Research Article

# Aerodigestive tract foreign bodies: an experience at a teritiary-care hospital

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**Abstract**

**Background:** Foreign bodies (FBs) in aerodigestive tract are a common concern for all ENT surgeons and chest physicians. While FBs in air passage are commonly seen in younger children, FB in food passage is encountered in children and adults alike. Foreign body is ingested accidentally but occasionally homicidal or suicidal. This study is about the experience of aerodigestive FBs at a tertiary-care hospital.

**Objective:** To reveal our experience of aerodigestive FBs in terms of (i) age/sex distribution of aerodigestive FBs; (ii) site of impaction/nature of aerodigestive foreign bodies; and (iii) different procedures done for aerodigestive foreign bodies.

**Materials and Methods:** This is a retrospective study done in the Department of ENT and Head and Neck surgery and Department of Chest Medicine In this study, ENT operation theatre registers and registers of bronchoscopy laboratory of chest medicine were analyzed for all the data about removal of aerodigestive FBs from April 2007 to March 2014.

**Result:** This study includes a total of 1125 foreign bodies, of which 878 were in digestive tract and 247 in respiratory tract. Bone chip was the commonest foreign body ingested, whereas whistle and seed were the commonest FBs inhaled.

**Conclusion:** FBs in an airway is an acute emergency. The general physician should know when to suspect an aerodigestive FB and should refer such cases as soon as possible to tertiary centers for removal. Rigid bronchoscopy, especially, and flexible bronchoscopy in few selected cases are the treatments of choice for tracheobronchial FBs. Cricopharynx is the most common site of FB lodgment in the digestive tract. Right main bronchus is the commonest site of lodgment of inhaled FB. Seed of dry fruits is the commonest FB inhaled.

**KEY WORDS:** Foreign body, bone chip, whistle

## Introduction

Foreign bodies (FBs) in aerodigestive tract are a common concern for all ENT surgeons and chest physicians. The FBs in the aerodigestive tract are the important causes of morbidity and mortality and pose diagnostic and therapeutic challenges. While FBs in air passage are commonly seen in younger children, FBs in food passage are encountered in children and adults alike.

FB is ingested accidentally but occasionally homicidal or suicidal. Most common FBs in children are coins, but marbles, button, batteries, safety pins, and bottle tops are also reported.[1–3] In adults, common FBs are bones, dentures, and metallic wires. The FBs that have gone beyond the esophagus will pass uneventfully through the intestinal tract in 70%–80% cases. The FBs in tracheobronchial area pose additional diagnostic problem, which is all the more so in radiolucent FBs.

General practitioners should know when to suspect and refer a case of aerodigestive FB. The best method of removal

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of an esophageal and tracheobronchial FB is endoscopic-guided extraction.[4–6] Both rigid and flexible bronchoscopes can attain more than 90%–95% success rate,[7] but there is no consensus as to which is better. In our hospital, aerodigestive FBs are removed using hypopharyngoscope, easophagoscope, or rigid or flexible bronchoscope combined with optical forceps depending upon the site of FB.

## Materials and Methods

This retrospective study was conducted in the Department of Otorhinolaryngology and Department of Chest disease, Government Medical College, Srinagar, Jammu and Kashmir, India. Departmental operation theatre and bronchoscopic laboratory registers were analyzed for all the data about the removal of aerodigestive FBs from April 2007 to March 2014. In our ENT and Chest Medicine departments, a strict record of all the procedures, both minor and major done either in local or general anesthesia, is being kept. The data were compiled as per the various parameters such as age, sex, site, nature of FB, and mode of removal.

## Result

This study included a total of 1,125 patients with FBs, of which 878 FBs were in the digestive tract [Table1] and 247 in the respiratory tract [Table 2].

Cricopharynx was the most common site of FB lodgment in digestive tract [Table 3].

The most common intervention for the removal of digestive FBs was hypopharyngoscopy [Table 4].

Bone chip was the commonest FB ingested [Table 5]. Inhaled FBs were more commonly seen in male subjects [Table 6].

Right main bronchus was the commonest site of lodgment of inhaled foreign [Table 6], whereas seed and plastic whistle were the commonest FBs inhaled [Table 7].

Bronchoscopy alone is the treatment of choice for tracheobronchial FBs [Table 8].

**Table 1:** Age and sex distribution of digestive tract foreign bodies

| Age in years | Sex | | Total | Percentage |
|---|---|---|---|---|
| | Male | Female | | |
| 0–10 | 230 | 165 | 395 | 44.98 |
| 11–20 | 54 | 60 | 114 | 12.98 |
| 21–30 | 56 | 48 | 104 | 11.84 |
| 31–40 | 44 | 42 | 86 | 9.79 |
| 41–50 | 46 | 35 | 81 | 9.22 |
| 51–60 | 30 | 24 | 54 | 6.15 |
| 61–70 | 26 | 7 | 33 | 3.75 |
| 71–80 | 8 | – | 8 | 0.91 |
| >80 | 3 | – | 3 | 0.34 |
| Total | | | 878 | 100 |

**Table 2:** Age and sex distribution of respiratory tract foreign bodies

| Age in years | Sex | | Total | Percentage |
|---|---|---|---|---|
| | Male | Female | | |
| 0–5 | 108 | 80 | 188 | 76.11 |
| 6–10 | 13 | 12 | 25 | 10.12 |
| 11–15 | 10 | 12 | 22 | 8.90 |
| 16–20 | 04 | 02 | 06 | 2.42 |
| >20 | 02 | 04 | 06 | 2.42 |
| Total | 137 | 110 | 247 | 100 |

**Table 3:** Site of foreign bodies in digestive tract

| Site | Number of patients | Percentage |
|---|---|---|
| Base of tongue | 7 | 0.79 |
| Tonsillar pilar/fossae | 9 | 1.02 |
| Pyriform fossae | 3 | 0.34 |
| Posterior pharyngeal wall | 1 | 0.11 |
| Cricopharynx | 693 | 78.92 |
| Esophagus | 165 | 18.79 |
| Total | 878 | 100 |

**Table 4:** Interventions done for removing digestive tract foreign bodies

| Intervention | Number of patients | Percentage |
|---|---|---|
| Oropharyngoscopic examination | 20 | 2.27 |
| Hypopharyngoscopy | 693 | 78.92 |
| Esophagoscopy | 165 | 18.79 |
| Total | 878 | 100 |

**Table 5:** Nature of foreign bodies in digestive tract

| Nature of foreign body | Number of patients | Percentage |
|---|---|---|
| Bone chip | 348 | 39.63 |
| Coin | 338 | 38.49 |
| Meat bolus | 59 | 6.71 |
| Denture | 39 | 4.44 |
| Tin lid | 29 | 3.30 |
| Fish bone | 15 | 1.70 |
| Alakaline batteries | 9 | 1.02 |
| Pins | 7 | 0.79 |
| Ear rings | 7 | 0.79 |
| Nails | 5 | 0.56 |
| Ring | 3 | 0.34 |
| Pendulum | 3 | 0.34 |
| Wire | 3 | 0.34 |
| Wood | 4 | 0.45 |
| Needle | 2 | 0.22 |
| Spring | 2 | 0.22 |
| Vegetable | 2 | 0.22 |
| Walnut shell | 1 | 0.11 |
| Pen cap | 1 | 0.11 |
| Leaf | 1 | 0.11 |
| Total | 878 | 100 |

**Table 6:** Anatomical site of foreign bodies in respiratory tract

| Site | Number of patients | Percentage |
|---|---|---|
| Glottis/subglottis | 6 | 2.42 |
| Trachea | 27 | 10.93 |
| Right main bronchus | 153 | 61.94 |
| Left main bronchus | 49 | 19.83 |
| Right secondary bronchus | 9 | 3.64 |
| Left secondary bronchus | 3 | 1.21 |
| Total | 247 | 100 |

**Table 7:** Nature of foreign bodies in respiratory tract

| Organic foreign body | Number of patients | Percentage | Inorganic foreign body | Number of patients | Percentage |
|---|---|---|---|---|---|
| Bean | 35 | 18.51 | Pin | 19 | 32.57 |
| Peas | 41 | 21.69 | Whistle | 26 | 44.82 |
| Melon seed | 4 | 2.11 | Coin | 1 | 1.72 |
| Groundnut | 20 | 10.58 | Bead | 5 | 8.62 |
| Peanut | 31 | 16.40 | Nose ring | 1 | 1.72 |
| Maize | 18 | 9.52 | Rubber | 1 | 1.72 |
| Pea husk | 1 | 0.52 | Pen lid | 2 | 3.44 |
| Melon seed | 2 | 1.05 | Denture | 1 | 1.72 |
| Pumpkin seed | 2 | 1.05 | Mucus plug | 1 | 1.72 |
| Tamarind seed | 3 | 1.58 | Swing needle | 1 | 1.72 |
| Cherry seed | 5 | 2.64 | Total | 58 | 100 |
| Apricot seed | 1 | 0.52 | | | |
| Almond | 6 | 3.17 | | | |
| Almond shell | 6 | 3.17 | | | |
| Coconut | 2 | 1.05 | | | |
| Walnut shell | 4 | 2.11 | | | |
| Cashew nut | 1 | 0.52 | | | |
| Toffee wrapper | 1 | 0.52 | | | |
| Bone | 1 | 0.52 | | | |
| Nut shell | 2 | 1.05 | | | |
| Thorn | 1 | 0.52 | | | |
| Total | 189 | 100 | | | |

**Table 8:** Interventions done for removing respiratory tract foreign bodies

| Intervention | Number of patients | Percentage |
|---|---|---|
| Bronchoscopy | 231 | 93.52 |
| Bronchoscopy + tracheostomy | 14 | 5.66 |
| Thoracotomy | 2 | 0.80 |
| Total | 247 | 100 |

## Discussion

Management of aerodigestive FB patients was revolutionized by the technique and instruments developed by Chevalier Jackson in 1904. The mortality decreased from more than 20% to 2%.[8] Of our 1,125 patients with FBs in aerodigestive tract, 878 (78.04%) FBs were in the food passage, while 247 (21.95%) FBs were in the air way. In their study, Hung and Lin[9] found that 76% and 24.7% FBs in food

passage and air passage, while Brooks[10] found them to be 80% and 20%, respectively.

Among the cases of FB in the food passage, the age ranged from 1 to 82 years. The most common age group in our study was 1–10 years with 44.98% of patients. Most FBs in food passage are ingested by children younger than 5 years with the peak incidence between 6 months and 3 years, as a sequel to natural proclivity to put things in their mouth.[11–13] Digestive FBs were located at cricopharynx in 693 (78.92%) of 878 patients with digestive FBs. This is owing to poor peristalsis, sphincteric action, and narrow diameter of cricopharynx. In one large series,[8] 50.5% FBs in food passage were also seen in cricopharynx, thus supporting our observation. Similarly, in yet another study,[14] 83.5% of FBs were located at the cricopharynx. We observed bone chips [348 (39.63%)] and coins [338 (38.49%)] to be the commonest types of FB in food passage. In a study of 152 cases (104 children and 48 adults), 91 FBs (69%) were coins; Kamat et al.[8] found fish bone (39%) as the commonest FB. The reason for bone chip to be the commonest FB in our study may be owing to the fact that meat is a very common food in this part of world.

In our study, in tracheobronchial group, the youngest patient was aged 6 months, while the oldest was 23 years. The FBs were encountered in the right main bronchus in 153 (61.95%)patients , whereas, they were in the left main bronchus in 49 (19%) of them. In most published series, the FBs tend to be localized in the right bronchial tree.[15] This right-sided predominance can be explained by the vertical nature of the right main bronchus, its larger diameter, the greater air flow through it, and the localization of the carina to the left of the midline of the trachea.[15] In our study, majority of the patients showed vegetable FBs, with peas being the common [41 (21.69%) patients]. Bhalodiya et al.[16] also found vegetable FBs, mostly seed (groundnut) in 38 of 42 patients, which is in similar to our observation. In our study, tracheostomy was done in 14 (5.66%) patients; most of these tracheostomies were emergencies as patients presented with severe respiratory distress with FBs in glottis/subglottis area. Two (0.80%) patients in our study were referred for thoracotomy, as FB (scarf pin) in these patients was distally located and could not be removed with bronchoscopy.

Cases with suspected FB in tracheobronchial tree can present with normal auscultatory and/or X-ray chest findings. A definitive or suspicious history of FB inhalation should be the most important factor in deciding for bronchoscopy in these patients. Performing an X-ray chest in these patients at the time of presentation has only a limited value in diagnosis and should never influence the decision for a timely bronchoscopy. Bhalodiya et al.[16] found normal X-ray findings in 32 of 42 patients. They also observed that the time elapsed since inhalation was significantly related to normalcy of X-ray chest findings. Our study is an observational, retrospective study and, as such, has all limitations that apply to any retrospective study.

## Conclusion

The FBs ingestion and inhalation is a well-known fact. Digestive tract FBs are removed by many centers but tracheobronchial FB removal is done at few centers, and our medical college is one of them. This study highlights the importance of these FBs. Tracheobronchial FBs are seen in children, especially, while digestive ones can be seen at any age. Rigid bronchoscopy, especially, and flexible bronchoscopy in few selected cases is the treatment of choice for tracheobronchial FBs. Seeds/dry fruits/nuts/whistles/small toys are commonly seen obstructing the airway in children; so, children should be trained to chew dry fruits properly and should not be allowed to handle small plastic toys that are given these days free with many dairy products and biscuits. Hypopharyngoscopy is the most common procedure done to remove digestive FBs as cricopharynx is the most common site of lodgment of such FBs.

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