

ORIGINAL RESEARCH ARTICLE

EFFECTIVENESS OF FLEXIBLE ENDOSCOPY IN THE MANAGEMENT OF UPPER GASTROINTESTINAL TRACT FOREIGN BODIES AT A TERTIARY HOSPITAL OF WESTERN NEPAL

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ABSTRACT

Background: Foreign body ingestions are some of the most challenging clinical scenarios faced by gastrointestinal endoscopists. The commonly ingested foreign bodies are coins, toys, and batteries in children whereas bone or meat boluses are common in adults. The present study was carried out to study the clinical profile of patients presenting with foreign body in the upper gastrointestinal tract and effectiveness of endoscopy as a therapeutic tool in its management.

Methods: A descriptive cross-sectional study was carried out in the endoscopy unit of Universal College of Medical Sciences, Bhairahawa, Nepal from Jan 2015 to Dec 2018. All patients who underwent endoscopy with suspicion of ingestion of foreign body in the upper gastrointestinal tract were enrolled in this study. Foreign body was removed with appropriate endoscopic tools.

Results: Sixty-four patients were enrolled in the present study with mean age of 34.78±21.84 years. There were 42.19% (n=27) males with female preponderance (57.37%, n=37). Retrosternal discomfort with dysphagia was the most common presentations seen in 68.75% (n=44) patients. The most common site for foreign body impaction was lower oesophagus (53.13%). Three most common foreign bodies encountered were meat bone, meat balls and coins respectively. Endoscopic management was successful in 59 (92.19%) patients.

Conclusions: Foreign body ingestion is commonly seen in children and young adults with female predominance. Most common upper gastrointestinal foreign bodies are related to food bolus impaction with animal bone or meat. Therapeutic endoscopy is a safe and effective method for removing foreign body from upper gastrointestinal tract.

INTRODUCTION

Foreign body (FB) ingestion is one of the most challenging clinical situations faced by gastrointestinal (GI) endoscopists. In the United States, approximately 1,500 people die annually due to FB ingestion.¹ It can occur in patients of any age group but is more commonly encountered in children which may account to 80% of cases. In majority of patients (80–90%), the FB may pass through the gastrointestinal tract naturally. A noninvasive intervention is necessary in 10–20% of cases, and surgery may require in approximately 1% or less.²⁻⁴

The commonly ingested FBs in children are coins, toys, and batteries,^{5,6} whereas impaction of either bone or meat bolus while eating is common in adults.⁷ Ingested FBs can frequently lodge in the oesophagus. However, once it reaches in the stomach, it easily passes through the intestinal tract without any difficulty. If the objects are long, hard and sharp, like pins or fish bones, the risk of perforation of the gastrointestinal wall is high.⁸

Flexible endoscopy is the ideal choice for both diagnostic and therapeutic purposes in the management of upper gastrointestinal tract FBs.⁹ However, plain chest radiography abdominal ultrasonography or computed tomography (CT) scan can be

done.⁹ Endoscopy has a success rate of greater than 95% with complication rates between 0-5%.^{1,10,11} Therefore, the present study was done to study the clinical profile of patients presenting with FB in the upper GI tract and to look for the effectiveness of endoscopy as a therapeutic tool in its management.

METHODS

It was a descriptive cross-sectional study carried out in the endoscopy unit of Universal College of Medical Sciences, Bhairahawa, Nepal from 1 January 2015 to 31 December 2018. The study was approved by the institutional review board of the institute. All the patients who underwent endoscopy with suspicion of ingestion of FB or features suggestive of an impacted FB in the upper gastrointestinal tract were enrolled in this study. Those patients who refused to give consent or were endoscopy could not be completed were excluded from the study. Written informed consent was taken from all patients. After enrolment in the study, as per predesigned pro-forma, detailed history including age, sex, ethnicity, occupation, presenting complaints, history of dysphagia, abdominal pain, hematemesis or melena, smoking, alcohol ingestion and any co-morbid illness were taken. Detailed general physical and systemic examinations were performed. Appropriate investi-

gations such as chest X-ray, ultrasonography of abdomen and computed tomography were done, if required. The upper gastrointestinal endoscopy was done in all cases on the same day of presentation if they presented during working hours or the next immediate working day with the intention to establish the diagnosis and to provide necessary therapeutic intervention to remove FB with appropriate endoscopic accessory tools. Fujinon video endoscope (EG-250WR5) was used for the endoscopy. The endoscopy was performed under 10% lignocaine spray by an experienced endoscopist. Endoscopic accessories like foreign body forceps, Roth net, tripod forceps, snare loop and endoscopy over-tube were used where required. Biopsy was taken from suspicious lesions where necessary. Clinical features of the foreign bodies, such as type, size, sharpness of edges, number, and location, were noted. All the data was entered in Microsoft excel sheet. Endoscopic data were analyzed

including duration of foreign body impaction, endoscopic device, days of hospitalization and complication rate. Descriptive analysis was done as mean, percentage and standard deviation.

RESULTS

Total 64 patients with history of ingestion of FB or features suggestive of an impacted FB in the upper gastrointestinal tract underwent endoscopy and were enrolled in this study. Baseline characteristics and the demographic profile of the study subjects are depicted in table 1. Mean age of patients in the present study was 34.78±21.84 years. Patients less than 20 years of age constituted 40.63% (n=26) of the total study population. Females were more predominant than males in the present study (Table 1).

Table 1: Baseline characteristics of patients with foreign bodies

Characteristics	n (%)
Age (yrs)	
≤20	26 (40.63)
21-40	9 (14.1)
41-60	20 (31.3)
>60	9 (14.1)
Sex	
Male	27 (42.19%)
Female	37 (57.81%)
Demographic data	
Rupandehi	36 (56.25%)
Kapilvastu	10 (15.63%)
Nawalparasi west	6 (9.37%)
Arghakhachi	4 (6.25%)
Dang	4 (6.25%)
Palpa	3 (4.69%)
Pyuthan	1 (1.56%)

Patients included in the present study were from 7 nearby districts from the study site. Rupandehi, Kapilvastu and Nawalparasi west were the three most common districts respectively which constituted 81.25% of the total study population (Table 1).

Accidental ingestion of foreign bodies was documented in all the study population. 42.19% (n=27) patients visited the ENT OPD of the hospital followed by emergency (n=16, 25%), medicine OPD (n=11, 17.19%) and paediatric OPD (n=10, 15.62%) respectively.

Retrosternal discomfort with dysphagia (n=44, 68.75%) was the common symptom which led them to visit the hospital whereas rest of them were asymptomatic (n=20, 31.25%). In

the present study 51.56% (n=33) patients presented within 24 hours, 25% (n=16) on 2nd day, 9.38% (n=6) on 3rd day, 4.69% (n=3) on 4th day and 9.38% (n=6) on 6th day after ingestion.

Common sites for FB impaction was the lower oesophagus (n=34, 53.13%) followed by stomach (n=17, 26.56%), upper oesophagus (n=10, 15.62%) and pyriform fossa in (n=3, 4.69%) respectively. There were wide varieties of foreign bodies detected in upper gastrointestinal tract. Thirty-five (54.69%) foreign bodies were related to edible products whereas 31 (45.31%) foreign bodies were related to inedible products. The most common type of foreign object was an animal bone (17 patients; 26.56%), followed by meat ball (10 patients; 15.63%), coin (9 patients; 14.06%), denture (8 patients; 12.5%), battery (4 patients; 6.25%), plastic toy (4 patients; 6.25%), mango seed

(3 patients; 4.69%) and fish bone (3 patients; 4.69%). Other materials retrieved were wedding ring, safety pin, fennel seed,

coat button and a sweet candy. (Table 2, Figure 1).

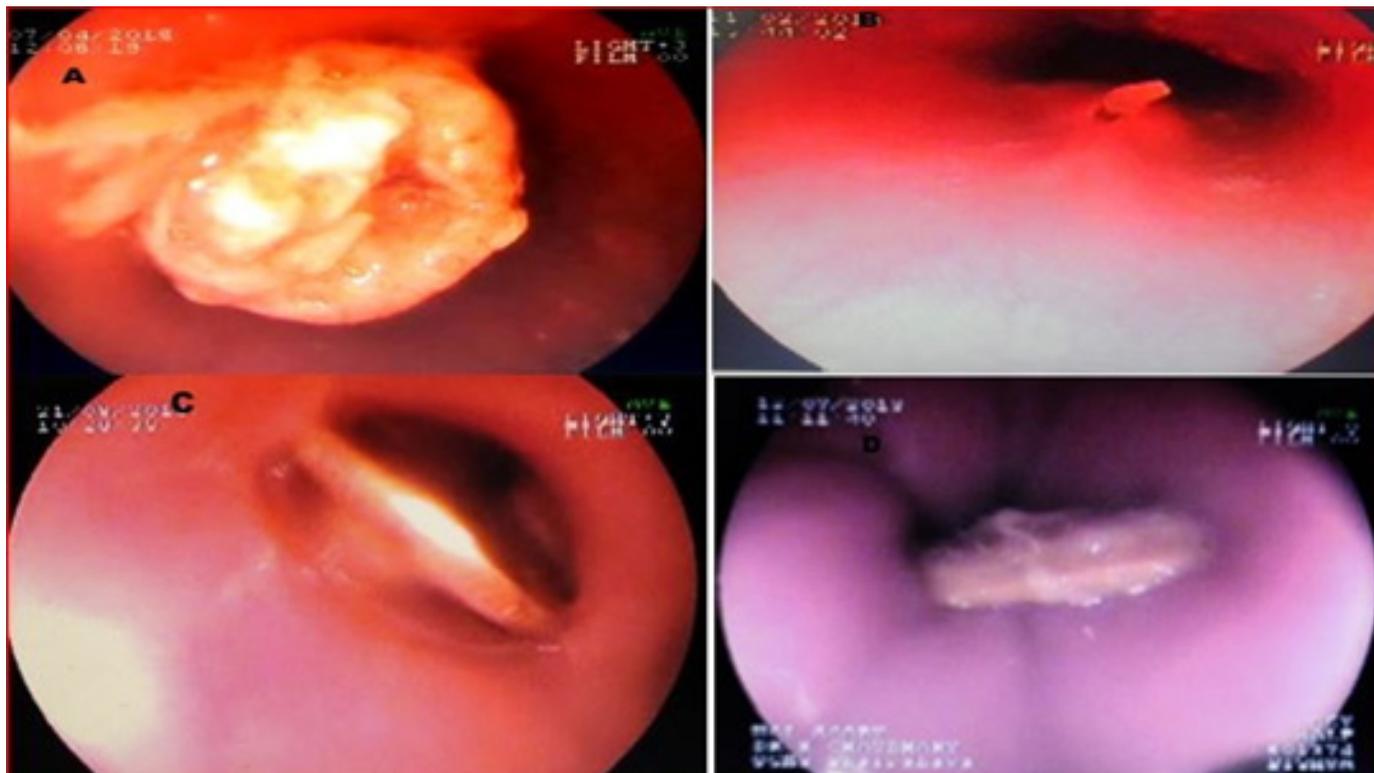


Figure 1: Foreign body in esophagus (A Meat ball, B Fish bone, C Coin, D Mango seed)

Table 2: Types of foreign bodies in patients

Foreign bodies	n (%)
Animal bone	17 (26.56)
Meat ball	10 (15.63)
Coin	9 (14.06)
Denture	8(12.50)
Battery	4 (6.25)
Plastic toy	4 (6.25)
Mango seed	3 (4.69)
Fish bone	3 (4.69)
Wedding ring	2 (3.13)
Safety pin	1 (1.56)
Fennel seed	1 (1.56)
Coat Button	1 (1.56)
Sweet candy	1 (1.56)
Total	64 (100)

FB management was successful in 59 (92.19%) patients with flexible endoscopy and failed in 5 (7.81%) patients. Those cases where failure of endoscopic removal was seen had impacted large meat bolus with bone. All these cases underwent alternative procedures. Four (6.25%) patients required rigid esophagoscopy and one patient required

surgical management (laparotomy).

The preferred accessory devices used to extract a foreign body varied according to the type and location of the foreign bodies. For retrieval, commonly used accessory devices were rat tooth/ alligator foreign body forceps (n = 35, 54.69%), snare loop (n= 15, 23.44%), net (n= 11, 17.19%), tripod forceps (n=6, 9.38%) and biopsy forceps (n = 1, 1.56%). Overtube was used in 16 (25%) patients. Foreign body push into the stomach was performed in 11 (17.19%) cases. There were no complications related to the procedure. There were esophageal mucosal erosions in 8 (12.50%) patients at the site of impaction, esophageal ulceration in 4 (6.25%) patients and esophageal perforation in 2 (3.13%) patients.

DISCUSSION

FB ingestion can be defined as materials swallowed accidentally or intentionally, or objects swallowed naturally when taking medication or food. In adults, most foreign body ingestion occurs accidentally, but may be a result of contributory factors, such as psychiatric disorders, mental retardation, alcohol consumption, esophageal motility disorder, esophageal stricture and an edentulous state.¹² In the present study all the patients had accidental ingestion of foreign body. Diagnosis of upper gastrointestinal foreign body is often clear with patient's history of foreign body ingestion. Patients may report a sudden onset of dysphagia while eating, often associated with chest pain or odynophagia and an inability to swallow oral secretions. In the present study all the patients had the history of ingestion of a foreign body. Sometimes patients may not

able to provide a clear history so in these conditions a sudden refusal to eat, drooling of saliva, or respiratory symptoms such as coughing or wheezing due to aspiration should alert the physician to suspect foreign body ingestion. In another study from Taiwan the most frequent symptomatic complaint after foreign bodies ingestion was odynophagia 36.5% followed by dysphagia 27%, foreign body sensation 27%, chest pain 4.2%, nausea 3.1%, and others 2.2%. Thirty-four patients (17.2 %) were asymptomatic.¹³

A careful physical examination should be done to look for features of esophageal or gastrointestinal perforation such as subcutaneous emphysema or peritonitis. Presence of drooling of saliva often suggests complete esophageal obstruction. Plain radiography of neck, chest or abdomen may show the foreign body especially containing metals or bone. Patient with perforation may have subcutaneous emphysema, pneumomediastinum, or pleural effusion. Barium studies are now obsolete due to easy availability of endoscopy and computerized tomography (CT) scan.¹⁴ CT scanning is better to plain radiography in identifying the foreign bodies.¹⁵

Mean age of our patients was 34.78 years ranging from minimum 8 years to maximum 70 years. Results are similar to another study where the mean age at the time of ingestion was 26.4 years (range 14 - 71 years).¹⁶ Another study from Pakistan shows that FB ingestion occurs mostly in the younger age group.¹⁷ In our study FB ingestion was more common in male than female. Male predominance was noted in many other studies.^{13,17} Potential sites for blocking for an ingested FB include the cricopharyngeus muscle or upper sphincter, aortic arch, left main stem bronchus, gastroesophageal junction or lower sphincter, pylorus, duodenal sweep, ileocecal valve, and anus. In the present study common sites for FB impaction was the lower esophagus 53.13% followed by stomach 26.56%, upper esophagus 15.62% and pyriform fossa in 4.69% respectively. Which means esophagus was the most common site of lodgment site of ingested foreign bodies. This finding is similar to the another study where esophageal lodgment was seen in 75.6% of incidents followed by the stomach 12.5%, the pharynx 8.3%, anastomoses 2.4%, and the duodenum 1.2%, respectively.¹³

Wide varieties of materials have been found as foreign body in upper gastrointestinal tract. In our study 15 different varieties of objects were retrieved. Materials retained in the upper GI tract generally fall into two categories, namely, a food bolus impaction and a true foreign body.^{11,18} Classifications for foreign bodies, which define anatomic region and shape, are important for defining optimal therapy.¹⁰ Once foreign body ingestion is diagnosed, the gastroenterologist must decide whether intervention is necessary, how fast, and what will be the best modality of intervention. The timing of endoscopic intervention depends on risks of possible complications like aspiration or perforation. However, no foreign object or food bolus impaction should be allowed to remain in the esophagus beyond 24 hours after presentation.¹⁹ Foreign bodies like sharp objects and disk batteries lodged in the esophagus require urgent endoscopic intervention to avoid perforation. Similarly,

urgent intervention is also needed for impacted foreign bodies causing obstruction and excessive salivation which may lead to aspiration.

For retrieving foreign bodies various endoscopy accessory tools like grasping forceps, alligator forceps, rat tooth forceps, tripod forceps, polypectomy snares, Roth net, baskets, retrieval snare net, transparent cap-fitting device and overtube are used. In our study, commonly used accessory devices were rat tooth/ alligator foreign body forceps, snare loop, a net, tripod forceps, biopsy forceps and overtube. An overtube protects the airway and facilitates passage of the endoscope during removal of multiple objects or piecemeal removal of a food impaction. An overtube also protects the esophageal or gastroesophageal junction mucosa from laceration during retrieval of sharp objects.²⁰ Foreign bodies and food impactions in the esophagus have the highest incidence of complications with the complication rate directly proportional to the dwell time in the esophagus.¹⁴ An esophageal food bolus impaction often contains chewed meat lodged at one of the narrowed sites. Using a snare or snare basket, a food bolus can be retrieved in one piece or by piecemeal extraction or reduced in volume allowing it to pass spontaneously. The food may be successfully pushed into the stomach after it is cut into small pieces by a snare. If the object has passed into the stomach and is less than 2 cm in size, it will usually pass through the entire gastrointestinal tract without difficulty.

Button/small disk batteries are found in watches, hearing aids, calculators and other electronic devices may result in corrosive injury, necrosis and perforation of gastrointestinal tract. After radiographic documentation, batteries lodged in the esophagus or stomach should be emergently removed. Use of a retrieval snare net or a stone retrieval basket is most often successful. Surgical management is recommended if severe abdominal pain develops or if the battery fails to pass in 72 hours.

Common sharp pointed foreign bodies include bones, toothpicks, needles, safety pins, nails, dental appliances and medication blister packs. They should be removed, if possible, before they pass through the stomach, as these objects may perforate the intestine. Sharp objects within the esophagus should be urgently removed endoscopically. Surgical intervention is indicated if the patient develops symptoms of perforation or if the ingested sharp object fails to progress within 72 hours after ingestion.²¹ It can be removed by a snare net. For removal of sharp and pointed objects, use of an overtube or a retractable latex-rubber condom-type hood is recommended. Pointed objects should always be removed such that the pointed end is trailing as done in a safety pin or fish bone removal. These objects can also be retrieved using a polypectomy snare. Objects greater than 5 cm in length, such as pens, tooth brushes, spoons and cutlery usually lodge in the duodenal sweep and generally require endoscopic removal with a polypectomy snare. In the present study FB management was successful in 92.19% patients with flexible endoscopy and failed in 7.81% patients. High success rate is

also noticed by Yao CC et al.¹³ who had a success rate 98.8%.

Our study also has certain limitations. It is a hospital-based study so results obtained from this study can not be generalized. Furthermore, foreign body in upper gastrointestinal tract is also dependent upon the dietary habits of the population.

CONCLUSION

Foreign body ingestion is an important emergency clinical situation seen commonly in children and young adults with female predominance. Most common upper gastrointestinal foreign bodies are related to food bolus impaction with animal bone or meat. Retrosternal discomfort with dysphagia was the most common presentation. Lower esophagus is the most common site of impaction. Therapeutic endoscopy by an experienced, skilled endoscopist with suitable accessories is a reliable, safe and effective method in managing foreign body from upper gastrointestinal Tract. It has a very high success rate, low morbidity and no mortality. A variety of endoscopic techniques

and instruments are indicated for different situations.

DISCLOSURE

All authors have no disclosure of any financial involvement in any organization with a direct financial interest in the subject matter or materials discussed in the paper.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests regarding the publication of this paper.

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