

# THE MANAGEMENT OF INGESTED FOREIGN BODIES IN THE UPPER DIGESTIVE TRACT: A RETROSPECTIVE STUDY OF 49 CASES

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## ABSTRACT

Forty-nine cases of accidental foreign body ingestion treated in our unit were reviewed. Fish bones were the commonest foreign body ingested by adults while coins and pins accounted for most cases in the paediatric age group. All except one patient had endoscopy performed, majority with flexible endoscope. Foreign bodies were detected and successfully removed endoscopically in 23 patients except one. In another 12 patients, foreign bodies were demonstrated by chest X-ray or Barium meal but at the time of endoscopy, they had passed beyond the reach of the endoscope. For the remaining 13 patients, despite having a history of foreign body ingestion and retrosternal pain, subsequent investigation failed to demonstrate the foreign bodies. Barium contrast studies were performed in 31 cases, with 5 false negative and 2 possible false positive findings. There were 2 serious complications related to foreign body ingestion, one had empyema thoracis and another died of massive bleeding due to esophageal carotid fistula.

**Keywords:** Upper gastrointestinal endoscopy, gastrointestinal foreign body.

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## INTRODUCTION

Accidental and voluntary foreign body ingestion is a common problem in clinical practice. The offending foreign bodies are different in the adult and paediatric groups. In the adult, fish bones or food boluses are usually responsible. In children, coins are the commonest object reported in most series<sup>(1)</sup>. When the offending agent is a bone, it will usually be impacted either in the tonsillar fossa or base of the tongue<sup>(2)</sup>. Its removal is fairly easy and most rewarding since this provides immediate relief to a distressed patient. Once the foreign body is swallowed beyond the cricopharyngeus, it frequently remains in the esophagus because the esophagus has weak peristalsis and multiple narrowings. When a foreign body is impacted in the esophagus, it may cause mucosal ulceration, inflammation and superimposed infection. In the thin esophageal wall which lacks a serosal layer, this may result in the dreaded complication of esophageal perforation. Patients presenting with a history of foreign body ingestion should therefore be investigated and treated urgently.

## MATERIALS AND METHODS

### Patient Population

Between August 1986 and August 1988, 49 consecutive patients treated for various foreign body ingestion in the Department of Surgery, Tan Tock Seng Hospital, Singapore, were reviewed. Twenty five were male (51%) and 24 were female (49%). The ages ranged from 3 to 90 years, with a mean of 30.3 years. Ten were children and their mean age was 5.8 years.

Sixteen patients (33%) were direct admissions from the Accident and Emergency unit. Thirty patients (61%) were referrals from the Otolaryngology unit; the remaining 3 patients (6%) came from the Medical, Neurology and Psychiatric units in the same hospital.

### Methods

During the study period, patients presented with a history of

foreign body ingestion and were first seen by the otolaryngologist in the Accident and Emergency unit. Cervical and chest X-rays were routinely ordered and any foreign body found impacted in the oral cavity or oropharynx was removed or its presence excluded. If the patient still complained of pain or discomfort in the neck or retrosternal region, they were then admitted to either the otolaryngology or general surgical wards.

All patients admitted to the otolaryngology wards had urgent barium swallow studies done as a first investigation. If the barium swallow X-rays showed an abnormality or if the patients continued to have persistent retrosternal pain despite normal barium swallow studies, they were then referred to the general surgeon for flexible endoscopy. About half of the cases were referred to the author, the rest were scoped by the surgeon on call. For those 16 patients who were directly admitted to the general surgical wards, flexible endoscopy was performed under sedation as soon as possible without contrast X-rays studies. All of them had endoscopy performed within 18 hours of presentation and in 75% within 8 hours.

We analyzed retrospectively our experience in the management of those treated for foreign body ingestion. We compared the diagnostic accuracy between the flexible fiberoptic endoscopy and contrast radiography and studied the therapeutic usefulness of the flexible fiberoptic endoscope in the retrieval of ingested foreign body.

## RESULTS

### Presentation

History of ingestion of foreign body was reported in 41 patients (81.6%). Most of the adult patients had retrosternal pain or discomfort, while in children, 90% did not complain of any symptoms. Forty percent of the patients were seen within 6 hours after ingestion of the foreign body.

Table I  
Presentation of 49 patients treated for foreign body ingestion

	History of FB Ingestion	
	Present	Absent
Symptomatic	31	7
Asymptomatic	10	1
Total	41	8

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Three of the four patients with food bolus impaction in the lower esophagus presented to us with dysphagia (6%); two of them were later found to have an associated esophageal stricture consequent to previous caustic soda ingestion. One patient presented with hemiplegia and later massive upper gastrointestinal bleeding due to esophageal-carotid fistula caused by a fish bone. The only patient who presented without symptoms or a history of foreign body ingestion was an epileptic patient; the post-intubation chest X-ray revealed a denture in the mid-esophagus.

**Table II**  
Presenting symptom of 38 symptomatic patients

Pain/Discomfort:	No.
- Neck	2
- Retrosternal	27
- Epigastric	3
Dysphagia	3
Odynophagia	2
Hemiplegia	1
<b>Total</b>	<b>38</b>

#### Types of Foreign Body

In adult patients, fish bones comprised 41% of all ingested foreign bodies. In children, pins and coins were most commonly responsible (Table III).

**Table III**  
Types of foreign bodies in adults and children

Type of FB in Adults	No.	Type of FB in Children	No.
Fish Bone	16 (41%)	Coin	4 (40%)
Chicken Bone	6 (15.4%)	Pin	2 (20%)
Food Bolus	4 (10.2%)	Pencil	2 (20%)
Denture	4 (10.2%)	Key Ring	1 (10%)
Seed	2 (5.2%)	Oyster Shell	1 (10%)
Others	5 (12.8%)		
Unknown	2 (5.2%)		
<b>Total</b>	<b>39 (100%)</b>	<b>10 (100%)</b>	

#### Sites of Foreign Body Impaction

Table IV shows the location of foreign bodies in various investigations. The most frequent site of impaction is the upper esophagus. In the study, we were unable to prove the presence of foreign bodies in 13 patients (26.5%) although all of them gave a history of foreign body ingestion and retrosternal discomfort. All these patients later became asymptomatic, either in the hospital or a week later when reviewed in outpatient clinic; presumably the swallowed foreign bodies had passed out spontaneously and escaped detection. In the remaining 36 patients, foreign bodies were detected by either plain X-rays, barium contrast studies or endoscopy. In 12 of them (5 had minor esophageal mucosa contusions or lacerations on endoscopy, and they probably were the sites of foreign body impaction and 7 had radiological evidence of foreign bodies), the foreign bodies had passed distally and were not seen during endoscopy performed within 12 hours of presentation. The ingested foreign bodies did not result in any complication in this group of patients.

#### Plain Radiography

Plain chest and abdomen X-rays were done soon after presentation of all patients. As expected, all metallic foreign bodies and pencils which contain lead, were detected on the plain films. Six of the 13 patients with foreign body demonstrated

**Table IV**  
The sites of foreign bodies as demonstrated during endoscopy, plain radiography and barium contrast studies

Site of FB	Endoscopy	Plain X-Ray	BMX
Esophagus:			
- Upper	11*	3	3
- Mid	3*	1	4**
- Lower	8	3	7**
Stomach	6	5	-
Duodenum	1	1	-
<b>Total</b>	<b>29*</b>	<b>13</b>	<b>14**</b>

\* Including 5 cases of previous sites of FB impaction as evidence by endoscopic findings of esophageal mucosal tears and contusions.

\*\* Including 2 "False Positive" findings.

on plain films were positive and verified by endoscopy. In the remaining 7 patients, the ingested foreign bodies had passed distally beyond the reach of the flexible gastroscope. These foreign bodies included two coins of less than 2 cm in diameter, two fragmented dentures, and a case of pin, pencil and key ring each. However, none of the other foreign bodies like bones, food boluses, seeds, etc. were radiologically dense enough to show up on the plain films.

#### Barium Contrast Studies

Barium contrast studies were performed in 31 patients; 52% were done within 6 hours and 85% within 12 hours of presentation. One patient had barium studies ordered by her family physician before sending her to the hospital. For the remaining 30 patients who were initially managed by the otolaryngologists, contrast studies were done before the patients were sent to the general surgeon. The results of barium contrast studies were rather disappointing. There were 5 false negative reports (16%). Contrast studies were reported normal but during endoscopy, contusions or superficial tears of the esophageal mucosa and an impacted fish bone at lower esophagus were noted. Presumably, the findings of superficial tears or contusions were caused by the ingested foreign bodies. Two false positive findings (6.5%) also were noted. Contrast studies reported slight esophageal mucosal irregularities consistent with an impacted foreign body but endoscopy performed shortly (within 2 hours) after the contrast studies however found no abnormalities. This could mean either true/false positive barium studies or the foreign bodies had passed distally during the short interval between the barium study and endoscopy; both these patients became asymptomatic after the endoscopy. The overall accuracy rate of barium contrast studies was 77.5%.

#### Endoscopy

Endoscopy was performed in all except one patient who died of massive bleeding from the upper digestive tract before endoscopy could be performed. In children, endoscopy was done under general anaesthesia, whereas in adult patients, sedation was sufficient in most cases. One patient had rigid endoscopy performed, 3 had both rigid and flexible instrumentation and the remaining 44 patients had only flexible endoscopy done on them.

Rigid endoscopy alone was performed in a young child who swallowed a 20 cents coin which measured 2.5 cm in diameter. The coin became impacted in the upper esophagus, it was removed with a short rigid esophagoscope after we had failed to remove the coin with a Foley's catheter.

In the 3 patients who had both rigid and flexible endoscopy performed, the first was a child who swallowed a 2.5 cm diameter coin who was endoscoped immediately with a rigid

esophagoscope under general anaesthesia. During the procedure, the coin slipped into the stomach and remained there for the next 5 days. This was subsequently removed with a flexible gastroscope. Another 2 patients had fish bones larger than 2 cm which became impacted at the cricopharyngeus. We were unable to retrieve it beyond this level because of spasm of the muscle. A short rigid esophagoscope was then introduced under sedation and in both instances, foreign bodies were removed without much difficulty.

In the remaining 44 patients who had only flexible endoscopy performed, foreign bodies were detected endoscopically in 20 patients. All except one patient had their ingested foreign bodies retrieved using various flexible forceps or Dormia baskets. The most distal foreign body removed was a pin which had partially penetrated the third part of the duodenum. The only patient from whom we failed to remove the foreign body had a 1.5 cm smooth jackfruit seed which became impacted in the upper esophagus. Attempts to remove it with flexible forceps and Dormia baskets were unsuccessful and the seed was then dislodged endoscopically into the stomach with immediate symptomatic relief.

### Complications

Minor complication of sore throat which persisted for more than 24 hours occurred in 4 patients. Two of these patients had rigid esophagoscopy. One patient developed an empyema of the left chest due to esophageal perforation caused by a fish bone. This was a 46-year-old man who complained of retrosternal chest pain after he had ingested a fish bone. Chest X-ray done on admission showed subcutaneous emphysema. He was endoscoped immediately. A T-shaped bone was discovered; each limb measured 2 to 3 cm long and one of the limbs had penetrated the esophagus at 31 cm. The fish bone was removed endoscopically. Post-operatively, he was put on intravenous drip, nasogastric tube suction and broad spectrum antibiotics. In spite of this, he developed left pleural effusion and later empyema thoracis which only settled with open drainage.

There was one death in our series. This was a 25-year-old mentally retarded girl who presented initially to the Medical unit with a history of refusal to take her meals, high fever and right hemiplegia. While she was being investigated for her right hemiplegia, she developed massive bleeding from the upper digestive tract and was subsequently referred to a surgeon. She died shortly after another bout of massive bleeding. Postmortem revealed an esophageal-left carotid artery fistula which resulted from a penetrating fish bone.

### DISCUSSION

Esophagoscopy removal of foreign bodies from the esophagus using rigid scope was first reported in 1911<sup>(3)</sup>. Non-endoscopic technique using Foley's catheter<sup>(4)</sup> and medical regimens with papain<sup>(5)</sup> or glucagon<sup>(6)</sup> also have been reported. With the advent of the flexible fiberoptic endoscope, this instrument has increasingly been used for foreign body extraction<sup>(7)</sup>. Obvious advantages of the modern flexible endoscope over the rigid esophagoscope in the detection and removal of foreign body of the upper digestive tract are: excellent illumination and visibility; ability to reach and retrieve a foreign body as far down as the duodenum; local anaesthetic throat spray is sufficient for the procedure in most adult patients; and it is also a much safer procedure compared to rigid endoscopy, which has a reported complication rate of esophageal perforation between 0.2 to 2%<sup>(8)</sup>. The only disadvantage of the flexible instrument is the relative difficulty in retrieving a foreign body larger than 2 cm. A larger foreign body tends to get stuck at the level of the cricopharyngeus; this muscle frequently goes to spasm during endoscopic procedure. In such instances, the foreign

body can be removed with the introduction of a short rigid esophagoscope to the upper esophagus, as was required on two occasions in this study.

There has been a report on the use of an overtube in removal of sharp or irregular objects<sup>(9)</sup>. We have found its insertion extremely uncomfortable for the patient and have abandoned it after our first attempt. It was possible to avoid injury to the esophagus by grasping the sharp object with its sharp or pointed end pointing downwards into the lumen without contact with the esophageal wall during its removal. Various types of flexible forceps should be available.

The Dormia basket is most useful in the removal of round objects including seeds and coins. Rat-tooth and alligator forceps are most suited for removal of fish or poultry bones and flat jaw grasping forceps will come in handy in removing wires and pins.

In our study, we have found that in children, the types of ingested foreign bodies were similar to the reports in the West<sup>(10,11)</sup>. But in the adult, unlike in the West, where food bolus was frequently reported as the main culprit, our series showed that fish bone was the commonest foreign body encountered (41%). This is similar to the finding reported in Hong Kong<sup>(1)</sup>. This is probably due to the dietary habit of a high proportion of southern Chinese residing in the region. They are fish-loving people and eat fish unfileted.

As serious complications can arise from an ingested foreign body especially when the removal is delayed, anyone with retrosternal discomfort following foreign body ingestion should be thoroughly investigated. Plain X-ray is useful in locating a metallic foreign body but not as useful for other foreign bodies such as fish and poultry bones. The presence of pneumomediastinum suggests the dreadful complication of esophageal perforation. We have found contrast X-rays unreliable in the detection or exclusion of foreign bodies in the esophagus. In some instances, contrast studies are contraindicated<sup>(12)</sup>. When a patient presents with a history consistent with impaction of a food bolus and sialorrhea, the foreign body usually is located at or just below the cricopharyngeal muscle, a barium swallow adds little to the diagnosis and may result in aspiration. Moreover, the coating of barium on foreign body may even obscure its borders and render endoscopic removal more difficult. Contrast studies should perhaps be indicated only when esophageal perforation or an associated esophageal stricture is suspected as in all cases of food bolus impaction.

Flexible endoscopic examination of the upper digestive tract is a highly accurate diagnostic test for the presence of a foreign body in the upper digestive tract. In our experience, we have found 87% success rate in the removal of various ingested foreign bodies when flexible endoscope was used alone and 96% success rate when combining both flexible and short rigid esophagoscope. This is consistent with the results reported by others<sup>(7,11,12)</sup>. There was no major complication resulting from either endoscopy or endoscopic removal of foreign bodies.

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