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Oesophageal foreign body in children: 15 years experience in a tertiary care paediatric centre

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ABSTRACT

Background: The objective of this study was to report our experience and outcome in the management of oesophageal foreign body (EFB) in suspected cases of foreign body (FB) ingestion. **Materials and Methods:** Records of children with documented EFB ingestion treated in the Department of Pediatric surgery from January 1997 to December 2012 were analysed. Diagnosis was made on the basis of history, clinical examination and radiological evaluation. Stronger index of suspicion was kept in cases of sudden onset of symptoms with an inappropriate history of FB ingestion. **Results:** A total of 317 children underwent emergency rigid oesophagoscopy for EFB. Out of these, 206 were males and 111 were females. The most common EFB found was coins in 209 (65.9%) cases, followed by food bolus obstruction in 54 (17%), metallic FB in 29 (9.1%), plastic FB in 21 (6.6%), and button batteries in 14 (4.4%) cases. The most common site of FB impaction was found to be cricopharynx in 291 (92%) cases. **Conclusions:** High index of suspicion should be kept for EFB in children who present with unavailable history of FB ingestion. The wait-and-watch policy in cases of FB oesophagus is not always the correct approach, especially when it presents as respiratory distress of sudden onset.

Key words: Coin, oesophageal foreign body, rigid oesophagoscopy

INTRODUCTION

Foreign body (FB) ingestion is a common serious problem often seen in children from 6 months to 6 years of age, which, if not treated in time, can be life threatening. The majority of cases is purely accidental, but can be occasionally homicidal, especially when the child is a girl. Not only the nature and site of FB but also the duration of symptoms plays a pivotal role in the final survival outcome. Sometimes oesophageal foreign body (EFB) can be fatal, especially when present with acute respiratory distress. Operating surgeon should always be prepared to perform urgent tracheostomy or thoracotomy if rigid oesophagoscopy fails to retrieve the FB and child becomes clinically unstable.

MATERIALS AND METHODS

We retrospectively analysed our data from January 1997 to December 2012. A total of 693 cases of FB were admitted during this period. Out of this, 317 (45.7%) cases were of EFB. Only cases of EFB were included in the study. All cases were evaluated with a thorough history, clinical examination, and X-ray chest and neck (anteroposterior and lateral views). Barium oesophagography and computed tomography (CT) chest were done either in radiolucent EFB or in longstanding cases. Endotracheal intubation was done in unstable cases before shifting them to the operation theatre. Urgent rigid oesophagoscopy was performed under general anaesthesia. Consent for tracheostomy and thoracotomy was taken beforehand in all cases. Mechanical ventilator support was provided for unstable patients. A single dose of antibiotics was given in the preoperative and postoperative period in all cases. Stable cases were discharged within 24 h of the procedure.

RESULTS

A total of 317 cases of EFB ingestion during January 1997 to December 2012 were admitted to the Department of Pediatric Surgery. An overwhelming majority were males, i.e. 206 (64.9%), while 111 (35.1%) were females, with male to female ratio of

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1.8:1. The age distribution of the study group of 317 cases was as follows: 70 (22%) cases less than 1 year of age, 190 (60%) cases between 1 and 3 years, 41 (13%) cases between 3 and 5 years and 16 (5%) cases were more than 5 years of age. The maximum incidents occurred at the age of 1-3 years, with the number of cases being 190 (60%). Details regarding the type of FB are shown in Table 1.

The most common site of FB impaction was cricopharynx in 291 (92%) cases. Chest and neck X-ray (anteroposterior and lateral views) was diagnostic in 307 (96.8%) cases. Barium swallow for diagnosis was done in 9 (2.4%) cases. CT scan was required in 1 (0.3%) case. Exploratory laparotomy with retrieval of FB through a gastrotomy was done in 7 (2.2%) cases. Preoperative ventilation was required in 15 (4.7%) and postoperative ventilation in 33 (10.4%) cases. Three (0.9%) died without undergoing surgical intervention, while 1 (0.3%) died postoperatively. The overall mortality rate was 1.2%. Three cases (0.9%) which died without any surgical intervention were less than 1 year of age and they presented with acute respiratory distress, with two (0.6%) of them having a metallic FB with serrated margin in the upper oesophagus [Figure 1] while in one case (0.3%), the type of FB could not be identified as the child expired without undergoing any investigation. Parents had not given the consent for post-mortem examination in any of the four cases which died in the hospital.

DISCUSSION

EFB can present with a wide variety of symptoms. Although it is sometimes asymptomatic, most of the cases have cough, dyspnoea, haemoptysis and even respiratory arrest [Table 2].[1-3] Longstanding EFB may cause failure to thrive or recurrent pneumonia. The majority of FB ingestions occur in the paediatric population, with a peak incidence between 6 months and 6 years of age.[4-7] Clinical history and radiological examinations are enough for the diagnosis, but in some cases, it is difficult to diagnose even by oesophagoscopy. A high index of suspicion must be maintained when the child presents to a medical facility with symptoms related either to the respiratory or the gastrointestinal tract. Respiratory distress is the most common manifestation of an EFB in neonates.[8] EFB causes less morbidity and mortality as compared to FB bronchus. Although most commonly described EFBs are coins, other ingested objects include toy parts, jewels, batteries, needles, pins, balls and buttons. In our study group, coin ingestion was found in 209 (65.9%) cases, followed by food bolus obstruction in 54 (17%). All cases of food bolus obstruction were operated cases of oesophageal atresia and obstruction was seen on anastomotic site. Metallic FB was found in 29 (9.1%) cases and included safety pins, earrings and nails. In seven cases, safety pins were with open ends that required minilaparotomy with retrieval of FB through gastrotomy. Plastic FB (mostly toy wheels) was found in 21 (6.6%) cases. Fourteen (4.4%) cases were of button battery ingestion. Four (1.2%) of them developed tracheoesophageal fistula, while 2 (0.6%) developed oesophageal erosion. All six cases in which complications were seen presented late, after 12 h. Initially oesophagoscopy with retrieval of button

Table 1: Types of ingested EFBs

FB oesophagus	No. of patients	Percentage
Coin	209	65.9
Food bolus	54	17
Metallic	29	9.1
Plastic toy	21	6.6
Button batteries	4	1.2
Total	317	100

Table 2: Symptoms following EFB ingestion

Symptoms	Patients *n* (%)
Respiratory distress	28 (8.8)
Tachypnoea	22 (6.9)
Wheezing	43 (13.5)
Stridor	39 (12.3)
Dysphagia	55 (17.3)
Coughing	37 (11.6)
Drooling	25 (7.8%)
Recurrent aspiration pneumonia	26 (8.2)
Failure to thrive	17 (5.3)
Fever	14 (4.4)
Asymptomatic	11 (3.4)

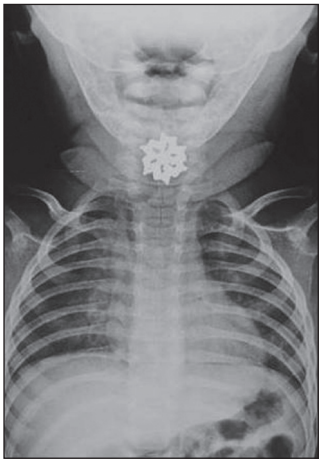


Figure 1: Chest X-ray anteroposterior view showing the radio-opaque FB with serrated margin in upper oesophagus

battery, along with the upgradation of antibiotics was done. Definitive surgery, i.e. thoracotomy with the division of fistula and repair of rent, was performed after 6 weeks, once the inflammation and oedema settled. Preoperative endotracheal intubation and mechanical ventilatory support were required in 15 (4.7%) cases, while postoperative ventilation was needed in 33 (10.4%) cases. Three cases (0.9%) died without any intervention. All presented with acute respiratory distress with a short duration of history. One (0.3%) died on the 26th postoperative day because of type 1 respiratory failure.

The most common method to demonstrate EFB is by biplane radiographs. Radiographs can confirm the location, size, shape and number of ingested FB and help exclude aspirated objects. Sharp objects have a tendency to get stuck at the level of upper oesophagus. In these cases, direct vision or laryngoscopic-aided view are enough to make the diagnosis and extract the FB.[9] EFBs that do not pass to the stomach tend to get impacted at one of the following three levels: thoracic outlet (70%), mid-oesophagus, where the aortic arch and the carina overlap (15%), and at the lower oesophageal sphincter (15%). When there is no breathing difficulty, a case of acute ingestion of FB can be observed for 24 h and checked as to whether the EFB has passed into the stomach.[1] If the object fails to pass into the stomach, then it should be removed or pushed into the stomach. An object that has been lodged in the oesophagus for more than 24 h should be removed endoscopically, but if the duration is more than a week, then there is significant risk of erosion into the surrounding structures and the surgical team should be kept ready before attempting the endoscopic removal.[1,3] This general rule of wait and watch does not apply in cases of sharp objects and button battery ingestion or in any case presenting with respiratory distress with acute onset. Button battery posed a variety of complications either due to voltage discharge or due to direct corrosive effect.[1] More the duration, severe the complications. In our study group, chest X-ray was diagnostic in 96% of cases. Barium swallow was required in 2.8% cases of radiolucent EFB. Some experts recommend barium oesophagography in cases of EFB, only when facilities of endoscopy are not available.[1] Timing of endoscopy depends on the clinical presentation of the case as shown in Table 3.

Delay in the diagnosis of EFB or failure to diagnose more than one FB can be associated with severe complications, which include mediastinitis, failure to thrive, pneumothorax, abscess and stricture.[10,11] Over the years, our protocol has changed with the availability of better endoscopes and advanced radiological technology such as CT with 3-dimensional (3D) reconstruction. If the plain radiograph does not reveal any FB or abnormalities, management depends on the characteristics of the patient and the suspected FB; in a symptomatic patient, or in suspected FB having any dangerous characteristics [large (>2 cm), long or sharp], or if the type of FB is not definitively known by the caretakers, we use CT with 3D reconstruction as the next diagnostic procedure. We avoid gastrointestinal contrast studies when possible. Although the study may help identify the FB, the contrast may obscure visualisation on subsequent endoscopy. Moreover, the contrast may be aspirated if the oesophagus is obstructed. Because of these concerns, endoscopy may be preferred over contrast even if radiographs are negative. In today's era, the investigation of choice for EFB is CT which is easy, fast, has 100% sensitivity, and is therefore the choice technique for diagnosing suspected upper oesophageal FBs not expected to be visible on plain radiographs.[12]

Table 3: Timing of oesophagoscopy for ingested FBs in children

Procedure	FB/symptoms	Patients (N = 317)
Immediate endoscopy	Button batteries	14
	Sharp objects	7
	Complete obstruction	6
	Acute respiratory distress	10
Urgent endoscopy	Incomplete food bolus obstruction	54
	Blunt objects	8
Non-urgent endoscopy	Coins	209
	Blunt objects in stomach	9

CONCLUSION

Diagnosis of EFB in children is extremely challenging, especially in the absence of clear history and normal physical examination, and because of its presentation which can be mistaken as asthma or respiratory tract infection, leading to delayed diagnosis and treatment. High index of suspicion should be kept for EFB in children who present with an unavailable history of FB ingestion. EFB leading to severe acute respiratory distress is uncommon and requires urgent surgical intervention. Wait-and-watch policy in cases of FB oesophagus is not always the correct approach, especially when present as respiratory distress of sudden onset.

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