

Original Research Article

Prevalence and management of foreign bodies in aerodigestive tract in tertiary care centre

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ABSTRACT

Background: Foreign bodies in aerodigestive tract is common, frequent, and sometime life threatening emergency for otorhinolaryngologists mainly in the paediatric group. The aims of the present study was to find the incidence of foreign bodies, in relation to demographic factors, type and sites of foreign bodies its clinical presentations and its management. **Methods:** A prospective study was conducted on 100 cases coming to the ear, nose and throat (ENT) emergency and outpatient department (OPD). After thorough history, clinical examination, routine blood and urine investigations and urine done. Radiological examination was done to visualize the radio-opaque foreign body, and if the foreign body was not radio-opaque then computed tomography (CT) scan was done.

Results: Incidence of foreign was 67% in male than 33% in female. Mostly foreign bodies were in nose (49%), followed by oesophageal (31%), abdominal (14%), and bronchus (6%) respectively. 33% were totally asymptomatic, 25% with mucopurulent discharge from nose, dysphagia (16%), nasal obstruction (15%), and odyphagia (11%) respectively. Most of the foreign bodies were inorganic in nature, coin (42%), pearls (8.16%), and battery (6.45%). Among organic foreign bodies peanut was most common (33.33%), grains (10%). All foreign bodies were removed successfully with minimal morbidity and zero mortality.

Conclusions: Present study suggested incidence was very common among male children, in rural background, with common asymptomatic presentation. With high index of suspicion, and proper and timely intervention all 100 cases were managed successfully. But still educating the parents about keeping such things away from kids prevent these incident.

Keywords: Foreign bodies, Aerodigestive tract, Bronchoscopy, Cricopharynx

INTRODUCTION

Foreign bodies (FBs) in aero digestive tract are frequent occurrence and may lead to life threatening situation due to obstruction caused in respiratory passages. The aerodigestive apparatus can be defined as the common pathway that facilitates safe breathing and safe swallowing.^{1,2} It is one of the most common ear, nose and throat (ENT) emergency. Foreign body aspiration is a serious health problem in paediatric patients causing significant morbidity and mortality. A high index of

suspicion and timely intervention can reduce morbidity as well as mortality especially in the paediatric age group.³ Time lag between the aspiration and expert attention is very important with regard to overall morbidity and mortality.⁴

It is the third leading cause of death in children under the age of 1 year and the fourth leading cause among 1-6 years age group. The maximum prevalence is seen 1 to 2 year age group; however no age group is completely immune. This risk is increased if the child has neurological

impairment.⁵ The commonly encountered foreign bodies vary geographically. Coin ingestion is the commonest worldwide problem. Other common non-food items are school stationery, balloons, toys etc. Pharyngeal fish bones are well reported from countries where fish forms a part of the staple diet. Now a day rise in the incidence of disk-type battery ingestion also very common in the paediatric population, but it lead to serious consequences.^{6,7}

These patients usually present with history of swallowing a foreign body, dysphagia and/or odynophagia. Plain radiographs of neck, chest and abdomen identify radio-opaque foreign bodies, while fluoroscopy may be required to delineate non radio-opaque objects. Serious complications from aspirated foreign bodies include recurrent pneumonia, bronchiectasis, lung abscess, oesophageal perforation and atelectasis, tracheoesophageal fistula, vascular injury (e.g., aorto-esophageal fistula), retropharyngeal abscess, mediastinitis, pericarditis, or vocal cord injury, and can occur from a chronic foreign body aspiration. Bronchial stenosis is also a well-known complication of chronic foreign bodies in the airway. Tracheal lacerations are also as reported as common complication among affluent countries. However pneumonia is common among poorer socioeconomic communities.^{8,9}

Other common complications include local injury to the mucosa such as abrasion, lacerations, necrosis, and stricture formation. It is difficult to eradicate the problem, as children, by nature, are curious and exploratory. So, it is important to develop a comprehensive approach for early recognition and timely management of aspirated and ingested foreign bodies, as complications from delayed diagnosis can have significant health implications. So the purpose of the present study was to highlight the incidence, epidemiology, and presentation, type of foreign body, in relation to the anatomy of the aero digestive tract, its management and related complication of the aspirated foreign body.

METHODS

A prospective study was conducted on 100 cases coming to the ENT emergency and outpatient department (OPD) over the period of July 2018 to December 2020, of Rajindra Hospital Patiala. Institutional ethical committee approval was obtained for the conduct of study. All 100 patients were selected randomly presented with the history of ingestion of foreign bodies of either sex or any age group, and willing to participate in the study. Patients not willing to participate were excluded from the study. Thorough history and clinical evaluation was done. Patients were subjected to routine blood investigations and urine examination for albumin and sugar. Radiological examination was done to visualize the radio-opaque foreign body. If the foreign body was not radio-opaque then computed tomography (CT) scan was done to locate the foreign body in the aerodigestive tract.

Table 1: Treatment modalities were decided according to the anatomical location.

Area	Procedure
Gastro-intestinal tract	No extractive procedure
Pharynx, oropharynx and hypopharynx	Endoscopy
Nose	Eustachian catheter (anterior), foreign body hook (posterior)
Larynx	Direct/suspension laryngoscopy
Subglottic foreign body	Emergency tracheostomy
Trachea (normally foreign body passed down into the right main bronchus)	Bronchoscopy

Data analysis

Data obtained were compiled and analysed statistically using IBM statistical package for the social sciences (SPSS) statistical software version 22.

RESULTS

The present study showed that the incidence of aerodigestive foreign body was twice more in male (67%) than female (33%). Most patients with foreign body aspiration was under 10 year age with mean age 16.81 years (Figure 1). Incidence of the foreign bodies according to the socio-economic status was 41% in lower middle, 32% in lower, 21 % in upper middle, 6% in upper middle class respectively. It was observed that 49% were nasal foreign body while 31 % of the foreign bodies were oesophageal which was followed by abdominal foreign bodies that is 14% and 6% of the foreign body cases were in the bronchus (Figure 2).

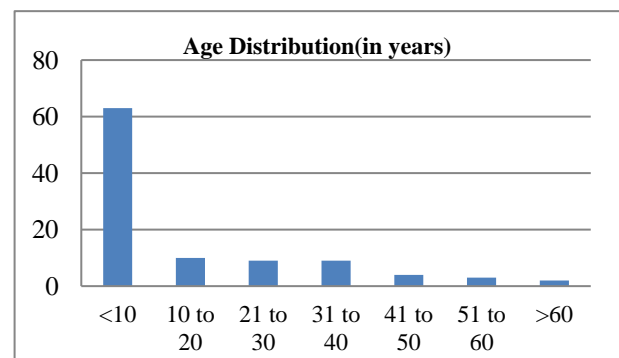


Figure 1: Age distribution of patients with foreign body aspiration in aerodigestive tract.

It was observed that 33% of the cases were totally asymptomatic while 25% patients reported with mucopurulent discharge a followed by dysphagia (16%) and nasal obstruction (15%) and odynophagia (11%). Other

minor symptoms were foreign body sensation, vomiting. With the foreign bodies in the tracheobronchial passages, the most common sign and symptom were dyspnoea, wheeze, right basal crept, reduced air entry, drooling of saliva and pain epigastrium.

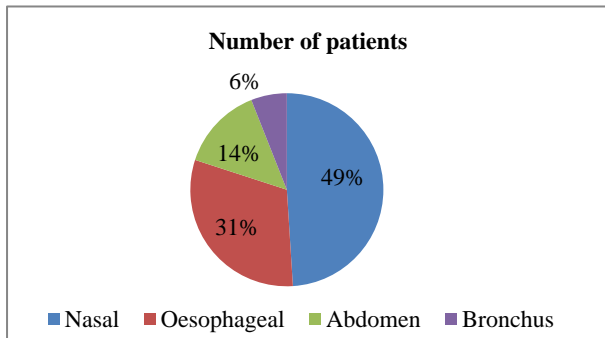


Figure 2: Distribution of patients according to site of foreign bodies.

It was observed that maximum foreign body were coin 42%. Among the patients with abdominal foreign body aspiration, coins were the FB in 100 % of the patients.

Among the patients with bronchus foreign body aspiration, pearl was foreign body in 50%, bead in 16.67% and peanut were the foreign body in 33.33% of the patients. Among the patients with nasal foreign body aspiration, 8.16% patients had pearl as a foreign body, 14.29% has bead, 10.2 % had peanut and eraser were the foreign body in 16.33 % of the patients. Among the patients with oesophageal foreign body, 90.32% were coins and in 6.45% of patients it was battery cell (Table 2).

In foreign body in digestive tract radiological evidence was found in 100% of the patients whereas in nasal FB patients X-ray nose and paranasal sinuses (PNS) showed foreign-body (FB) on right side is 59.18% while 40.82% in left side.

Out of 14 patients with abdominal foreign body, 100% of the patients were referred to surgery department. All the 6 patients with bronchus foreign body were removed under general anaesthesia (GA) by bronchoscopy. All the 49 patients with nasal foreign body were removed under local anaesthesia (LA) by embryo transfer (ET) catheter. All the 31 patients with oesophageal foreign body aspiration were removed under GA by forceps (Figure 3).

Table 2: Incidence and type of foreign body.

Type of foreign body	Total	Abdominal foreign body (%)	Bronchus foreign body (%)	Nasal foreign body (%)	Oesophageal foreign body (%)
Coin	42	14 (100)	-	-	28 (90.32)
Pearl	7	-	3 (50)	4 (8.16)	-
Bead	8	-	1 (16.67)	7 (14.29)	-
Peanut	7	-	2 (33.33)	5 (10.2)	-
Insect	1	-	-	1 (2.04)	-
Eraser	8	-	-	8 (16.33)	-
Thermacoal	2	-	-	2 (4.08)	-
Pomegranate grain	3	-	-	3 (6.12)	-
Wheat grain	2	-	-	2 (4.08)	-
Battery cell	7	-	-	7 (14.29)	2 (6.45)
Rhinolith	8	-	-	8 (16.33)	-
Crayon	2	-	-	2 (4.08)	-
Ring	1	-	-	-	1 (3.23)
Total	100	14 (100)	6 (100)	49 (100)	31 (100)

DISCUSSION

Foreign body’s aspiration in aerodigestive tract are relatively common particularly in paediatric population, but their presence in adults can by no means be ignored. Likewise management of every case is challenging. Inhaled and swallowed exogenous foreign bodies in air and food passages include almost all the substances or parts of substances with which human beings commonly come in contact.

Incidence of foreign body aspiration is frequent occurrence among children less than 10 years as it was observed in the present study (63%) with mean age of the

patients was 16.81 years. Our results were in concordance with the results obtained by Hariga et al, Hsu et al and Higo et al.¹⁰⁻¹² The high propensity for these age group would be due to many reasons like children behaviour, physiological and anatomical characteristics like start of chewing habit, swallowing coordination not developed properly. In addition to this behavioural problem play crucial role, and concomitant mental and psychiatric issues related to health add on to this. In the present study, 67% of the patients were males while the remaining were females. The male to female ratio from our series is similar with that reported by other studies (Bittencourt et al, Roda et al and Mantel et al). The reason for male predominance remains unclear, however, some attributed it to the more adventurous and impulsive nature of young boys as compared to girls.^{13,14}

Incidence of the foreign bodies according to the socio-economic status was 41% in lower middle, 32% in lower, 21% in upper middle, 6% in upper middle class respectively. So lower middle socio-economic status have direct relation with the higher incidence of foreign bodies aspiration. Incidence of the repetitive history of foreign bodies of aspiration was 11% also common in lower middle and lower class group.

In 49% and 31% of the patients, the site of foreign body was nasal and oesophageal site respectively. Abdomen and bronchus were the sites of foreign body in 14% and 6% of the patients respectively. Previous studies have also reported involvement of nasal and oesophageal sites in majority of the patients with foreign body aspiration. In a previous study conducted by Hsu et al, airway and oesophagus involvement occurred in 14.3% and 85.7% of the cases respectively.¹⁰ In another study conducted by Hariga et al, the most involved sites were the oesophagus (51.9%) followed by the tracheobronchial tree (33.9%) and the hypopharynx (13.5%). Sub-glottic FB was found in four cases (0.7%).¹² In a study conducted by Patil et al, gastrointestinal tract, bronchus, nasal, and oesophageal foreign body aspiration cases were seen in 38.78%, 36.73%, 12.24% and 2% of the patients.¹⁵

In the present study, most common type of foreign body was coins found to be present in 42% of the cases. Eraser, bead and pearl were found to be present in 8%, 8% and 7% of the cases. Battery cell, rhinolith and peanut were found to be present in 9%, 8% and 7% of the cases. Variable results were obtained in the past literature in this context. In a study conducted by Hariga et al, coins were encountered in 20.1% of the cases followed by peanuts, seeds and beans (18.5%).¹² Coins are the most commonly ingested foreign bodies in children, accounting for 80 percent of esophageal impactions, according to Wright et al. Magnets, batteries, small toys, buttons, and jewellery are all examples of foreign bodies that are widely ingested. 16 coins were found in 39.47 percent of cases in another study by Shetty et al, followed by mutton piece, seeds, artificial dentures, and safety pins.¹⁷

Nature of foreign body were organic as well as non-organic. So parent's awareness is highly needed to keep such things out of reach from their kids. For adults and old age people organic foreign bodies can be avoided by educating them on food safety.

In the present study, 85.72% of the patients with abdominal foreign body aspiration were asymptomatic. In case of bronchus, dyspnoea, wheeze, right basal crept and reduced air entry were seen in 50%, 33.33%, 16.67% and 33.33% of the patients respectively. The most common sign and symptom of foreign bodies in the bronchial passages, according to Gupta et al, were rhonchi and other attenuated sounds (31.25 percent) and dyspnea (37.5 percent).¹⁸ In another study conducted by Radhakrishnan et al, reduced air entry, respiratory distress and crepts were seen in 75%, 68.75% and 62.5% of the patients

respectively.⁵ Kim et al reported that the most common presentations of a foreign body in the airway were dyspnea and cough.⁴ In another study conducted by Shetty et al, major respiratory symptoms were more common within weeks or months after ingestion such as coughing, fever, chest pain, stridor etc.¹⁷

In the present study, among the patients with nasal foreign body aspiration, muco-purulent discharge, nasal obstruction and bleed were seen in 51.02%, 30.62% and 5.13% of the patients. 26.53% of the patients were asymptomatic. Our results were in concordance with the results obtained by Radhakrishnan et al, who also reported muco-purulent discharge and bleeding as the predominant symptoms in patients with nasal foreign body aspiration.⁵

In the present study among patients with oesophageal FB dysphagia (51.61%), odynophagia (35.48%), FB sensation (22.58%), vomiting (16.13%) and drooling of saliva (6.45%) were the most common symptoms present among patients with oesophageal foreign body aspiration. 25.81% of the patients were asymptomatic. Our results were in concordance with a study conducted by Radhakrishnan et al, drooling of saliva was seen in 17.5% of the patients.⁵ In another study conducted by Gupta et al, in patients with foreign body in digestive tract, the most common symptoms were dysphagia 45 (48.9%), odynophagia 32 (34.78%), foreign body sensation 20 (21.73%) and vomiting 14 (15.2%). About 40 (43.47%) patients were asymptomatic.¹⁸ In a previous study conducted by Shetty et al, common signs and symptoms in the digestive tract foreign body are dysphagia, drooling, vomiting.¹⁷

In the present study, removal of bronchus foreign bodies was done by rigid bronchoscopy under GA in 100% of the patients. According to Mantor et al and Freeman et al bronchoscopy remains the gold standard for diagnosis of airway foreign bodies.^{19,20} In case of nasal foreign bodies, all FB were removed under local anaesthesia i.e. lignocaine 4% by eustachian tube catheter. In the present study, all the foreign bodies were removed from oesophagus under GA by alligator forceps. Hariage et al mentioned that removal of FB in the aerodigestive tract under direct visualisation through the rigid endoscope is the safest and the most reliable method, especially with recent improvements in endoscopic illumination and anaesthesia techniques.¹² Asymptomatic patients and their parents were instructed to monitor the stools for the passage of the coin and confirmed by serial X-rays and it was still there elective endoscopic removal was considered. In present study all the 100 cases of foreign bodies at different anatomical location of aerodigestive tract was managed successfully. With only limitation of small sample size, and region based study.

CONCLUSION

Accidental foreign bodies in aerodigestive tract remain the common cause of childhood morbidity and if not managed timely than also for mortality. It is also one of the

commonest emergency for the otorhinolaryngologies. So early intervention remain the essential factor for its management. Early detection is possible only by means of thorough history taking, imaging, and whenever required endoscopic examination to reach the diagnosis. Above this is the prevention of these incidents by educating the parents about keeping away the article from reach of children and to observe the activity of child will prevent the higher incidence of a foreign body in children. As this is the only safe and most cost effective strategy to prevent the FB aspiration.

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REFERENCES

1. Andrews ML. Manual of voice treatment: Pediatrics through geriatrics (3rd ed.). Thomson Delmar Learning. 2006.
2. Coyle JL. Ventilation, respiration, pulmonary diseases, and swallowing. Perspectives on Swallowing and Swallowing Disorders (Dysphagia). 2010;19(4):91-7.
3. Jadcherla SR. Pathophysiology of Aerodigestive Pulmonary Disorders in the Neonate. Clin Perinatol. 2012;39(3):639-54.
4. Kim IG, Brummitt WM, Humphrey A. Foreign bodies in the airway: a review of 202 cases. Laryngoscope. 1973;83:347-54.
5. Radhakrishnan KR, Kumar SA, Anandan H. Clinical Study of Foreign Body in Aerodigestive Tract. Int J Sci Study. 2017;5(5):108-11.
6. Mahafza TM. Extracting coins from the upper end of the oesophagus using a Magill forceps technique. Int J Paediatr Otorhinolaryngol. 2002;62(1):37-9.
7. Jackson C, Jackson, CL. Diseases. Diseases of the Air and Food Passages of Foreign Body Origin. 1st ed. Philadelphia: Saunders. 1936;1-635.
8. Cramer N, Jabbour N, Tavarez MM. Foreign Body Aspiration. In: StatPearls. Treasure Island (FL): Stat Pearls Publishing. 2020.
9. Schaefer TJ, Trocinski D. Esophageal Foreign Body. In: StatPearls. Treasure Island (FL): Stat Pearls Publishing. 2020.
10. Hsu WC, Sheen TS, Lin CD, Tan CT, Yeh TH, Lee SY. Clinical experiences of removing foreign bodies in the airway and oesophagus with a rigid endoscope: a series of 3217 cases from 1970 to 1996. Otolaryngol Head Neck Surg. 2000;122:450-4.
11. Higo R, Matsumoto Y, Ichimura K, Kaga K. Foreign bodies in the aerodigestive tract in pediatric patients. Auris Nasus Larynx. 2003;30:397-401.
12. Hariga I, Khamassi K, Zribi S. Management of foreign bodies in the aerodigestive tract. Indian J Otolaryngol Head Neck Surg. 2014;66(1):220-4.
13. Bittencourt PF, Camargos PA, Scheinmann P, de Blic J. Foreign body aspiration: clinical, radiological findings and factors associated with its late removal. Int J Pediatr Otorhinolaryngol. 2006;70(5):879-84.
14. Roda J, Nobre S, Pires J, Estêvão MH, Félix M. Foreign bodies in the airway: a quarter of a century's experience. Revista Portuguesa de Pneumologia. 2008;14(6):787-802.
15. Patil RT, Prakash A. Foreign bodies in aero-digestive tract in children: spectrum of presentation and management. Int Surg J. 2017;4:1889-95.
16. Wright CC, Closson FT. Updates in pediatric gastrointestinal foreign bodies. Pediatr Clin N Am. 2013;60:1221-39.
17. Shetty H, Gangadhar KS. Foreign bodies in the aerodigestive tract and its management- study of 44 cases. IAIM. 2015;2(9):47-50.
18. Gupta R, Poorey VK. Incidence of foreign bodies in aerodigestive tract in vindhya region: our experience. Indian J Otolaryngol Head Neck Surg. 2014;66(2):135-41.
19. Mantor PC, Tuggle DW, Tunell WP. An appropriate negative bronchoscopy rate in suspected foreign body aspiration. Am J Surg. 1989;158-622.
20. Freeman EM, Anthony B. A five-year analysis of airway foreign body management: toward a better understanding of negative bronchoscopies. Ann Otol Rhinol Laryngol. 2016;125(7):591-5.

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