

## Original Research Article

# Endoscopic management of foreign bodies in the upper gastrointestinal tract

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**Received:** 01 April 2020

**Revised:** 10 June 2020

**Accepted:** 11 June 2020

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## ABSTRACT

**Background:** Foreign body ingestion and food bolus impaction is a common clinical scenario and can present as an endoscopic emergency. Though majority of them pass spontaneously 10-20% require endoscopic intervention. Flexible endoscopy is recommended as therapeutic measure with minimal complications. The aim of our study is to present 5 years' experience in dealing with foreign bodies in the upper gastrointestinal tract.

**Methods:** Cases of foreign body ingestion admitted to department of general surgery from March 2015 to March 2020 were evaluated. The patients were reviewed with details on age, sex, type of FB, its location in gastrointestinal tract, treatment and outcome.

**Results:** A total of 55 cases were studied. Age range was 1-85 years. Males were predominant 61.81%. Coins were found most commonly 63.6%. Esophagus was the commonest site of FB lodgement 70.9%. Upper esophagus being the most common 36.36%. Upper gastrointestinal flexible endoscopy was useful in retrieving FB in all the 55 cases. There were no complications throughout the study period.

**Conclusions:** Flexible endoscopy should be used as definitive treatment and endoscopic treatment is safe and effective.

**Keywords:** Foreign body, Endoscopic management, Esophageal stricture, Food bolus impaction, True foreign body

## INTRODUCTION

Foreign body ingestion is a common medical emergency in both children and adults. Children constitute 80% of total ingestions. In children most of them are true FBs like coins, marbles, toys, safety pins and batteries.<sup>1</sup> In adult's food bolus impaction is more common and true foreign body ingestion (non-food objects) occur in those with psychiatric disorders and alcohol intoxication. Most of the ingested foreign bodies pass spontaneously but few of them pose as an endoscopic emergency.<sup>2</sup> Upper esophagus is the commonest site followed by middle esophagus, stomach, pharynx, lower esophagus, and finally duodenum.<sup>3</sup> The aim of the current study is to

report our clinical experiences in the endoscopic management of foreign bodies in the upper gastrointestinal tract in both children and adults.

## METHODS

We have described a study of case reports and series of 55 cases of foreign body ingestion admitted to department of general surgery in Safal Multispecialty Hospital from March 2015 to 2020. Data were collected from the general surgery, gastro medicine department and recorded information was entered into pre-coded proforma which included details of demography, clinical profile, treatment and outcome.

The data collected were cross checked by two independent observers. Inclusion criteria Involves patients of all age groups, those who presents within 72 hours of FB ingestion, people present with multiple foreign bodies ingestion, those presented with FB with substance abuse excluded from study.

Endoscopy provides the most accurate diagnostic method in suspected FB ingestion and food bolus impaction.<sup>16,17</sup> Endoscopic intervention is deemed necessary in one out of five cases of FB ingestion.<sup>18,19</sup> In general, all esophageal FB and food impactions require urgent or emergent endoscopic intervention.<sup>34</sup> Because the time that a FB remains in the esophagus is directly related to an increase in complications rates, they should be removed within 24 hours preferably within 6-12 hours after presentation (Figure 2).<sup>20-22</sup> In most occurrences, conscious sedation is adequate in order to perform the endoscopic procedure, however, surgical consultation and endoscopy under general anesthesia should be considered in patients in whom the duration of the endoscopic procedure for the resolution of an esophageal FB impaction is unpredictable.<sup>18,23</sup> Airway protection should always be considered for patients undergoing endoscopic FB removal. Oropharyngeal suction is required to avoid pulmonary aspiration. Patients with impactions in the upper esophagus may necessitate endotracheal intubation and an over tube in order to protect the airway. Laryngoscopes should be available in case an airway obstruction develops. Otorhinolaryngologists/ interventional pulmonologists should be involved at an early phase in the management of FB above or at the level of the upper esophageal sphincter. After a failed attempt with flexible endoscopy, a rigid hypopharyngoscopy with compatible forceps can be used for FB retrieval. Endoscopists should recognize some high-risk features that demand an urgent approach: involvement of the upper third of the esophagus, symptoms of complete obstruction (e.g., a patient who is unable to handle secretions) and at-risk objects (e.g., sharp-pointed objects, food bolus impaction and button batteries).<sup>17</sup> Foreign bodies that have reached the stomach have a chance to be evacuated spontaneously. Therefore, endoscopic removal of FB in the stomach should only be considered in case of dangerous FB, to avoid them passing the duodenal sweep, or all objects with a diameter larger than 2.5 cm.<sup>17</sup> Blunt or small objects should be removed only if they are still present after 3-4 weeks.<sup>17</sup> When a sharp object has passed the pylorus, perforation may occur in the duodenum or at the ileocecal valve, thus removal should be considered if in the proximal duodenum.<sup>24,25</sup> A blunt object remaining in the duodenum for 8 days or greater than 6 cm of diameter, should be removed to avoid ischemia and other complications.<sup>17</sup> Sharp objects that passed the duodenal curve should be followed daily with radiographs and surgical removal be considered if the FB fails to progress in 3 days. Before initiating endoscopic therapy, the endoscopist should be aware of the type of FB that will be encountered and plan the safest method for retrieval. It

may be beneficial to perform a simulation *ex vivo* to select the best retrieval device.<sup>26</sup> In uncooperative patients or patients who have ingested multiple complex objects, intravenous conscious sedation is adequate, but monitored anesthesia care or general anesthesia assistance may be required. In the pediatric setting, general anesthesia with orotracheal intubation is frequently used to remove FB from the upper gastrointestinal tract. Proper documentation and informed consent are important to reduce liability in the event of litigation. Multiple non-endoscopic therapeutic approaches have been studied. Glucagon, given in doses of 0.5-2.0 mg, can induce relaxation of the esophageal smooth muscle and the lower esophageal sphincter, allowing the FB or the impacted food to pass.<sup>27,28</sup> Success rates in food bolus impactions with glucagon (1 mg, intravenously) as primary therapy ranged from 12-58%.<sup>29-31</sup> Hyoscine butyl bromide (butyl scopolamine) use in the management of esophageal soft food bolus impaction is reported in three published studies. All of these studies concluded that there was no significant difference in disimpaction rate between those patients treated with hyoscine butyl bromide and those who received no treatment.<sup>32-34</sup> In the removal of complex or large FB, butyl scopolamine is often given to induce aperistalsis. Carbonated beverages are used with the theoretical mechanism of carbon dioxide gas release that distend the lumen and act as a piston to push the object from the esophagus into the stomach, however the effectiveness of this method is unreliable and anecdotal perforations have been reported.<sup>35,36</sup> Papain, a meat tenderizer is not recommended due to the lack of efficacy and risk of perforation and mediastinitis.<sup>37</sup> Interventional radiographic methods, such as the use of a Foley catheter to extract FB or impacted food bolus are not recommended unless flexible endoscopy is not available.<sup>38</sup> Endoscopy is incontestably the best method for the therapeutics of true FB ingestion and food bolus impaction. The success rates are greater than 95% and associated morbidity and mortality range from 0-5%.<sup>39</sup> The most consistent predictors of treatment failure and complications include intentional ingestion, ingestion of multiple and complex FB and lack of patients' cooperation. The study was approved by hospital's ethics committee.<sup>40,41</sup>

The data were analyzed using SPSS computer software version 15 (SPSS Inc, Chicago 2, USA) and expressed as a number and a percentage for qualitative variables and as mean  $\pm$ SD (standard deviation) for quantitative variables.

## RESULTS

A total of 55 patients were admitted with foreign body ingestion over a period of 5 years. The patients were in the age range of 1 to 85 years. The mean age was 42.5 years. The males constituted 61.81% of the patients. The age group distribution is shown in (Table 1). In study of Mirji males constituted 60.87%.

**Table 1: Age distribution of patients (n=55).**

| Age groups (years) | Males N (%)       | Females N (%)     | Total           |
|--------------------|-------------------|-------------------|-----------------|
| 0-20               | 14 (25.45)        | 10 (18.18)        | 24 (43.63)      |
| 20-40              | 4 (7.27)          | 1 (1.81)          | 5 (9.10)        |
| 40-60              | 4 (7.27)          | 3 (5.45)          | 7 (12.72)       |
| 61-80              | 8 (14.54)         | 6 (10.90)         | 14 (25.45)      |
| 80-100             | 4 (7.27)          | 1 (1.81)          | 5 (9.10)        |
| <b>Total</b>       | <b>34 (61.81)</b> | <b>21 (38.18)</b> | <b>55 (100)</b> |

N = number of patients.

The majority of foreign bodies found were coins constituting 63.6% Compare to 52.17% followed by food particles (chicken bone, meat, fruits pieces/seeds, fish bone) constituting 21.81% compare to 21.74% in study of Mirji. Other foreign bodies found were all pin, dentures, magnet, jewellery, drug capsules. The details are shown in (Table 2).

**Table 2: Frequency of different types of foreign bodies ingested.**

| Name of foreign body | N (%)           |
|----------------------|-----------------|
| Coins                | 35 (63.6)       |
| Food particles       | 12 (21.81)      |
| All pin              | 1 (1.81)        |
| Magnet               | 1 (1.81)        |
| Dentures             | 2 (3.63)        |
| Jewellery            | 2 (3.63)        |
| Drug capsules        | 2 (3.63)        |
| <b>Total</b>         | <b>55 (100)</b> |

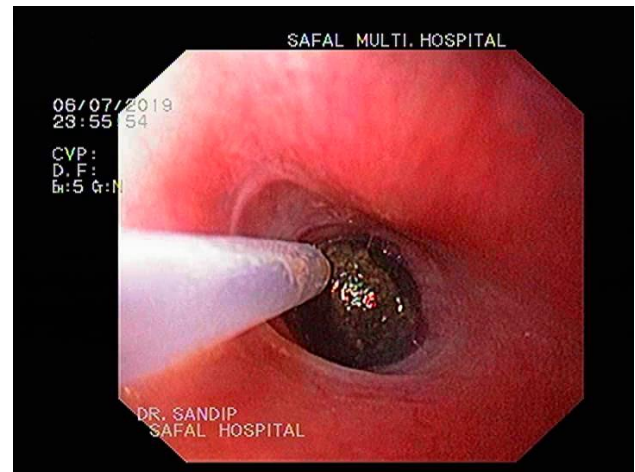
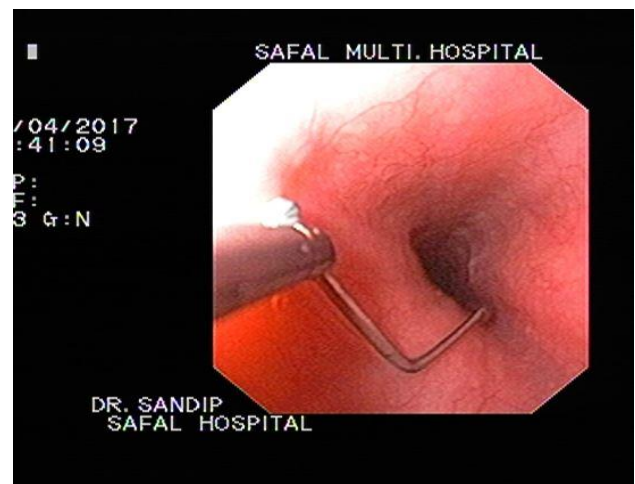
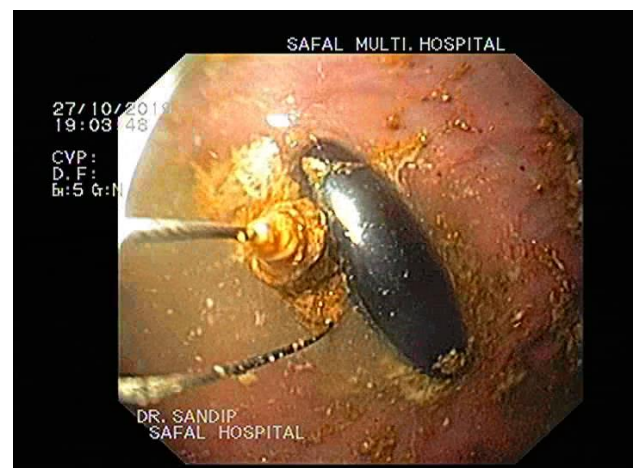
The most common site for lodgement of foreign bodies was esophagus 70.9% versus 65.22% in Mirji. Upper esophagus 36.36% vs 39.13% being the most common followed by mid and lower esophagus (21.81% and 12.72%) vs 13.04% in Mirji. The details are shown in (Table 3).

**Table 3: Frequency of different sites of foreign body lodgement.**

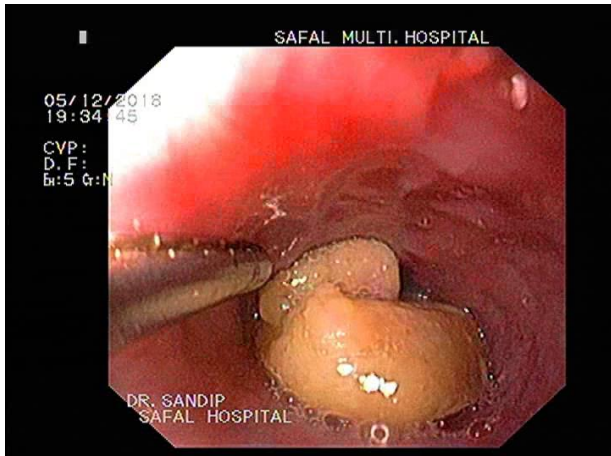
| Sites of lodgement | Frequency (%)   |
|--------------------|-----------------|
| Esophagus          | 39 (70.9)       |
| Upper              | 20 (36.36)      |
| Middle             | 12 (21.81)      |
| Lower              | 07 (12.72)      |
| Stomach            | 13 (23.63)      |
| Pyloric fossa      | 01 (1.81)       |
| Duodenum           | 02 (3.63)       |
| <b>Total</b>       | <b>55 (100)</b> |

Out of 55 patients 47 patients presented within 24 hours. All the patients were symptomatic. Dysphagia was the presenting symptom. All the patients underwent therapeutic endoscopy with 98.19% success rate.

One elderly male patient with denture impaction in mid-oesophagus presented after 48 hours, it was unable to retrieve FB with endoscopy due to extremely oedematous surrounding tissue n risk of impending oesophageal perforation. He underwent surgical procedure.

**Figure 1: Fruit nut in oesophagus.****Figure 2: Safety pin in oesophagus.****Figure 3: Magnet in stomach.**





**Figure 4: Fruit ball in oesophagus.**

## DISCUSSION

Gastrointestinal foreign bodies are comprised of food bolus impaction and intentionally or unintentionally ingested or inserted true foreign body. Safe removal of these foreign bodies is a true challenge in gastrointestinal endoscopy.<sup>4</sup> Food bolus impaction above a preexisting esophageal stricture or a ring is the most common cause of obstruction in adults. Coins are the most common foreign body ingested by children.<sup>5,6</sup> Nearly 30% pass into the stomach within 24 hours. If the object is less than 2 cm in size it passes through entire GI tract. If it fails to pass beyond stomach by 3-4 weeks it needs endoscopic removal.<sup>7</sup> Majority of ingestions occur in pediatric population with a peak incidence between 6 months and 6 years. In adults, true FB ingestion occurs in those with psychiatric disorders and alcoholic intoxication.<sup>8</sup> The foreign bodies with soft end do not cause much problem but the ones with sharp edges may pose serious problems. The commonest symptoms of foreign body ingestion are dysphagia, odynophagia, retrosternal pain, sore throat, FB sensation, retching, vomiting, choking and hypersalivation.<sup>9</sup> Usually the FBs less than 2cms in size pass through the GI tract without causing any complications.<sup>10</sup> Initial radiographic assessment is usually the preferred initial step in foreign body management.<sup>11</sup> Surgical intervention becomes necessary if patient develops symptoms of perforation and when sharp objects do not pass through within 72 hours.<sup>12</sup> Mortality due to FB ingestion is quite rare.<sup>13</sup>

In this experience of 55 patients over a period of 5 years 40% were less than 8 years old. True FB ingestion (coin) was the most common as reported with other studies.<sup>14</sup> All of them presented with symptom of dysphagia. Commonest site of obstruction was upper esophagus constituting nearly 39% of cases. The same observation is made in many other studies.<sup>15</sup> We could successfully retrieve the foreign body in all 54 patients. One elderly male patient with denture impaction in mid-oesophagus presented after 48 hours, it was unable to retrieve FB with endoscopy due to extremely oedematous

surrounding tissue risk of impending oesophageal perforation. He underwent surgical procedure.

No major complications were encountered. Flexible endoscopy is the ideal approach in the management of FBs. The overall success rate is >95% and the complication rate is 0-5%.<sup>9</sup> Our study correlates with many other studies. Out of 55 patients 47 presented within 24 hours of ingestion. FBs were removed in them without any complications.

## CONCLUSION

Most foreign bodies ingested pass through the GI tract spontaneously without causing any harm and without requiring any intervention. Flexible endoscopy should be used for definitive treatment. It is a safe, reliable procedure for a skilled endoscopist with a high success rate, low morbidity and no mortality.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Chaudhari SKS, Chaudhary SM. Endoscopic management of foreign bodies in the upper gastrointestinal tract. *Int Surg J* 2020;7:2226-30.