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FOREIGN BODIES IN THE UPPER DIGESTIVE TRACT : STUDY IN A TERTIARY CARE CENTRE

Otorhinolaryngology

Dr. Sonith Peter George Post Graduate Resident Department of Otorhinolaryngology MGMMC, Indore M.P, India

Dr. Neeraj Kumar Dubey Senior Resident Department of Otorhinolaryngology SSMC, Rewa M.P, India

Dr. Anshul Sharma Post Graduate Resident Department of Otorhinolaryngology MGMMC, Indore M.P, India.

Dr. Pooja Muvel* Post Graduate Resident Department of Paediatrics MGMMC, Indore M.P, India *Corresponding Author

Dr. Sapna Sharma Post Graduate Resident, Department of Anaesthesia, SAIMS Indore.

ABSTRACT

Introduction: Foreign body ingestion is a quite common occurrence worldwide. The narrowest portion of the GI tract is the esophagus and consequently, it is the commonest site of foreign body impaction Maximum chances of foreign body impaction are noticed in the paediatric population, followed by edentulous adults and psychiatric patients. The most well accepted modality of treatment in such cases in Rigid Endoscopy and foreign body removal. **Methods:** This was a prospective study of 36 patients with history of foreign body ingestion. Radiological investigations included radiograph of the neck, chest and abdomen, Barium swallow and Computed Tomography scan of the neck and chest. Rigid esophagoscopy and foreign body removal was done. The type of foreign body, its location and the distance of impaction from the upper incisors was noted. The post-operative complicatons, management and duration of stay was noted. **Results:** The commonest age group in our study was 2-5 years age group which had 63.8% cases. The most common symptom was difficulty in swallowing, in 77.7% cases, followed by pain in 69.4% cases. The most common site of impaction was at cricopharynx in 66.6% cases, followed by aortic arch level and GE junction. The most common foreign body removed was coin, seen in 63.8% cases. The longest duration of hospital stay was for sharp foreign bodies (7.7 days), followed by the corrosive button batteries (7.2 days). The average hospital stay was longest for patients presenting after 4 days and lowest for patients who presented within the same day. **Conclusion:** CT scan is the best radiological investigation for diagnosing esophageal foreign bodies and preoperatively assessing the level of FB, any other anatomical deformity and possible serious complications like perforation or mediastinitis. Rigid esophagoscopy remains the GOLD STANDARD as a safe and efficient method of both diagnosing and removing impacted foreign bodies from the esophagus.

KEYWORDS

Rigid Esophagoscopy, Foreign body, Esophagus

INTRODUCTION:

Foreign body ingestion is a quite common occurrence worldwide with a peak in children older than 3 years. It usually presents as an emergency(1). The narrowest portion of the GI tract is the esophagus and consequently, it is the commonest site of foreign body impaction. An esophageal foreign body may lodge in the thoracic inlet at the level of cricopharynx, the aortic arch area, or the gastroesophageal (GE) junction. The most common site of impaction of foreign bodies is the cricopharynx level, followed by the GE junction and then the aortic arch.(2,3)

Maximum chances of foreign body impaction are noticed in the paediatric population, followed by edentulous adults and psychiatric patients. Of all the factors, the wearing of removable dentures is most commonly associated with foreign bodies in adults.(4) Patient presentations vary, although dysphagia and odynophagia are the most frequently reported symptoms. The overall approach towards patients with esophageal FBs comprises a meticulous history, methodical examination and pertinent investigations followed by prompt and appropriate management. The type of foreign body, duration and nature of symptoms are all useful indicators regarding the site of lodgement and the need for immediate intervention.(5)

Various investigations to confirm the presence of a foreign body in the esophagus include X-ray of the neck, chest and abdomen, Barium swallow and Computed Tomography. Among these, CT is the best radiological investigation to diagnose or rule out a case of foreign body impaction in the esophagus.

The most well accepted modality of treatment in such cases in Rigid Endoscopy and foreign body removal. There are other modes of treatments reported in the literature such as the use of flexible esophagoscopy, cervical esophagotomy, and the use of Foley's catheter under fluoroscopic guidance(1). The best method of removing impacted foreign body remains controversial. Rigid endoscopic removal of foreign body is safe and effective, but requires GA. Removal by flexible endoscope, which can be done under LA in outpatient department has gained great popularity over the past decade(6), but the Rigid Esophagoscopy and Foreign Body removal remains the Gold standard procedure because of its higher success rate compared to other methods.

In this study, we attempt to look at the various types of foreign body in our demographic, clinical presentation, complications of rigid esophagoscopy if any and duration of hospitalization in patients of foreign body impaction in esophagus.

MATERIALS AND METHODS:

This was a prospective study conducted in M.G.M.Medical College and M.Y Hospital, Indore. A total of 36 patients presenting to the Emergency Department and undergoing admissions under the Department of ENT from August 2021 to July 2022 with history of accidental foreign body ingestion and symptoms suggestive of foreign body ingestion like dysphagia, regurgitation, throat or chest pain were included in the study.

On presentation, a detailed history and clinical examination was carried out. Radiological investigations included radiograph of the neck, chest and abdomen, Computed Tomography of the neck and chest and Barium swallow. The first investigation to be done was x-ray. X-ray was done of the neck, chest and abdomen in both AP and lateral views to locate the position of the foreign body in the GI tract. If history suggests a radiolucent foreign body or if there is a strong clinical suspicion inspite of negative history and negative x-ray, a CT scan or barium swallow was advised for confirmation. If the foreign body was identified in the stomach or distal GI tract, conservative management was done. If investigations suggest foreign body impaction in the esophagus, patient was prepared for surgery and all necessary investigations for anaesthetic fitness were done. After a written and informed consent, rigid esophagoscopy and foreign body removal was done.

Inclusion Criteria:

Patients of age group 1–60 yrs who were clinically and radiologically diagnosed with impacted foreign body in the esophagus and giving consent to be part of the study and to undergo surgery were included.

Exclusion Criteria:
Patients not giving consent to be part of study or willing to undergo surgery or those in which the foreign body has passed to the stomach or distal GI Tract were excluded from the study.

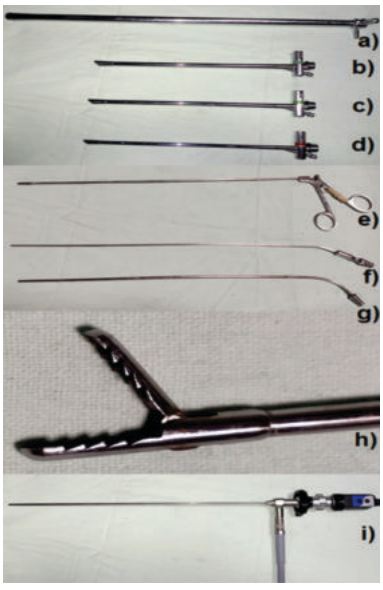


Figure 1: Instruments used in our study – a) Adult rigid esophagosope, b-d) Pediatric rigid esophagoscope, e) Grasping forceps, f-g) Suction cannula, h) Grasping forceps magnified, i) Hopkins Rod 0 degree Telescope with camera and light cord

The type of foreign body, its location and the distance of impaction from the upper incisors was noted. For sharp foreign bodies with likelihood of esophageal injury, Ryle's tube was inserted and left for a few days. All findings were noted and tabulated.

RESULTS:

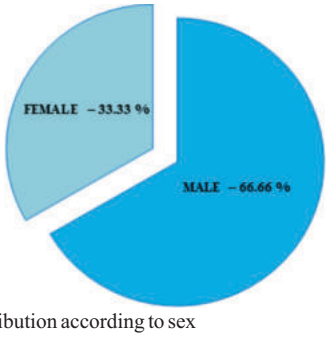


Chart 1 : Distribution according to sex

There were 24 males and 12 females in our study with a male: female ratio of 2:1.

Table 1 : Distribution according to age

Age (in years)	No: of cases	Percentage
Upto 2 years	3	8.3%
2-5 years	23	63.8%
5 – 10 years	7	19.4%
>10 years	3	8.3%

The most common age group in our study was 2-5 years age group which had 63.8% (n=23) of all cases, followed by 5-10 years group, followed by less than 2 years and more than 10 years group. All patients above 10 years were adults.

Table 2 : Distribution based on presenting symptoms

Symptoms	No: of patients	Percentage
Difficulty in swallowing	28	77.7%
Pain	25	69.4 %
Regurgitation	24	66.6 %
Vomiting	19	52.7 %

The most common symptom was difficulty in swallowing, seen in 77.7% (n=28) cases, followed by pain, seen in 69.4% (n=25), followed by regurgitation in 66.6% (n=24) and vomiting in 52.7% (n=19) cases.

Table 3 : Distribution based on level of foreign body impaction

Level of FB	No: of cases	Percentage
Cricopharynx	24	66.66
Mid-esophagus	8	22.22
Gastro-esophageal junction	4	11.11

The most common site of impaction was at the level of the cricopharynx in 66.6% cases (n=24), followed by aortic arch level impaction in 22.2% (n=8) cases and GE junction in 11.1% (n=4) cases.

Table 4 : Distribution based on type of foreign body

Type of Foreign Body	No: of cases	Percentage
Coin	23	63.88 %
Battery	3	8.33 %
Vegetative Foreign Body	5	13.88 %
Denture	1	2.7%
Metallic washer	1	2.7%
Safety Pin	1	2.7%
Jeans button	1	2.7%
Ornament	1	2.7%

The most common foreign body removed was coin, seen in 63.8% (n=23) cases. Most of the foreign bodies ingestion cases constituted blunt objects (91.6%, n=33) and sharp object impaction was seen in 8.3% cases (n=3).

Vegetative FBs included:
- Mutton bone, which was also a sharp foreign body
- Mutton piece
- Food material impaction in post-op case of Tracheo-esophageal fistula repair

Sharp FBs included :
- Safety pin
- Ornament (earring)
- Mutton bone

Various Foreign Bodies And Radiology:

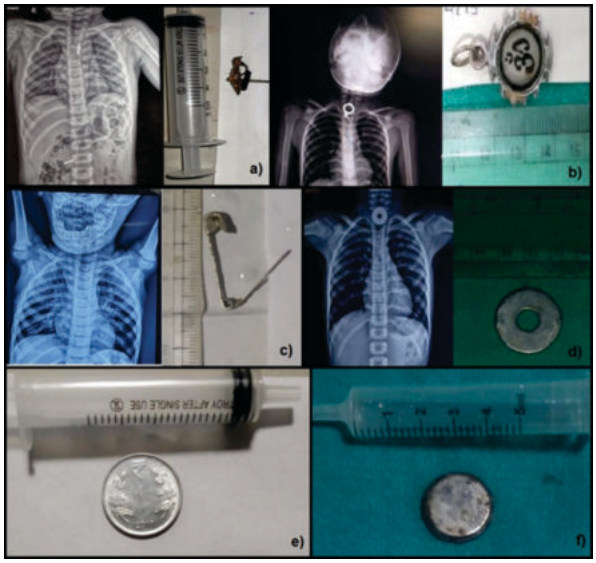
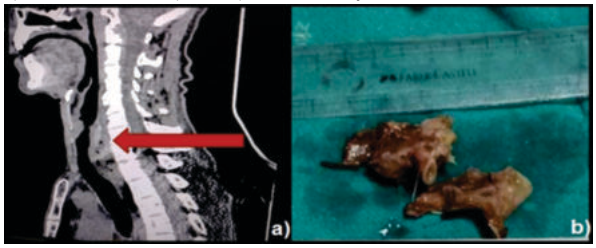


Figure 2: Various radio-opaque foreign bodies visualized on x-ray in pediatric patients – a) Metallic ornament, b) Pendant, c) Safety pin and d) Metallic washer, e) coin, f) button battery



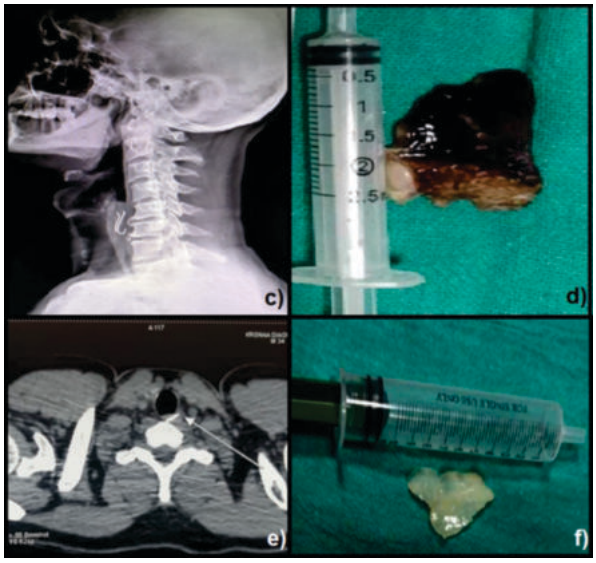


Figure 3 : Various foreign bodies in adult patients – a) CT scan of Neck showing foreign body in esophagus at C7-T1 level, b) On rigid esophagoscopy, Foreign body mutton pieces removed, c) X-ray neck of patient showing radiopaque shadow, d) On rigid esophagoscopy, foreign body denture removed, e) CT Neck axial section showing foreign body in esophagus, f) On removal found to be mutton bone

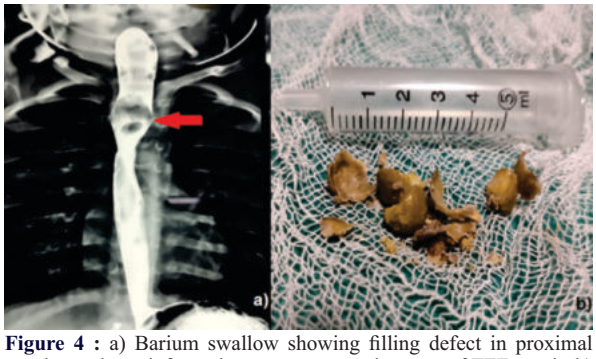


Figure 4 : a) Barium swallow showing filling defect in proximal esophagus in an infant who was postoperative case of TEF repair, b) Impacted vegetative foreign body ? chana removed on Rigid Esophagoscopy

Table 5 : Average hospital stay for type of foreign body

Type of Foreign Body	Average Hospital Stay
Coin and other blunt foreign bodies	3.6 days
Button battery	7.2 days
Sharp foreign bodies	7.7 days

The longest duration of hospital stay was for sharp foreign bodies (7.7 days), followed by the corrosive button batteries (7.2 days). The mean hospital stay was shortest for blunt object impaction (3.6 days)

Table 6 : Average hospital stay for time of presentation

Time of presentation	Average Hospital Stay
0 days	2.3 days
1 day	2.4 days
2 days	4.4 days
3 days	4.6 days
4 days	5.1 days
> 4 days	6.6 days

The average hospital stay was longest for patients presenting after 4 days and shortest for patients who presented within the same day.

DISCUSSION:

The most common age group in our study was 2-5 years age group with 63.8% cases, showing that foreign body impaction in esophagus is a predominantly pediatric problem. *In our study male:female ratio was 2:1, suggesting male preponderance. In the study by Haseen et al* (7)*, they also reported similar findings with male preponderance in ratio of 1.5:1 with children younger than 6 years of age comprising 80% of the patients.*

In our study, the most common symptoms was difficulty in swallowing and pain seen in 77.7% and 69.4% respectively, followed by regurgitation of meals (66.6%) and vomiting (52.7%). The study by Naveen Kumar et al(4) reported that dysphagia was the most common symptom seen in 80% cases, followed by breathing difficulty (40%) and retrosternal pain (25%). In our study, no patients had difficulty in breathing.

Plain radiographs confirmed the presence of foreign body in 31 cases in which the foreign body was radio-opaque. 2 cases of vegetative FB impaction in children who were operated cases of Tracheo-esophageal fistula repair and 1 case of vegetative FB impaction in a child suspected of achalasia cardia required Barium swallow study, which showed filling defect. The remaining 2 cases required CT scan of the neck and chest to confirm the diagnosis; one was a case of mutton bone impaction which was not visualized on X-ray and the other was mutton bolus impaction.

Literature suggests that the 3 most common sites of foreign body impaction are at the 3 main anatomical constrictions of the esophagus. The first constriction is the narrowest part of the oesophagus is at the cricopharyngeal sphincter. The second constriction is formed when it is crossed over by the arch of the aorta. The next constriction is caused by the left main bronchus crossing over it. These two constrictions are often considered as one constriction since both are separated by a small distance and both lie in the mid-esophagus. The final constriction occurs as it passes through the diaphragm just prior to the start of the abdominal part of esophagus(1,2,4,8). In our study, we found that the most common site of foreign body impaction was at the level of the cricopharynx, seen in 66.6% cases (n=24), followed by aortic arch level impaction in 22.2% (n=8) cases and GE junction in 11.1% (n=4) cases.

The study by Pawan Kumar Sharma in 2019(9) also reported similar findings with 66.6% of impactions in cervical esophagus, 25% of cases having upper and midthoracic esophagus impactions and only 8.3% in the lower esophagus. The study by Zhang et al(10) also showed that the most common level of impaction is upper esophagus, in 85.5% cases, followed by mid-esophagus in 12.6% cases and the least common site was lower esophagus with only 1.8% cases. We observed that objects impacted in 1st narrowing caused mainly drooling, regurgitation and dysphagia. Pain was the most predominant complaint when FBs were located in the 2nd or 3rd narrowing of esophagus.

In our study, the most common foreign body removed was coin, seen in 63.8% (n=23) cases. Vegetative foreign bodies were observed in 13.8% cases. Most of the foreign bodies ingestion cases constituted blunt objects (91.6%, n=33) and sharp object impaction was seen in 8.3% cases (n=3). Unusual foreign bodies in our study included metallic washer, safety pin, jeans button and ornament. The study by Adjeso et al (11) shows that coins were the most common finding, seen in 60.9% cases. The next common finding in their study was fish bone, seen in 11.3% cases and dentures in 5.2% cases. Weissberg et al (12) observed that among children (n=10), the most common foreign body impaction inthe esophagus is coin, seen in 9 out of 10 children in the study. In their study, among adults (n=22), mainly vegetative impaction was seen, with 59% of all adult foreign body impaction being a vegetative foreign body. They observed more foreign body impaction in the adult population. This is contrary to what our study as well as literature shows.

In our study, there was slight bleeding in 5 cases (13.8 %) of blunt foreign bodies, which was controlled effectively and only conservative management was required in postoperative period. There was linear laceration of mucosa in all 3 (8.33 %) cases of sharp foreign bodies. All 3 cases of button battery impactions showed significant edema and granulation in the esophagus during removal. Nasogastric tube insertion was done in the patients of button batteries and sharp EFB removal for speedy recovery and to prevent strictures or stenosis and to prevent mediastinitis in suspected cases of esophageal perforation due to sharp or erosive EFBs. Patients were kept on nasogastric feed for 1 week – then peritubal feed was started - and then nasogastric tube was removed and oral feeds started. Patients were comfortable and had no residual symptoms. All patients who underwent surgery recovered fully after the procedure. In the study by Zhang et al (10), they observed that ulceration or laceration with or without minor bleeding were the most common complications, followed by perforation and perforation with mediastinitis or a mediastinal abscess.

Hospital stay was shortest for patients of blunt foreign body impaction with an average of 3.6 days. Average stay for patients of corrosive foreign body impaction was 7.2 days and for sharp foreign bodies were 7.7 days. This was because these patients were kept on nasogastric feeds and observation for a longer time than patients with blunt foreign body impaction.

Patients who presented on the same day were discharged after around 2 days on oral medications with an average of 2.3 days. Patients of foreign body impaction, whether blunt or sharp, who presented after 4 days developed significant edema and granulation around the foreign body and required hospitalization and intravenous antibiotics and steroids for recovery. This increased the hospital stay to an average of 6.6 days.

Zhang et al (10) observed that complications were less frequent in patients who presented within the same day of foreign body impaction and that postoperative hospitalization was shortened when patients presented at an early stage.. In their study, the mean postoperative hospitalization stay in patients who presented within the same day was 1.79±2.01 days and in those who presented after 24 hours was 2.89±2.83 days, resulting in a significant difference between the two groups ($P < 0.05$).

In our study, there were no major post-operative complications that needed surgical interventions.

CONCLUSION:

A very simple but effective tool to ellicit the nature of foreign body is a detailed history. Majority of cases with EFBs will give a positive history of FB ingestion or possible personal factors predisposing to FB impaction (e.g., congenital fistulas (TEF), chemical burns in past). Even a plain chest and cervical X-ray followed by an esophagogram does not exclude the presence of a foreign body. Radiological examination using xray and proper evaluation are helpful to diagnose EFBs in children but sometimes they give false negative results. CT scan is the best radiological investigation for diagnosing esophageal foreign bodies. It also helps in preoperatively assessing the level of FB, extent of involvement of esophagus, any other anatomical deformity (stricture, narrowing) and possible serious complications like perforation or mediastinitis.

Despite various alternative methods of FBs removal, Rigid esophagoscopy remains the GOLD STANDARD as a safe and efficient method of removing impacted foreign bodies from the esophagus.

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