

Aero - Digestive Foreign Bodies in Tertiary Care Hospital of Madhya Pradesh: A Retrospective Study

**Jyotsna Kubre¹, Vandana Pandey¹, Saladi Venkata Akshay²,
Shubhi Kapuskar^{2*}**

¹Assistant Professor, Department of Anaesthesia, Gandhi Medical College Bhopal, Madhya Pradesh, India

²Resident, Department of Anaesthesia, Gandhi Medical College Bhopal, Madhya Pradesh, India

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Corresponding author: Shubhi Kapuskar

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Abstract

Background: There is plenty of data available regarding ingestion and aspiration of foreign body in young children. Children between the age of 1-4 years, are at maximum risk for foreign-body aspiration or ingestion due to their inquisitive nature and tendency to explore objects with their mouths.

Aim and Objective: To audit data regarding most common type and site of foreign body, common age group of presentation, intervention done, mode of anaesthesia provided and perioperative complications.

Materials and Methods: A retrospective study was conducted by analysing data of patients who underwent bronchoscopy and oesophagoscopy for aerodigestive foreign body from January 2021 to January 2022 at Department of Anaesthesiology, Gandhi Medical College and Hamidia Hospital, Bhopal. Patients were audited for age, gender, types of foreign body, site (location), intervention for removal of foreign body (FB), mode of anaesthesia and perioperative complications.

Result: The youngest patient in our study was 8 months old while the oldest was 60 years old. The male: female ratio of 3:2. The most common site of impaction was cricopharynx in food passage (66%) and right bronchus in FB airway (65%). The most common foreign body digestive tract was coin (60%) and FB airway was organic type i.e peanut (50%). Most of the cricopharynx foreign body were removed by oesophagoscopy and direct laryngoscopy under general anaesthesia and controlled ventilation whereas bronchus foreign body were removed by bronchoscopy under general anaesthesia intermittent positive pressure ventilation. Major Complications such as desaturation (<90%), bradycardia, bronchospasm, wheeze, stridor were noted in patients with foreign body aspiration in which bronchoscopy were performed. No such complications noted during oesophagoscopy, laryngoscopy.

Conclusion: The majority of FB aspirations occurred in children aged three years or less with more common incidence in males. Peanut was the most common aspirated organic foreign body with a majority being localized in the right bronchus & coins were the most common foreign body in cricopharynx. In majority of the patients, the aspirated foreign bodies were retrieved successfully by rigid bronchoscopy under general anaesthesia with intermittent positive pressure ventilation & ingested foreign body were retrieved by oesophagoscopy under general anaesthesia.

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Introduction

Aero-digestive foreign bodies constitute an emergency problem which needs immediate intervention as it can occlude the proximal airway, can lead to severe morbidity and mortality [1]. Foreign body ingestion and inhalation are more common in children, especially in childhood, with a peak incidence between 1 and 3 years of age, due to lack of molar teeth, lack of supervision, tendency for oral exploration, tendency to play and eat at the same time and poor co-ordination during swallowing. It is rare in adults. In adults, foreign body ingestion or aspiration is usually associated with psychiatric illness of the patient. Accidental ingestion of foreign body is primary cause of foreign body aspiration in children, whereas alcohol intoxication, sedative or hypnotic drug use, primary neurologic disorders, seizures as well as accidental ingestion are primary predisposing factors in adults.

Foreign bodies in the aerodigestive tract present with a wide spectrum of clinical presentation. A large foreign body occluding the upper airway or oesophagus may lead to symptoms such as painful swallowing, dysphagia if untreated may even lead to sudden death whereas a small foreign body lodged in the aerodigestive tract may present with less severe symptoms [4,5]. Early diagnosis and prompt management of aerodigestive foreign body are imperative to prevent long term complication. Tracheobronchial foreign body aspiration is common among children aged 5 years or less. The sequelae of foreign body aspiration can range from cough and dyspnea to an acute life-threatening event such as pneumonia. The severity of an ingested foreign body is determined by the nature of the object (e.g., blunt, long, sharp, battery, magnetic) and its location in the gastrointestinal (GI)

tract or cricopharynx. Generally, most ingested foreign material is well tolerated, and may pass spontaneously without complications. The nature of the foreign body (size, shape, and composition) and the ability of the tissue to distend influence the site of lodgment within the respiratory or GI tract.

We decided to study about children and adult presented with aero-digestive foreign body to our institute from January 2021 to January 2022. The aim of this study was to analyse the most common age group, type of foreign body, site, procedure for removal of FBs & mode of anaesthesia and perioperative complication.

Material and Methods

In this retrospective study, we analysed the medical records of patients who underwent bronchoscopy, oesophagoscopy, direct laryngoscopy for suspected aerodigestive FB from January 2021 to January 2022 at Department of Anaesthesiology, Gandhi Medical College and Hamidia Hospital Bhopal. Informed consent was waived off by Institutional Ethics Committee as this was a retrospective audit. The study included all the aerodigestive foreign body patients. The medical record of the patients were analysed to record patients characteristics including name, age, sex, type of foreign body, site of foreign body, procedure performed for extracting aerodigestive foreign body (bronchoscopy, oesophagoscopy or direct laryngoscopy), mode of anaesthesia for procedures, and post operative outcome.

Data pertaining to the anaesthetic management during bronchoscopy, oesophagoscopy or direct laryngoscopy was also analysed.

Peri-operative adverse events such as

arterial desaturation, bronchospasm, laryngospasm, and laryngeal oedema were noted. Other complications including episodes of bradycardia, cardiac arrest, pneumothorax, stridor, wheez were recorded.

Statistical Analysis: The data was analysed using complementary-descriptive statistical method. The categorical variables were expressed as percentage (%) values.

Result

Sex Incidence

Out of 70 patients incidence of foreign

body in male patients was more (59.6%) as compared to female (39.76%) which corresponds to M: F is 3:2.

Age Incidence

67% patients with foreign body belonged to less than 5 years of age. Among these, most were within 1–3 years of age. We have found one patient below 1 year of age (8 months) who aspirated his mother’s earrings. 11% patients belonged to more than 10 years of age. So, airway foreign body is predominantly a problem of younger children. Age incidence is described in figure 1.

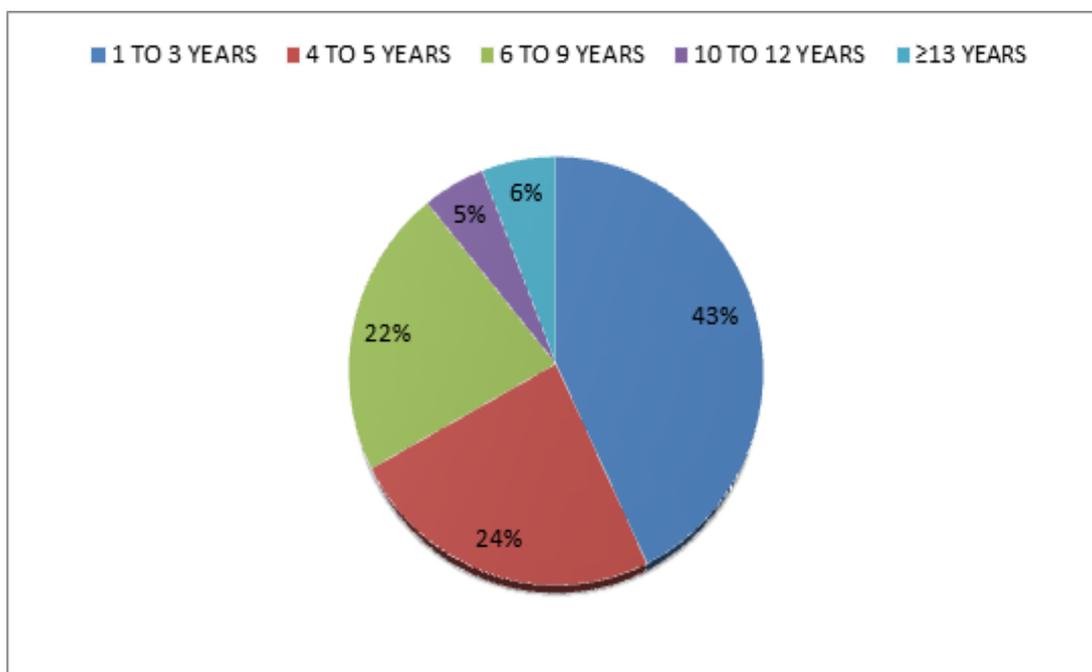


Figure 1: Distribution of patients according to age of the patients

Different Foreign Bodies

Different types of foreign bodies retrieved by bronchoscopy, oesophagoscopy or by direct laryngoscopy are tabulated below (Table 1 & 2). Foreign body of airway includes food material such as peanut & seeds are the most common as it was seen in 16 cases in which peanut accounts for 50%. Other common food items were grains (10%), peas (5%), cashews (5%), chicken bone (5%), different coated seeds

(10%) and other types of foreign bodies were pearls (10%), earrings (5%).

Coins are very common foreign bodies found in digestive tract or cricopharynx in children. It was seen in 60% of cases. Other foreign bodies were battery (10%), button (6%), Pearls (6%), safety pins (4%), dentures (4%), jewellery (4%) and miscellaneous (3%). Different types of foreign bodies shown in figure 2 & radiological images shown in figure 3, 4, 5.

Table 1: Common types of foreign body (airway)

Organic foreign body	Number of cases (20)	Percentage
• Peanut	10	50%
• Grains	2	10%
• Pea	1	5%
• Cashew	1	5%
• Chicken bone	1	5%
• Rajma seeds	1	5%
• Seetaphal seed	1	5%
Inorganic foreign body		
• Pearls	2	10%
• Earinnngs	1	5%

Table 2: Common types of foreign body (digestive tract)

Types of foreign body	Number of cases (50)	Percentage
Coin	30	60%
Battery	5	10%
Button	3	6%
Pearl	3	6%
Jewellery	2	4%
Safety pin	2	4%
Dentures	2	4%
Miscellaneous	3	6%

Site of Lodgments

Right bronchus (65%) was found to be the most common site for foreign body aspiration as compared to left bronchus

(35%) due to its anatomical alignment with the trachea (table 3). whereas the cricopharynx, oesophagus was found to be common site for ingested foreign body which did not pass to pharynx (table 4).

Table 3: Common sites for foreign body (airway)

Site for aspiration	Number of cases (20)	Percentage
Bronchus		
• Right bronchus	13	65%
• Left bronchus	7	35%

Table 4: Common sites for foreign body (digestive)

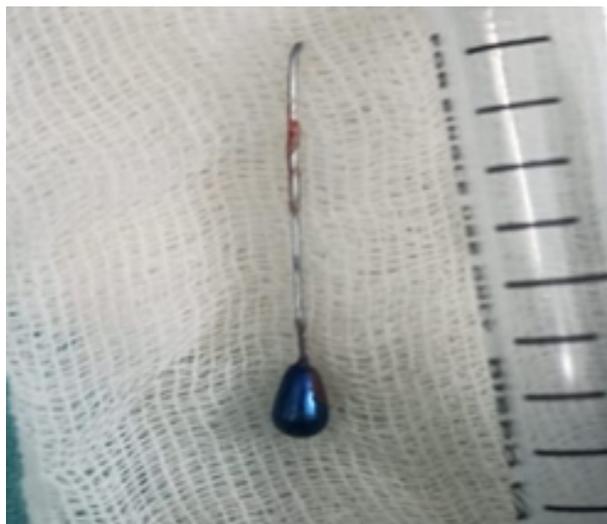
Site for ingestion	Number of cases(50)	Percentage
Cricopharynx	30	66%
Oesophagus	17	34%



(A) (B)



(C) (D)



(E)

Figure 2: Showing different types of foreign bodies (A) fb coin/metal, (B) fb screw, (C)fb earring, (D) fb chicken bone,(E) fb pin

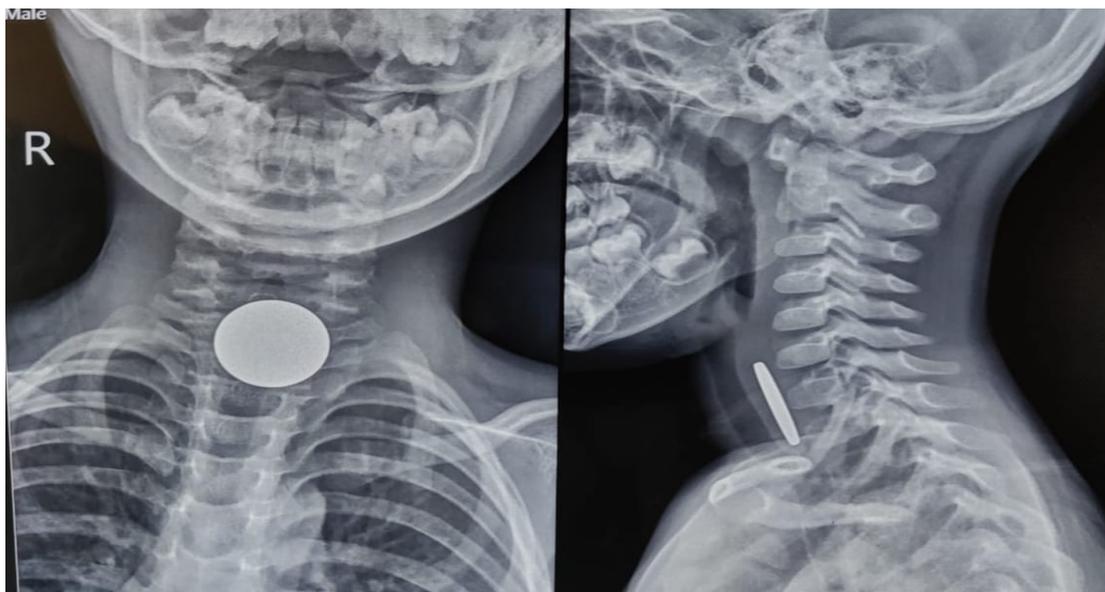


Figure 3: AP & Lateral radiograph of the neck revealing a swallowed coin at the level of the cricopharynx.

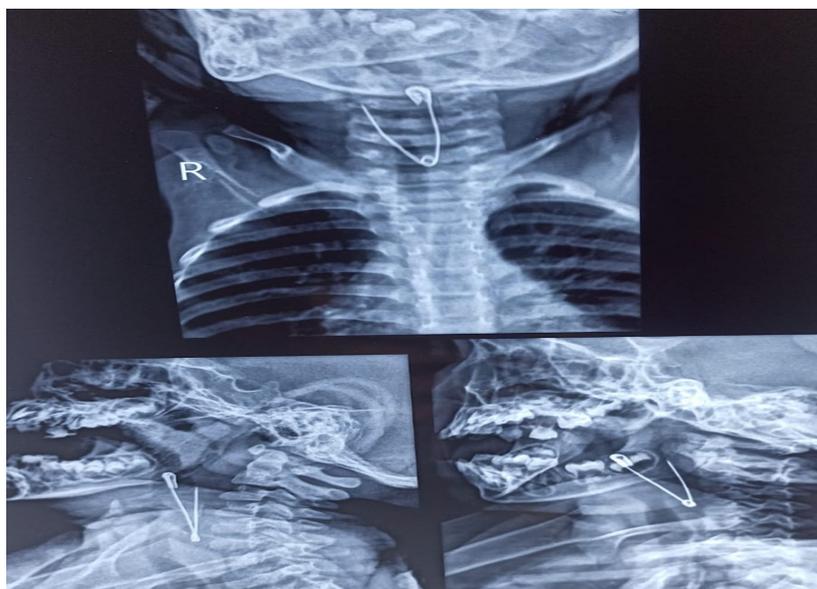


Figure 4: AP & Lateral radiograph of the neck revealing a safety pin



Figure 5: Aspirated foreign body lodged in the right main stem bronchus

Intervention, Mode of Anaesthesia and Ventilation

Out of 70 patient's rigid bronchoscopy for foreign body airway was performed for 20 patients in which 3 bronchoscopies (15%) were done in general anaesthesia & controlled ventilation whereas 17 bronchoscopies were done under general anaesthesia with intermittent positive pressure ventilation. Laryngoscopic guided removal of foreign body via Magill's for foreign body cricopharynx were performed in 20 patients, in which majorly done in sedation with spontaneous ventilation (100%).

Oesophagoscopy was performed in 27 patients out of which 18 oesophagoscopies (75%) were done under general anaesthesia & controlled ventilation whereas 9 oesophagoscopies (25%) were performed under sedation with spontaneous ventilation.

Perioperative Complications

Major Complications such as desaturation, bradycardia, bronchospasm, wheeze, stridor were noted in patients with foreign body aspiration in which bronchoscopy were performed. No such complications noted during oesophagoscopy, laryngoscopy.

Discussion

Foreign bodies lodgement in the aerodigestive tract are a common surgical emergency presenting to Emergency department in many centres with the highest incidence among children and associated with high morbidity and occasionally mortality. From our review, these comprised 42 males (59.6%) and 28 females (39.76%) giving a male-to-female ratio of approximately of 3:2 similar findings were reported by article [4, 5]. Foreign body aspirations were predominately common in children 1 to 3 years of age. This finding is similar to other data in the literature [4,5,13-18]. Children below the age of 5 years are more

vulnerable because of curiosity and their newfound abilities of locomotion; as they have natural propensity of gaining knowledge, putting things into mouth, inability to masticate well (molar appears at 4 yrs of age) and inadequate control of deglutition along with habit of crying, shouting, laughing and playing during meals. [6-11]

Cricopharynx is the most common site of foreign body lodgement in digestive tract as the cricopharynx is the first anatomical constriction in airway [6,11]. While in the airway foreign body lodgement is more common in right bronchus than left, as right bronchus is anatomically more vertical and wider as compared to left bronchus. Consistent with most of the previous reports; [6,12] foreign bodies were located predominantly in the right bronchial tree in our series. Contrary to our findings, a study done by Vane et al. has reported 53.4% of foreign bodies in the left lung [13].

Coins are the most common foreign body in cricopharynx among children. The reason for this may be due to free access to coins, which are usually given as gifts or to buy chocolates. Coins are randomly placed anywhere by adults in the house and children have habit of putting anything in their mouth.

An extensive educational campaign is required regarding FB aspiration, their presentation, and feeding of children for parents. We also found that the maximum incidence of foreign body ingestion and aspiration were in the month of April and May, which is the season of summer vacation in our country. Children spend more time at home at that time along with their siblings, and they get more time to explore which can be a cause of increase in number of such incidences.

In the airway vegetative foreign body such as seeds and food items were more common, among them, peanut was the commonest. Peanuts are a social delicacy

within the study area, which are eaten either boiled or roasted. Due to absence of molar teeth or poor dentition, peanuts cannot be properly chewed and hence can be easily aspirated. Hence, it is advisable not to offer peanuts and seeds to small children, who are liable to aspirate them into the respiratory passage. These are very dangerous as most of them are hygroscopic. They swell up within a few days causing blockage of the lumen of the bronchus and retention of secretions distal to it. Secondary infection occurs easily leading to lobar pneumonia.

Various anaesthesia techniques have been used successfully for the management of rigid bronchoscopy during FB extraction, including inhalational induction [15,17] and TIVA techniques. [17,19] There is no consensus on the use of spontaneous or controlled ventilation during anaesthesia for rigid bronchoscopies. In our centre, the rigid bronchoscopies were performed under general anaesthesia with intermittent positive pressure ventilation in most of the children. A review of 94 cases of pediatric foreign body aspiration suggested that there was no increased incidence of adverse events related to either spontaneous or controlled ventilation, but further studies are needed to ascertain the outcomes related to each mode of ventilatory support [19].

Most of the rigid oesophagoscopies were done under general anaesthesia & controlled ventilation and endotracheal intubation should be used to provide an adequate airway and to minimize the incidence of aspiration during oesophagoscopy. As oesophagoscopy poses its own risks such as pharyngeal bleeding, bronchospasm, accidental extubation, oesophageal perforation etc. so endoscopist should be skilled enough to perform such procedure. Denney et al. found that foreign body localization occurred most frequently in the upper oesophagus and reported a success rate of 99% with endoscopic removal [20]. Lakdhar-Idrissi et al. reported a success rate

of 84% with endoscopy [21]. Guelfguat M reported success rate of 76% with oesophagoscopy [22].

Foreign body in the cricopharynx were mostly removed by direct laryngoscopy via Magill's forceps under sedation with spontaneous ventilation. Chhabra et al in the case series also did direct laryngoscopy guided removal of foreign body via Magill's forceps [23].

The complications observed in our patients were similar to those in previous reports on paediatric bronchoscopy for FB retrieval. Complications included arterial desaturation, bradycardia, bronchospasm, and laryngospasm. No cardiac arrest, pneumothorax, and laryngeal oedema were noted.

In Israel in 1982–83 intensive educational campaign was done through television, radio broadcast and newspapers to increase awareness among people regarding foreign body aspiration and ingestion in kids. This initiative significantly reduced incidence of FB aspiration in Israel [14].

We should also conduct such programmes to educate people about foreign body ingestion and aspiration. We can teach parents of young children through play schools and their paediatric visits. Emergency management of aspiration and choking should also be taught to parents.

Our study did not evaluate the clinical presentations of the FB aspirations, which is a limitation; nonetheless, it would serve as a baseline for future prospective studies. Parents and guardians should be educated about the potential dangers of aspirating foreign bodies, especially in very young children, and the need to create a safe environment for them. A prospective study on FB aspirations is strongly recommended.

Conclusion

The majority of FB aspirations occurred in children aged three years or less with more

common incidence in males. Peanuts were the most commonly aspirated foreign bodies with a majority being localized in the right bronchus & coins were the most common foreign body in cricopharynx. In majority of the patients, the aspirated foreign bodies were retrieved successfully by rigid bronchoscopy under general anaesthesia with intermittent positive pressure ventilation & ingested foreign body were retrieved by oesophagoscopy under general anaesthesia & controlled ventilation or by direct laryngoscopy under sedation with spontaneous ventilation.

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