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FOREIGN BODIES OF AERODIGESTIVE TRACT: A 2 YEARS RETROSPECTIVE STUDY OF 186 PATIENTS

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ABSTRACT

INTRODUCTION

Foreign body (FB) ingestion or aspiration in the aerodigestive tract is a common emergency, particularly in the pediatric population. These incidents can lead to significant morbidity and, if not managed promptly, may be life-threatening. The aerodigestive tract includes the airway and the upper digestive tract, and foreign bodies in these areas require timely diagnosis and appropriate intervention

AIMS & OBJECTIVES

The aim of this study is to address the optimal management of foreign body inhalation or ingestion and its subsequent outcomes during and after removal of foreign body. This article emphasizes the need for urgent intervention for successful procedures of foreign bodies removal from aerodigestive tract in children or in adults.

This study was conducted in Department of Otorhinolaryngology & Head Neck Surgery, King George's Medical University, Lucknow, Uttar Pradesh, India over a period of two years. Patients of all age groups with history suggestive of foreign body aspiration or ingestion with symptoms and signs along with radiological evidence and patients with high degree of suspicion of foreign body as per history were included in the study.

MATERIAL & METHODS

Medical documentation of 186 patients were analyzed, who came with the suspicion of or definitive history of aerodigestive tract foreign body, hospitalized during 2019–2021 in Department of Otorhinolaryngology & Head-Neck Surgery, King George Medical University, Lucknow, UP, India

CONCLUSION

Authors would like to stress on the importance of good anamnesis concerning the kind of foreign body. Anamnesis with clinical and radiological examinations are helpful to diagnose esophageal foreign bodies and suspect tracheobronchial foreign bodies in children but sometimes they give false positive or negative results

KEYWORDS

Foreign body; aerodigestive tract; bronchoscopy; esophagoscopy

INTRODUCTION

The incidence of foreign body aspiration and ingestion in children has not changed significantly over years and is unlikely to be so;

as long as young children use their mouths to explore their surrounding environment1. Foreign bodies in airways continue to be a diagnostic and therapeutic challenge2.The spectrum of presentation of foreign body aspiration varies from minimal symptoms to respiratory compromise, failure, and even death. The symptoms and signs produced depend upon the nature, size, location and time since lodgment of trachea-bronchial foreign body1.The foreign body aspiration can happen in any age group but the majority of cases lie between age group of 1 year to 3 years3. Esophageal foreign bodies generally pass spontaneously through upper gastrointestinal tract. Esophageal foreign body needs to be removed at the earliest to avoid dangerous complications such as obstruction, perforation, bleeding, ulcerations, or fistulas of the upper gastro-intestinal tract2,3. Destruction of a thin and fragile esophageal wall by an ingested sharp foreign body or iatrogenic maneuver may increase a complication rate from 1% to 35% or may lead to mediastinitis, which is highly lethal. In children, in 40 % of cases of foreign body aspiration present with no symptoms3. There are different methods of removing EFBs. Rigid esophagoscopy is one of them, but in children it requires a general anesthesia. If a sharp foreign body is suspected, it might be dangerous to pull such an object behind the endoscope because of the risk of perforation. In such cases, classical, rigid endoscopes are used and a sharp object is hidden inside the tube and brought out. There are advanced endoscopic technologies for first aid and treatment but Tracheo-bronchial foreign body aspiration accounts for high incidence, morbidity and mortality in children4.

MATERIAL AND METHODS

Medical documentation of 186 patients were analyzed, who came with the suspicion of or definitive history of aerodigestive tract foreign body, hospitalized during 2019–2021 in Department of Otorhinolaryngology & Head-Neck Surgery, King George Medical University, Lucknow, UP, India. Medical history, clinical symptoms, and the radiological examinations constituted a base for qualification of the patient for the endoscopic procedure and was done as a rule. In all patients, a plain chest and neck X-ray was performed in anteroposterior and lateral view. Sometimes an abdominal X-ray was performed to locate a foreign body which already had descended into further parts of gastrointestinal tract [Fig. 1-3].

Fig.1: Radio-opaque FB in a X ray

All endoscopic procedures were usually conducted immediately from admission of patient within 4 hours from admitting into hospital (depending on the last meal). All procedures were preferably conducted during morning hours due to easy availability of the anesthesia team, post-operative ventilatory support and cardiothoracic vascular surgeons. Patients were either given general anesthesia or sedation. After removing the foreign body, a second endoscopy was always done to look for any residual fragment of foreign body or condition of the tissue where it was lodged.

RESULTS

Patients were divided on the basis of age four groups: infants (under 1 year old), Toddlers (1 to 3 years), Children (3 to 11 years) and adolescents (above 11 years old). Analysis of the age-related incidence of aerodigestive tract foreign bodies shows that as the age increases from 1 year to 3 years, the incidence of aerodigestive tract foreign body increases. Most common age group affected was 3 to 10 years, after which the incidence of foreign body aerodigestive tract decreases [Chart 1].

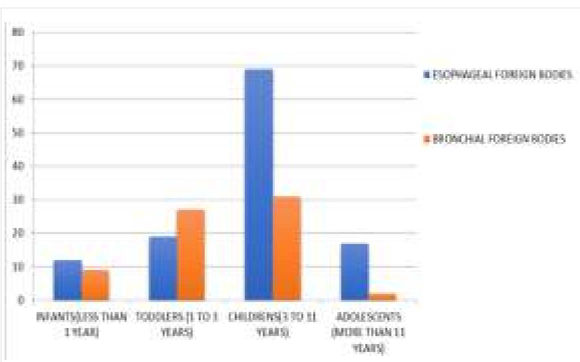

Chart 1. : Chart showing distribution of incidence of esophageal and bronchial foreign body according to the age

In aerodigestive tract foreign body, most common symptom was being asymptomatic, followed by dysphagia, stridor, dyspnea, and pain [Table no 1].

Table 1: Symptomatology

Symptoms	% of Total
Asymptomatic	35
Pain	7
Dysphagia	22
Dyspnea	16
Stridor	20
Procedure	% of Total

Rigid esophagoscopy was the most common procedure, followed by bronchoscopy, while cervical esophagotomy and tracheostomy were less frequently performed [Table no. 2].

Table 2: Surgical procedures

Procedure	% of Total
Bronchoscopy	36.5
Rigid Esophagoscopy	60.2
Cervical Esophagotomy	2.6
Tracheostomy	0.53

Esophagoscopy was performed in 117 patients with highest incidence of coin in 75 patients which were of age group 2-5 years. Amongst adults, foreign denture was seen to be most common those were 12 in number. During esophagoscopy, the cricoesophageal junction was the most common site of impaction, followed by the mid esophagus and the lower esophageal sphincter [Table no. 3].

Table 3: Site of Impaction in Esophagus

Site of Impaction	% of Total
Cricopharyngeal junction	70
Mid esophagus	20
Lower esophagus sphincter	10

Bronchoscopy suggestive of the right main bronchus was the most common site of impaction, followed by the left main bronchus, trachea/carina, and subglottis [Table no. 4].

Table 4: Site of impaction in airway

Site of Impaction	% of Total
Right main bronchus	70
Left main Bronchus	15
Trachea/Carina	10
Sub glottis	5

Some unsual foreign bodies were encountered like pin, safety pin, custard apple seed, sapodilla seed, spring, blade, LED bulb, tracheostomy tube in tracheo-bronchial airway and marble, blade, safety pin, head of toothbrush in esophagus [Fig-4].

Fig. 4: Different types of foreign recovered

It has been observed that when interventions for management of tracheobronchial foreign body are done on emergent basis, most of the patients could be managed successfully by rigid endoscopic procedures only. In this series, only in 1 patient, out of 69 suspected foreign body bronchus patients, a tracheostoma had to be made for foreign body removal. Patient had to be shifted to critical care unit for further management. In the present study, there were no casualties during intra operative or post-operative period.

DISCUSSION

In the present study, patients were divided in four age groups: infants (under 1 year old), Toddlers (1 to 3 years), Children (3 to 11 years) and adolescents (above 11 years old). There was the slight increase in incidence of foreign body ingestion or inhalation in 3 to 11 years of age i.e. children group; this is found to be in contrast to other studies, where children less than 2 years of life have more chances of having foreign body lodgement5,6,7.

Asymptomatic aerodigestive tract foreign body impaction occurred in around thirty five percent (35%) of patients.

During rigid esophagoscopy, most common site of foreign body impaction was at the first narrowing of the esophagus in 70% patients, which is similar to study quoted8.In the present study, there was higher incidence of foreign body aspiration in right bronchus as compared to left main bronchus (70% & 15%). In 5 cases, there was a subglottic lodgement of foreign body and in 5 cases foreign body was found in trachea. In a similar study the incidence of foreign body bronchus is more in right bronchus as compared to left bronchus6,7, however quoted study show there is no difference between foreign body aspiration in the right and left bronchus7.

Foreign body aspiration is an critical emergency requires urgent intervention and should be removed by rigid bronchoscopy for removal and to prevent complications. Esophageal foreign-body ingestion frequently occurs in children. Most patients manifest with dysphagia, vomiting. Timely treatment is necessary for this condition; untimely treatment could result in serious consequences and the properties and size of the foreign body also affect prognosis.

In this study Patients usually presented with a combination of signs and symptoms. The most common presentation is asymptomatic with a history of foreign body aspiration, followed by dyspnea, stridor. Dhupar Puja et al6 reported maximum patient came with nonspecific symptoms like sudden onset of cough and rapid breathing.

If children presenting with acute onset of respiratory symptoms there is huge suspicion of foreign body aspiration. Bronchoscopy should be mandatory in all cases with suspicion of foreign body aspiration despite negative history of aspiration. X-ray chest plays a important role in diagnosing the condition. Condition can be prevented by educating parents regarding food stuffs and playing objects.

In a similar study, total of 15 patients five years to nine years of age were recruited. Foreign bodies were successfully removed and no complications were seen intraoperatively. Esophageal foreign bodies were removed successfully by tracheal intubation forceps in children because of the distinct shape of the forceps. The method is simple, feasible, and safe8

A study shows the main treatment of foreign body aspiration is primordial prevention by raising community awareness, by running education programs by hospitals, health care workers, family doctors. In pediatric patients planned for bronchoscopy for diagnosis of foreign body aspiration, controlled ventilation with the appropriate general anesthesia should be favored. To reduce the risk of aspiration of foreign body, keep the children under the age of 3 years away from nuts and other small food items. Community and family awareness can be increased by proper monitoring and guidance about the food stuffs and playing objects under supervision of care-giver9.

In pediatric age group, ingestion or aspiration of FBs is very common. FBs aspiration and ingestion are the common indication for admissions in hospitals. Coins were the commonest aspirated FBs.10

In cases of foreign body aspiration, proper preoperative preparation and closed association of anesthesiologists, endoscopists and assistants will give good results. For adequate depth of anesthesia for rigid bronchoscopy, use of controlled ventilation with muscle relaxants and inhalational anesthesia should be preferred. Even though use of venturi for ventilation of patient is the safest and comfortable but ventilation with side port of ventilating bronchoscope can provide safe and adequate anesthesia for rigid bronchoscopy.11

A study shows that the involvement of digestive tract is more as compared to the airway. The esophageal FB constituted 50% of the total and the commonest site is just below the cricopharynx. The involvement of secondary bronchioles (1.85%) was almost exclusively due to vegetative FB and the extraction was extremely difficult. The postoperative phase following esophagoscopy and laryngoscopy was uneventful. If lacerated mucosa is found in esophagoscopy, Ryle's tube feeding for the first 48 hours is advised.12

A similar study shows that foreign body in aerodigestive tract related several factors like age, gender, socioeconomic status, culture background and cognitive development. Foreign body in aerodigestive tract is related to patient IQ (intelligence quotient). Children with developmental delays or cognitive impairments have high increased risk of foreign body ingestion and aspiration13.

CONCLUSIONS

Authors would like to stress on the importance of good anamnesis concerning the kind of foreign body. Anamnesis with clinical and radiological examinations are helpful to diagnose esophageal foreign bodies and suspect tracheobronchial foreign bodies in children but sometimes they give false positive or negative results. This is the reason, rigid esophagoscopy and bronchoscopy under general anesthesia for eventual diagnosis and treatment for foreign bodies of aerodigestive tract are recommended. Despite various alternative methods of foreign body removal, a rigid endoscopy remains a "golden standard" as a safe and efficient method of removing objects from the aerodigestive tract of patients.

DECLARATION

Ethics approval: Study was approved by Institutional Ethics committee.

Availability of data and material: The data sets during and/or analysed during the current study are available from the corresponding author upon reasonable request.

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Authors' contributions:

GG and VKP have assisted in the surgery and written the first draft of manuscript.
HP is the lead surgeon and prepared the final draft of the manuscript.
The author(s) read and approved the final manuscript.

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