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Original Research Article

Endoscopic removal of foreign bodies from the upper aerodigestive tract: a retrospective study from a tertiary care hospital

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ABSTRACT

Background: Foreign bodies (FB) in the upper aero-digestive tract pose major challenges to the otorhinolaryngologist in both diagnosis and management. Aspirated and ingested foreign bodies are often emergencies, leading to inadequate study, poor preparation and improper attempts at removal. A retrospective analysis was done on cases which were managed for the upper aero-digestive tract FBs in a tertiary care hospital in South India and the result is presented in this article.
Methods: Retrospective study was done on 100 patients diagnosed as cases of foreign body in upper aerodigestive tract on the basis of detailed history, clinical examination and radiological investigation. They underwent per oral endoscopy under general anaesthesia for retrieval of foreign body.
Results: Age group more prone for foreign body ingestion or aspiration was <10 years and >50 years. Most common site of impaction in oesophagus is cricopharynx and in airway is right bronchus. Most common type of FB is chicken bone. Most common symptom in FB ingestion is FB sensation and in case of FB aspiration it is cough. Most (82%) of the FBs were radio opaque.
Conclusions: Accurate history and clinical examination were the keystones in diagnosis and prevention of complications of FB lodgement in aerodigestive tract. Negative history and or normal imaging do not rule out a foreign body.

Keywords: Aerodigestivetract, Bronchoscopy, Oesophagoscopy, Foreign body

INTRODUCTION

Foreign bodies (FBs) in the upper aerodigestive tract are emergency situations and present a challenge to the Otorhinolaryngologist. Though it is more commonly seen in children, no age group is completely immune. The larynx performs an effective sphincteric action to protect the lower airways and it is unusual for to get aspirated rather than swallowed. Most of the cases of FB ingestion reported in literature were associated with acute symptoms and the object either courses through the gastrointestinal tract without incident, or requires an intervention to prevent complication. Complications caused by foreign bodies in aerodigestive tract are associated with significant morbidity and mortality.[1-3] The treatment options for management of aerodigestive tract foreign bodies were revolutionised by Chevalier Jackson's description of endoscopic removal of foreign bodies in 1936.[4,5]

Studies reported about aerodigestive tract FBs were not very common in literature due to the emergency nature of the situation and also due to lack of availability of adequate endoscopic techniques in all centres. This study

throws light on different types of FBs in the aerodigestive tract and the age groups more prone along with the symptoms and diagnostic techniques. The importance of proper history taking and clinical examination in early diagnosis of FB in aerodigestive tract is stressed, hence a delay in diagnosis and decision making time regarding management can be reduced thereby reducing complications.

METHODS

Study design

A retrospective study was conducted in the department of Otorhinolaryngology and Head and Neck surgery at Amala Institute of Medical Sciences, Kerala, India during the period of January 2016 to January 2018 among the patients who were diagnosed as cases of FB in the upper aerodigestive tract on the basis of detailed history, physical examination and radiological investigation and who underwent per oral endoscopy under general anaesthesia for retrieval of foreign bodies. The study was approved by the institutional ethics committee.

Study procedure

All patients with provisional diagnosis of FB ingestion or aspiration underwent X-ray neck and chest both antero-posterior and lateral views. A computed tomography of neck and thorax was done in selected cases. FB removal was done by forceps using rigid endoscopy and patients were observed post operatively for complications and relief of symptoms.

RESULTS

Out of the hundred patients of FB ingestion and aspiration in our study, 20 were children of age less than 10 years and 20 individuals were in age group between 51 to 60 years. The youngest child was 2 year old male with a coin at the level of cricopharynx and oldest patient was 68 year old female with an artificial denture in the cricopharynx (Table 1). Figure 1 showed chicken bone at cricopharynx and coin at mid oesophagus. Gender distribution showed slight female preponderance (52%). The most common site of impaction of oesophageal foreign bodies was cricopharynx (68%). In the airway, right bronchus was the most common site of lodgement of foreign body (6%) (Table 2). In this study, chicken bone was the most common FB and was seen in 19% of cases, followed by fish bone and denture (14% each). Other foreign bodies seen were marble, plastictoy, button, whistle, pencap, locket, ring, ballpin, groundnut, simcard, broken tracheostomy tube, scarfpin, safetypin, button battery, food bolus, coin and beef bone.(Table 3). Figure 2 X ray shows beef bone (Figure 2 IA) and fish bone at cricopharynx (Figure 2 IC). X ray showing broken tracheostomy tube at carina is given in Figure 2 II. CT thorax showing sim card and artificial denture (Figure 3).

History of ingestion of FB was present in 91 cases. Patients with foreign bodies in digestive tract usually present with FB sensation (73.62%) and dysphagia (69.23%) as confirmed by this study. Vomiting was seen in 28.57% cases while odynophagia in 36.26% (Table 4).

Table 1: Distribution of age.

Age (in years)	Frequency	Percentage (%)
≤10	20	20
11-20	8	8
21-30	6	6
31-40	16	16
41-50	19	19
51-60	20	20
≥61	11	11
Total	100	100

Table 2: Subsites for foreign body lodgement.

Subsite	Frequency	Percentage (%)
Hypopharynx	3	3
Cricopharynx	68	68
Mid oesophagus and below	20	20
Carina	2	2
Right bronchus	6	6
Left bronchus	1	1
Total	100	100

Table 3: Types of foreign bodies.

Type of foreign body	Frequency	Percentage (%)
Beef bone	8	8
Coin	8	8
Food bolus	6	6
Fish bone	14	14
Chicken bone	19	19
Denture	14	14
Button battery	3	3
Safety pin	4	4
Scarf pin	5	5
Tracheostomy tube	1	1
Sim card	1	1
Ground nut	1	1
Ball pin	3	3
Ring	2	2
Locket	3	3
Pen cap	1	1
Whistle	1	1
Plastic button	2	2
Marble	1	1
Metallic button	1	1
Plastic toy	2	2
Total	100	100

Figure 1: a) X- ray showing chicken bone at cricopharynx. b) Removed bone. c) X- ray of chest AP and lateral views showing coin at mid oesophagus.

Figure 2: (I): a) X ray showing beef bone at cricopharynx. b) Same bone removed. c) X ray showing fish bone impacted at cricopharynx. d) Same bone after removal. (II): a) X ray showing broken tracheostomy tube at carina. b) Corroded and broken tracheostomy tube after removal.

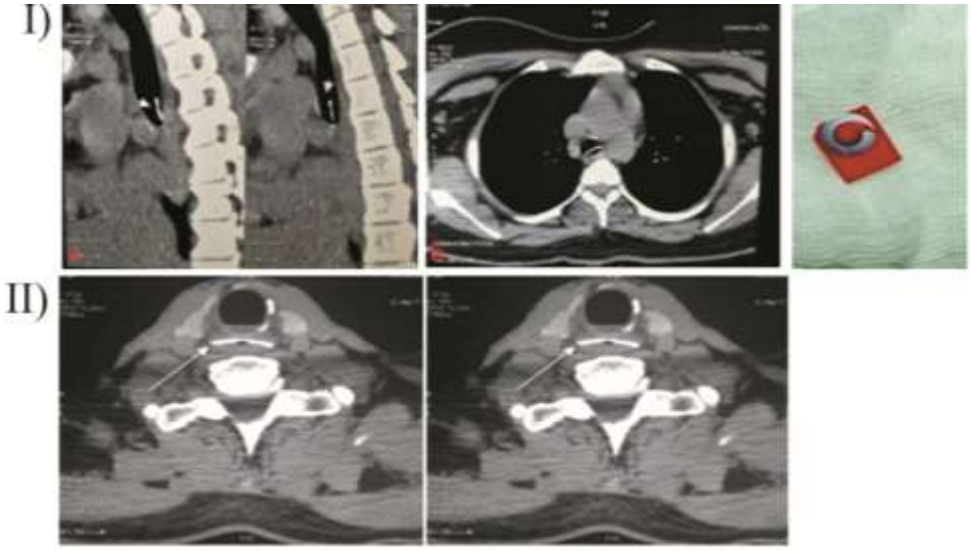

Figure 3: (I): a, b) CT scan of thorax shows sim card lodged at carina. c) Sim card after removal. (II): CT scan shows artificial denture.

Table 4: Clinical presentation of oesophageal foreign bodies.

	Frequency	Percentage (%)
History of ingestion	91	100
Dysphagia	63	69.23
Odynophgia	33	36.26
Vomiting	26	28.57
FB sensation	67	73.62

Table 5: Clinical presentations of tracheo-bronchial foreign bodies.

	Frequency	Percentage (%)
History of aspiration	9	100
Dyspnoea	6	66.66
Choking	3	33.33
Cough	8	88.88

Table 6: Radio opacity of foreign bodies.

Radio opaque	Frequency	Percentage (%)
Yes	82	82
No	18	18
Total	100	100.0

Table 7: Operative procedure performed.

Procedure	Frequency	Percentage (%)
Oesophagoscopy	91	91
Bronchoscopy	9	9
Total	100	100

History of FB aspiration was obtained in 9 cases. The commonest symptom of presentation was cough (88%) followed by dyspnoea (66%) and choking (33%) similar to the studies by Kim et al (Table 5).[9] 82% of these were radio opaque. Plastic toy, button, whistle, pencap, ground nut and some denture were radioluscent (Table 6). All of the patients with FB in aerodigestive tract underwent successful removal, with 91 patients undergoing oesophagoscopy and 9 patients undergoing bronchoscopy (Table 7).

DISCUSSION

Ingestion and aspiration of foreign bodies are avoidable incidents and cause more problems if they are lodged at the narrowest region such as the glottis or cricopharyngeal sphincter. Potential complications are attributed to their shape, size, nature and site of impaction. As we encountered in our study, FB aspiration is more common in children and oesophageal foreign bodies are common in adults with highest incidence in age group between 51-60 years. Higher incidence in children could be due to their natural propensity to gain knowledge by putting things in the mouth, inability to masticate well and inadequate control of deglutition, as well as the tendency to cry, shout, laugh or play during eating. Psychological factors like mental retardation and behavioural problems can compound the issue.[7] The symptoms of ingestion or aspiration of foreign bodies can simulate different paediatric diseases such as asthma, croup or pneumonia, thereby delaying the correct diagnosis.

The maturity of an adult larynx may be the reason for relatively lower incidence of tracheobronchial foreign bodies, but it possibly increases their chance of slipping into the oesophagus. Edentulousness and poor masticating habits could be other predisposing factors. In a study by Steven C, the average age of patients with FB in aerodigestive tract was 3 years.[8] We removed a range of foreign bodies from airway like sim card, scarfpin, corroded and broken tracheostomy tube, ground nut, pen cap and locket. Small and smooth objects tend to pass into trachea and bronchus whereas larger ones may cause acute laryngeal obstruction.[9] Foreign bodies in the airway were mostly seen in the right bronchus as in the series of Zerella et al.[10] The reason for this is the right bronchus being wider, shorter and straighter than the left and also because the interbronchial septum projects to the left.[11] Hassan et al opined that the site of final impaction is determined by the anatomical and aerodynamic considerations.[11] Some authors have suggested the use of a flexible bronchoscope for FB removal however rigid bronchoscopy is preferable in an operating room.[12,13]

The oesophagus is a passive and relatively inadaptable organ and its peristalsis is not strong enough to propel certain types of swallowed objects.[14] In this study we noticed that adults have higher incidence of impaction of bones in the oesophagus, however impacted coins were more common in children. Predisposing factors such as stricture, neuromuscular disturbance, hiatushernia, achalasiacardia, carcinoma oesophagus can often present with FB impaction as their first symptom.[15] The most common location for an esophageal FB to lodge is at the normal anatomic narrowing—most frequently at C-6 or at the level of the cricopharyngeus.[16] Potential complications include oesophageal perforation, mediastinitis, cervical or mediastinal abscess, emphysema, oesophago-tracheal fistula and septic complications.[14] However, we did not encounter any of these. An accurate history is one of the keystones in the diagnosis and prevention of complications of FB lodgement in the aerodigestive tract. Every effort must be made to avoid a delay in the diagnosis because this may lead to a notable increase in complication rates and irreparable damage.[17,18]

A positive history, detailed clinical examination and radiographic search often lead to a diagnosis, while negative history and or normal results of imaging do not rule out a foreign body.[19]

CONCLUSION

Results of the study concluded that an accurate history and clinical examination were the keystones in diagnosis and prevention of complications of FB lodgement in aerodigestive tract. A successful retrieval of foreign bodies requires excellent teamwork between the endoscopist, anaesthetist and the nursing staff because the airway of the patient is tended by all these personnel.

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