each patient underwent upper endoscopy after a local pharyngeal spray of 10% xylocaine. Some patients received conscious sedation with midazolam when necessary. Heart rate, blood pressure, and pulse oximeter reading were monitored during the procedures. Flexible upper endoscopes (GIF-Q260; Olympus Optical Co., Ltd, Tokyo, Japan) were used with appropriate accessories including rat-tooth biopsy forceps (Olympus Optical Co., Ltd) (Fig. 1A), alligator cup SwingJaw (Olympus Optical Co., Ltd) (Fig. 1B), polyp retriever (ENDO-FLEX GmbH, Voerde, Germany) (Fig. 1C), and foreign body retriever device EasyCollection (ENDO-FLEX GmbH) (Fig. 1D) to retrieve the EFBs. We also used a transparent plastic attachment (Olympus Optical Co., Ltd) (Fig. 1E) mounted at the end of the endoscope to facilitate the optimal observation and examination view. An overtube (Sumitomo Bakelite Co., Tokyo, Japan) (Fig. 1F) was electively used to protect the esophagus, cricopharyngeus, and oral cavity during retrieval. After extraction of the foreign bodies, patients were asked to undergo endoscopic examination to detect any underlying disorder and mucosal damage immediately. If no hemorrhage or mucosal damage was observed, the patient was discharged. If there were deep lacerations or bleeding from the penetration sites, the patients were admitted with fasting, intravenous fluid, and antibiotics, and were monitored for signs and symptoms of perforation such as fever, tachycardia, chest pain, and crepitation in the neck. The patients were then kept under observation for at least 3 days prior to discharge.

### 4. Data collection and statistical analysis

Demographic data (including age and gender), time from ingestion to endoscopic examination, types and location of EFB, associated upper-GI diseases, and comorbidity diseases were analyzed. We also divided these patients into two groups according to types of EFB: meat bolus impaction or mis-swallowing of nonmeat bolus. Statistical analysis was performed between two groups using the Statistical Package for the Social Science, version 18.0. Tests were two tailed, with a significance level of 0.05.

Descriptive statistics for continuous data were calculated and reported as mean  $\pm$  standard deviation (SD). Categorical variables were described using frequency distributions and reported as  $n$  (%). Calculation of  $p$  values was based on Chi-square test for categorical variables and Student  $t$  test for continuous variables.

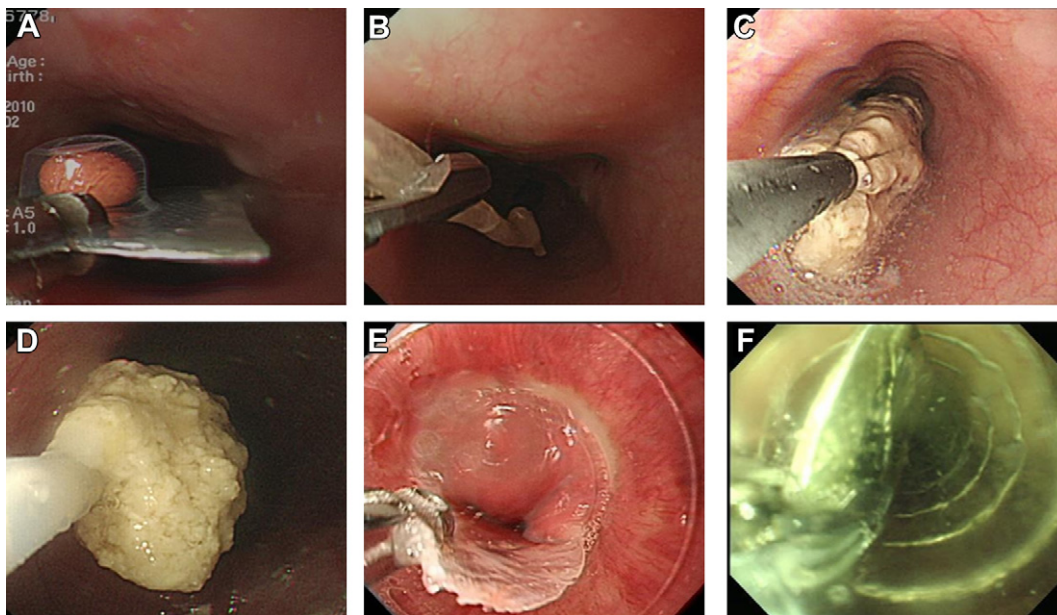
## 5. Results

### 5.1. Demographic and clinical characteristics of patients

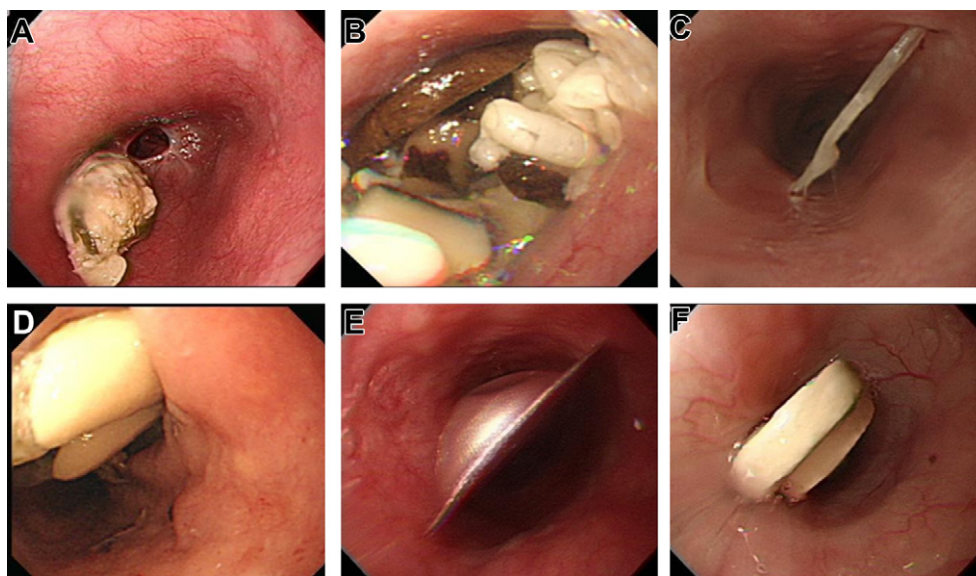
A total of 24 men and 21 women were included in this study. The average age of the patients was  $75.0 \pm 8.6$  years (range, 60–95 years). With regard to the level at which a foreign body was found, in 51.1% the foreign body was found at the pharyngoesophageal junction, and in the remaining it was lodged in the middle esophagus (13.3%), lower esophagus (28.9%), and the entire esophagus (6.7%). The most common organic EFBs were meat or food bolus ( $n = 16$ ) (Figs. 2A and 2B), fish bone (Fig. 2C), and chicken bones ( $n = 17$ ), whereas the most common inorganic EFBs were dental prostheses ( $n = 8$ ) (Fig. 2D), medicine, or medicine packing ( $n = 4$ ) (Figs. 2E and 2F).

### 5.2. Endoscopic findings and outcome measures

In 88.8% (40/45) of patients, EFBs were removed completely initially. The remaining five patients in whom retrieval failed at the first time received alternative treatments, such as rigid endoscopy under general anesthesia ( $n = 4$ ) or surgery ( $n = 1$ ). There was no mortality. A total of 12 (26.6%) patients were found to have esophageal abnormality. Esophageal benign stricture due to gastroesophageal reflux disease (GERD) ( $n = 8$ ) and achalasia ( $n = 2$ ) were found in patients with meat or food bolus impaction, while esophageal benign stricture of GERD ( $n = 1$ ) and esophageal carcinoma ( $n = 1$ ) were found in mis-swallowing group (Table 1). After retrieval procedures, all the 40 patients underwent endoscopic examination. The positive endoscopic findings of esophagus in 29 patients included mucosal break ( $n = 14$ ) (Fig. 3A), ulceration ( $n = 9$ ) (Fig. 3B), laceration ( $n = 4$ ) (Fig. 3C), and perforation ( $n = 2$ )



**Fig. 1.** Accessories used with flexible upper endoscopy to remove the foreign bodies: (A) rat-tooth biopsy forceps, (B) alligator-jaws forceps polyp retriever, (C) 5 prong, and (D) foreign body retriever device. A (E) transparent plastic attachment was mounted at the end of the endoscope to facilitate the optimal observation and examination view. An (F) overtube was electively used to protect the esophagus, cricopharyngeus, and oral cavity during retrieval.



**Fig. 2.** The most common organic EFBs were (A, B) meat bolus and (C) fish bone, whereas the most common inorganic EFBs were (D) dental prostheses, (E) medicine, and (F) medicine packing.

(Fig. 3D). Retrieval-associated complications needed endoscopic or surgical management in six patients with mis-swallowing of fish bones or medicine packing. Four patients had wound bleeding that needed endoscopic hemostasis, and the other two patients had penetrating wounds that needed surgical repair.

**5.3. Characteristics and presentation of patients according to the type of EFB**

When these patients were divided into two groups according to the type of EFB, there were 16 patients with meat or food bolus impaction and 29 patients with mis-swallowing of nonmeat bolus (Table 1). Patients with meat or food bolus impaction had higher rate of underlying esophageal stricture diseases (68.8% vs. 6.9%,  $p < 0.05$ ), longer period from symptom onset to endoscopic interventions ( $26.2 \pm 4.5$  vs.  $11.9 \pm 2.4$  hours,  $p < 0.05$ ), less incidence of previous cerebrovascular disease or dementia (12.5% vs. 37.9%,  $p < 0.05$ ), and less retrieval-associated complications (0% vs. 13.3%,  $p < 0.05$ ).

**6. Discussion**

Elderly persons ingest foreign bodies mainly because of impaired swallowing control and intraoral sensitivity, and mis-swallowing due to poor vision and teeth loss with denture

**Table 1**  
Clinical presentation, endoscopic finding, and outcome of patients according to the type of EFB.

	Meat or food bolus (n = 16)	Nonmeat bolus (n = 29)
* Underlying esophageal stricture diseases	62.5% GERD (n = 8) Achalasia (n = 2)	6.9% GERD (n = 1) Carcinoma (n = 1)
* Period from symptom to interventions (h)	26.2 ± 4.5	11.9 ± 2.4
* Incidences of previous cerebrovascular disease or dementia	12.5%	37.9%
* Retrieval-associated complication	0%	20.1% Bleeding (n = 4) Perforation (n = 2)

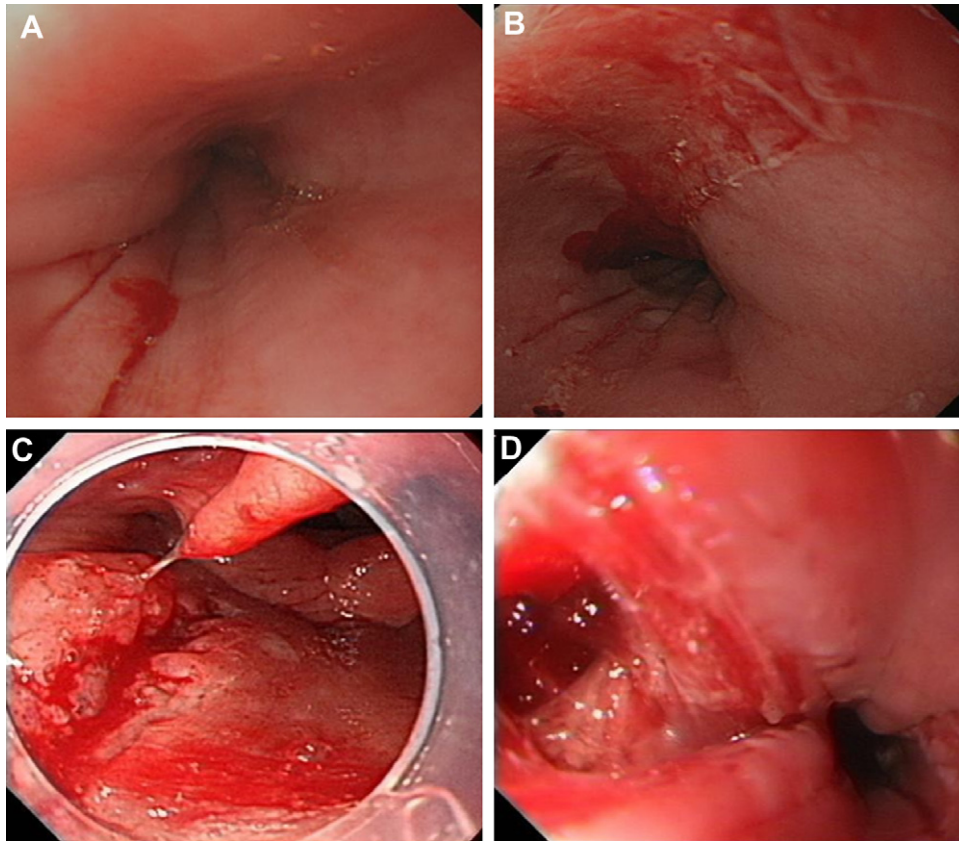
\*  $p < 0.05$ .  
EFB = esophageal foreign body; GERD = gastroesophageal reflux disease.

problems. The aim of this study is to present our experience on the management of EFB in the elderly using flexible upper endoscopy and try to address possible preventive strategies. As far as we are aware, this clinical experience focusing on the elderly has not previously been described.

The type of EFB in the children and psychiatric patients varies according to the feeding habits and culture of the communities. Metallic objects (safety pins, coins, and disc batteries) were the frequently ingested EFBs in children, which causes increased complications due to perforation<sup>2</sup>. Our findings did not encounter any “batteries” or “coins” in our patients. Compatible with a previous study<sup>8</sup>, fish or chicken bones are the most frequently swallowed EFBs in our study. Impacted sharp bones in the esophagus, if left without management, may cause mucosal inflammation, deep neck abscess, mediastinitis<sup>6</sup>, and even esophageal perforation.

In one study, meat bolus was identified as the impacted object in only 10% of EFBs in children<sup>9,10</sup>. However, it was the secondary common EFB in our elderly patients, especially in patients with underlying esophageal stricture diseases (10/12 = 83%). In contrast, mis-swallowing (11/14 = 79%) was predominant in patients with previous cerebrovascular disease who had an impaired swallowing or intraoral sensitivity. More interestingly, dental prostheses (8/45 = 17.8%) and medicine packing (4/45 = 8.8%) were found in elderly patients, which was relatively less often mentioned in children or psychiatric groups<sup>11</sup>. It may be the characteristic features of elderly patients who have poor vision leading to mis-swallowing of medicine and carry dental prostheses for teeth loss.

For suspected EFBs, upper endoscopy deserves the first consideration because it allows diagnosis and retrieval simultaneously. As the risk of perforation increases with time, the procedure should not be delayed. Endoscopic procedures should not be delayed for waiting barium swallow examination, as the barium residue is thought to make the endoscopic retrieval more difficult. Patients with meat or food bolus impaction had longer time period from symptom onset to endoscopic interventions than those with mis-swallowing because there was lack of specific symptoms such as odynodysphagia. An EFB should seriously be considered when the elderly who is nonverbal due to previous cerebrovascular disease or dementia suddenly refuses oral intake. Early diagnosis requires a high index of suspicion and detailed communication with caregivers. The usual historic clues such as choking, coughing, drooling, or dysphagia may be helpful.



**Fig. 3.** Of all patients undergoing endoscopic examination after retrieval procedures, positive findings such as (A) mucosal break, (B) ulceration, (C) laceration, or (D) perforation were observed.

The majority of EFBs were found to be trapped in the cervical esophagus<sup>12</sup>. In this circumference, it was difficult to see clearly the region extending from the hypopharynx to cervical esophagus because a space between the endoscope and an object cannot be maintained during the contraction of cricopharyngeal muscle. Some EFBs may escape detection when they were almost imbedded in the area because of cricopharyngeus muscle construction. Several kinds of attachments were mounted on the tip of Esophagogastroduodenoscopy (EGD) to fix a consistent distance from the mucosa in a magnifying endoscopy<sup>13</sup> or to help lift the submucosal tissue during endoscopic submucosal dissection<sup>14</sup>. We suggest that the observation of this area will be better if a transparent attachment is used to keep the cricopharyngeus muscle open. When the sharp bones were almost imbedded into the esophageal wall, it is difficult to estimate its real size. Computer tomography not only confirmed the size and location of imbedded subjects, but also determined whether or not the subjects have penetrated the esophagus with major vessel injury<sup>15</sup>.

Our initial rate of success in retrieving the EFB was about 88.8%. Of all patients examined with endoscopy after retrieval procedures, positive findings such as mucosal break, ulceration, laceration, and perforation were observed in 29 patients. The retrieval-associated complication rate (bleeding or perforation) was 13.3%. They occurred in six patients with mis-swallowing of fish bone and medicine packing; four had wound bleeding that needed endoscopic hemostasis and the other two had penetrating wounds that needed surgical repair. An overtube may be considered to protect the esophagus, cricopharyngeus, and oral cavity during retrieval. The safest and most effective method to remove an ingested EFB is still debatable. Gastroenterologists are advocating flexible instruments; however, chest surgeons prefer rigid esophagoscopy. One

study pointed out that both rigid and flexible endoscopy techniques appear to be equally safe and effective in EFB extraction<sup>16</sup>. The choice of endoscopy techniques and appropriate accessory depends on the individual's condition and doctor's preference.

From our clinical experiences of various types EFBs that were ingested by our patients, we try to suggest possible preventive strategies. First, the caregivers need to supervise closely the elderly patients with dementia or previous cerebrovascular disease. If the patients are unable to bite or masticate, use ground/mashed food or reduce the bolus size. Care for them and avoid removable dental bridges that may be mis-swallowed. When not contraindicated, crush tablets or open capsules and mix with adequate drinking water. The medicine should be removed from the packing under caregivers' surveillance if the patients have a poor vision. Finally, intraluminal impedance measurement and manometry of esophagus have emerged as effective tools to detect failed esophageal bolus transport and several patterns of ineffective esophageal body peristalsis. We need to develop objective assessment methods or screening programs to analyze and predict circumstances when miss-wallowing is likely.

In conclusion, flexible upper endoscopy is relatively safe and effective for extracting EFBs in the elders. Elderly patients with EFB had a high rate of underlying diseases, especially esophageal stricture for those with meat bolus impaction and previous cerebrovascular disease for mis-swallowing. Thus, additional considerations must be given while caring for such elderly patients.

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