

## Research Article

# Foreign bodies in upper aero-digestive tract: a clinical study

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## ABSTRACT

**Background:** Foreign-body ingestion and aspiration are common childhood adverse events, hence are commonest causes of morbidity and mortality in infants and children worldwide. Aim of current study was to identify the patients with foreign-body ingestion and aspiration, develop a suitable algorithm for their management and study various complications following their removal.

**Methods:** The present study was carried out in G.R. medical college, Gwalior, M. P. during last one year on hundred patients diagnosed as case of foreign-body in upper aero-digestive tract on the basis of history, examination and investigations.

**Results:** Foreign-bodies in upper aero-digestive tract were seen mostly in children less than 10 years of age (91%). The youngest was 8 months old and the oldest 48 years. Coins were the most common foreign-bodies in oesophagus (90%) while whistle in the upper airway (40%). Right bronchus is the commonest site of impaction in the airway (50%), while cricopharynx is most common in the oesophagus (95.55%). Patients with oesophageal foreign bodies presented mostly with the chief complaint of foreign body sensation (63.4%) in the throat whereas those with airway foreign body presented mostly with dyspnoea and choking sensation (60%). Pooling of saliva was most commonly seen in patients with oesophageal foreign bodies (43.3%). Tachypnoea was the most common sign in cases of tracheo-bronchial foreign bodies (80%). Positive radiological evidence was present in 88% of upper aero-digestive foreign-bodies. Only 2.2% cases showed complications following oesophagoscopy. Tracheo-bronchial foreign-bodies were removed by emergency bronchoscopy. 20% cases had complications post-operatively.

**Conclusion:** Early detection by meticulous history, imaging modality & prompt management remains basis for favourable outcome and prevents fatal complications.

**Keywords:** Aero-digestive, Cricopharynx, Oesophagoscopy, Tracheo-bronchial

## INTRODUCTION

Foreign body ingestion and aspiration are common childhood adverse events hence are commonest causes of morbidity and mortality in infants and children worldwide. They form the third leading cause of death in children under the age of 1 year and the fourth leading cause in the age group 1-6 years. The maximum

prevalence is seen between the ages of 1 and 2 years; however, no age group is completely immune.

Children younger than 5 years of age represent the highest risk group. This risk is increased if the child has neurological impairment. Unfortunately, these children are often not viewed with a high index of suspicion when they present with nonspecific symptoms. Children known to have congenital anatomic or physiologic abnormalities

of the oesophagus, such as diffuse oesophageal spasm, oesophageal atresia, and/or tracheo-oesophageal fistulas, or those who had previous bowel surgery are at increased risk of complications.

The commonly encountered foreign bodies vary geographically. Coin ingestion seems to be the commonest worldwide problem.<sup>1</sup>

Other common non-food items are school stationery, balloons, and toys. Pharyngeal fish bones are well reported from countries where fish forms a part of the staple diet. Over the years, there has been a rise in the incidence of disk-type battery ingestion in the paediatric population, which can lead to serious consequences.

Seeds and nuts are frequent causes of trachea-bronchial obstruction worldwide. Accidental aspiration of peanuts is commonly responsible for airway obstruction in children in Southeast Asia and Africa, and kola nuts, which are traditionally used in Africa, may be inhaled accidentally.

It is difficult to eradicate the problem, as children, by nature, are curious and exploratory. It is important to develop a comprehensive approach to the early recognition and timely management of aspirated and ingested foreign bodies, as complications from delayed diagnosis can have significant health implications. Serious complications from aspirated foreign bodies such as severe airway obstruction and death, tend to occur in infants and younger children due to the small size of their airways.

Chevalier Jackson's initial description of endoscopic removal of foreign bodies in 1936 revolutionised the treatment options for management of aero-digestive foreign bodies.<sup>2,3</sup> Associated developments in radiology have played an important role in the rationalised and safe management of these cases.

The purpose of the study is to determine the distribution of foreign bodies in relation to age, sex, site of lodgement, types, & also studying factors affecting morbidity & mortality among the patients attending our institution.

## METHODS

The present study is a prospective study, carried out in the department of otorhinolaryngology and head & neck surgery, G.R. medical college and associated J.A. group of hospitals, Gwalior, M.P during October 2012 to October 2013 on hundred patients diagnosed as case of foreign body in upper airway or digestive tract on the basis of detailed history, physical examination and necessary investigations. Out of hundred patients, ninety belonged to foreign body ingestion in upper oesophagus while the rest ten were cases of foreign body aspiration in trachea-bronchial tree.

All patients with a provisional diagnosis of foreign body ingestion underwent X-ray neck & upper chest both antero-posterior and lateral views.

Foreign body removal was done by forceps using rigid endoscopy and patients were observed post-operatively for complications and relief.

## RESULTS

Out of hundred patients of foreign body ingestion and aspiration in my study, 91 were children of age less than 10 years. There were 7 patients in 11-20 years of age. Amongst the patients of foreign body ingestion, 82 out of 90 cases were below 10 year of age while 9 out of 10 patients were below 10 year of age in patients with foreign body aspiration. The youngest child was 8 month old with a plastic bottle cap at the level of cricopharynx whereas the oldest patient was 48 year old male with artificial dentures in the cricopharynx (Table 1).

**Table 1: Age wise distribution.**

Age group (in years)	Number of patients
<10	91
11-20	7
21-30	0
31-40	1
41-50	1
51-60	0
>60	0
<b>Total</b>	<b>100</b>

Cricopharynx was the most common site of impaction of oesophageal foreign bodies (95.55%). In the airway, right bronchus was the most common site of foreign body lodgement (50%) while left main bronchus was involved only in 20% cases (Table 2).

**Table 2: Subsites of foreign body lodgement.**

	No. of case	Percentage
<b>Digestive tract</b>		
Oropharynx	2	2.23%
Hypopharynx	1	1.11%
Cricopharynx	86	95.55%
Mid oesophagus and below	1	1.11%
<b>Total</b>	<b>90</b>	<b>100%</b>
<b>Airway</b>		
Larynx	0	0%
trachea	2	20%
Right bronchus	5	50%
Left bronchus	2	20%
None (diagnostic)	1	10%
<b>Total</b>	<b>10</b>	<b>100%</b>

In present study, coins were the most common foreign bodies of digestive tract seen in 90% of cases. Blackberry seeds, dentures, ring, locket, paper pins, fish bones, plastic bottle caps and marble were the other objects ingested by patients in our set up. Whistle was the most common foreign body of tracheobronchial tree (40%). groundnuts (30%) and metallic pins (20%) were the other ones (Table 3) (Figure 1).

**Table 3: Types of foreign bodies.**

Foreign bodies	No. of cases
Coins	81
Black berry seed	2
Artificial dentures	1
Ring	1
Locket	1
Safety pin	1
Fish bone	1
Plastic bottle cap	1
Marble	1
Whistle	4
Groundnuts	3
Pins	2
Nil	1



**Figure 1: Extracted foreign bodies.**

History of ingestion of foreign body was present in 82 cases (91.1%). Foreign bodies in cricopharynx and oesophagus usually present with foreign body sensation (63.4%) and difficulty in swallowing (54.5%) as confirmed by this study. Vomiting was seen in 45.5% cases while odynophagia in 40%. Thirteen cases had no symptoms. Majority of the patients with a recent history of foreign body ingestion, have no examination findings (48.9%). 43.3% cases had pooling of saliva, 20% had throat congestion and mild oedema. Only 2 patients (2.2%) had retrosternal bulge (Table 4).

**Table 4: Clinical Presentation of oesophageal foreign bodies.**

	No. of cases	Percentage
<b>Symptoms</b>		
History of ingestion	82	91.1%
Foreign body sensation	56	63.4%
Dysphagia	49	54.5%
Vomiting	41	45.5%
Odynophagia	36	40%
None	13	14.4%
<b>Signs</b>		
Pooling of saliva	39	43.3%
Congestion and edema	18	20%
Retrosternal bulge	2	2.2%
None	44	48.9%

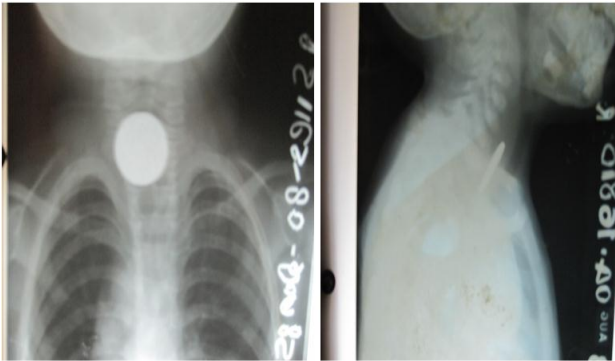
History of foreign body aspiration was obtained in 7 (70%) cases. The commonest symptom of presentation was choking and dyspnoea (60%) followed by coughing and wheezing (50%). Majority of the cases presented with tachypnoea (80%) followed by decreased air entry on affected side in 7 cases (70%). Stridor was noticed in half of the patients (5 cases) whereas rhonchi and crepitations were seen in 40% of cases. Intercostal and subcostal retractions were seen in 3 (30%) cases (Table 5).

**Table 5: Clinical features of tracheo-bronchial foreign bodies.**

	No. of cases	Percentage
<b>Symptoms</b>		
History of aspiration	7	70%
Dyspnoea	6	60%
Choking	6	60%
Cough	5	50%
Wheeze	5	50%
Dysphonia	3	30%
<b>Signs</b>		
Tachypnoea	8	80%
Decreased air entry on affected side	7	70%
Stridor	5	50%
Rhonchi	4	40%
Crepitations	4	40%
Intercostals & subcostal retraction	3	30%

Coins were the most common radio-opaque foreign body seen in the upper digestive tract. They were visible in both antero-posterior and lateral views of neck and upper chest (Figure 2). Dentures, ring, locket and pins (Figure 3, 4, 5) were the other radio-opaque objects. Thus, 95.56% foreign body ingestion cases were confirmed radiologically. Atelectasis was the most common

radiological evidence of foreign body in the airway in the present study (40%). Radio-opaque foreign body in the airway was present just in 20% cases. The other radiological changes were pneumonia in 30% cases, obstructive emphysema in 20% cases. 40% cases, which presented within a few hours of foreign body aspiration, showed no radiological changes (Table 6).



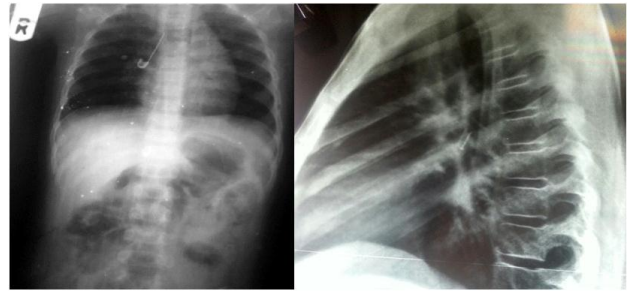
**Figure 2: X-ray neck and upper chest antero-posterior and lateral view showing coin at the level of cricopharynx.**



**Figure 3: X-ray lateral view neck showing ring in cricopharynx.**



**Figure 4: X-ray neck and upper chest antero-posterior showing locket in the cricopharynx.**



**Figure 5: X-ray chest postero-anterior view and lateral view showing pin.**

**Table 6: Radiological evidence of aero-digestive foreign bodies.**

X-ray findings	No. of cases
Radio-opaque foreign bodies	88
Atelectasis	4
Obstructive emphysema	2
Pneumonia	3
Normal	4
<b>Total</b>	<b>100</b>

Among ninety patients with foreign body in oesophagus, 88 underwent successful removal of the foreign body following oesophagoscopy (98.8%). Death occurred in one of our cases following oesophagoscopy, which was attributed to delay in presentation, poor general condition and peculiarity of lodgement of certain foreign bodies (metallic locket with sharp ends), which enhanced the degree of mortality. In other case, foreign body (coin) was pushed into the stomach which eventually came out with no complications (Table 7).

**Table 7: Operative procedures performed and their outcome.**

Procedure	No. of cases	Foreign body removed	Complications
Oesophagoscopy	90	88	02
Bronchoscopy	10	08	01
<b>Total</b>	<b>100</b>	<b>96</b>	<b>03</b>

In the trachea-bronchial tree, ten emergency bronchoscopies were done with successful removal of foreign bodies in 80% cases. There was one case in which no foreign body was present. The other case had a pen cap in right main bronchus. The patient had post-operative bronchospasm which was managed by oxygenation, and nebulisation with steroids (Table 7).

**DISCUSSION**

Foreign bodies in upper aero-digestive tract are relatively common particularly in children, but their presence in adults can by no means be ignored. The tendency of the



small children is to put whatever comes to their grasp into their mouth. Most of these foreign bodies are due to carelessness of the children, their parents and people staying with them. This includes improper preparation of food, putting inedible objects in the mouth, hasty eating and drinking habits, beetle nut chewing, permitting children to play while eating, talking while food is in the mouth, giving food like ground nuts to children who are yet to get molar teeth to chew them, improper supervision of small children playing, leaving small objects in reach of babies and allowing them to play with buttons, small toys, coins, beads, etc.

Foreign body removal from throat is difficult and is associated with large number of complications in an inexperienced hand. Most common of them are, injury to surrounding structures, perforations, injury to vocal cords and mediastinitis.

Our review confirmed the earlier findings of Banerjee et al.<sup>4</sup> and Rothman et al.<sup>5</sup> that the highest incidences of foreign body aspiration and ingestion were in children below three years. Since these children lack molar teeth, edibles placed in the mouth are usually broken up but not chewed which they easily ingest aspirate, especially if the child is running, playing, or talking. The natural propensity of attempting to gain knowledge by putting things into mouth and the tendency of parents to thump or spank the children for acts of naughtiness at feeding time were also contributory factors. This age group may also be involved due to immature co-ordination in the swallowing mechanism. In the study of Steven C,<sup>6</sup> the average age of patients with foreign body aero-digestive tract was 3 years.

In the study of Murty PSN,<sup>7</sup> the common site of impaction of foreign body in the airway is the right bronchus, whereas cricopharynx was the commonest site in food passage. It was observed in our study that majority of foreign bodies in trachea-bronchial tree were found in the right bronchus (50%) as in the series of Zerrella et al.<sup>8</sup> The fact that the right bronchus was wider, shorter and more vertical than the left bronchus was contributory to aspiration being more common on the right side. The incidence of foreign body in both bronchi was 2%, so this showed the importance of undertaking a check bronchoscopy.

In the study of Steven C,<sup>6</sup> 47 Coins, 23 sharp objects, 4 Button batteries and 65 blunt and non-corrosives were found.

Khan MA<sup>9</sup> also found that coin was the most common foreign body in aerodigestive tract. In the Arab world, watermelon seeds were the commonest aspirated foreign body. This difference is due to the eating habits of people in different countries.

Murty PSN<sup>7</sup> did 14 bronchoscopies. 1 bronchoscopy could not reveal any foreign bodies. Foreign body related

complication such as pulmonary oedema and lung collapse were seen in 2 patients. No complications accountable to endoscopy were encountered.

Nwaorgu OG<sup>10</sup> performed 22 cases of oesophagoscopies for dentures removal, 17 cases were successfully removed and failed in 3 cases. Complications were seen in 5 patients (pulmonary oedema and oesophageal perforation).

In our study, the incidence of bronchoscopic complications was 20% compared to 5% in a study by Black et al.<sup>11</sup> Persistent pneumonia, the most common complication did not occur in our study, concurring with the work done by Oguzkaya et al.<sup>12</sup> One patient developed bronchospasm in the post-operative period, who responded to bronchodilator and steroids treatment.

## CONCLUSION

Patients with oesophageal foreign bodies are asymptomatic or had transient symptoms at the time of the ingestion, such as a sensation of something stuck in the chest, refusal of feeds or dysphagia, drooling, The initial evaluation of a patient with suspected foreign body ingestion should include plane radiographs (antero-posterior and lateral) of the neck, chest, and abdomen. Other imaging modalities or direct advancement to upper endoscopy may be helpful in identifying radiolucent foreign bodies. Urgent and sometimes emergent intervention to remove a foreign body is indicated when the object is sharp and long, or if there are signs of oesophageal obstruction.

Tracheo-bronchial foreign body aspiration is a serious and potentially fatal condition, especially when occurring in a small child. Foreign body aspiration should be strongly suspected in children presenting with a history of choking episode or with persistent or recurrent pulmonary infections. Even in the absence of clinical or radiological evidence, bronchoscopic evaluation in these patients may prove valuable.

Emergency bronchoscopy is warranted in case the patient is in acute respiratory distress, otherwise an elective procedure with adequate preparation along with an efficient anaesthesiologist should be considered.

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