Unusual Foreign Body Aspiration in Infants Below 6 months of Age

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Abstract Foreign body aspiration is one of the leading causes of accidental death in children. In older infants, tendency to explore their environment by putting objects in mouth leads to aspiration, but in younger infants below 6 months of age, as they are non ambulatory, it is the elder sibling who puts the foreign body into younger child's mouth. Diagnosis is often difficult because of no definite history in most cases. The purpose of this study is to diagnose and manage airway foreign bodies in younger infants with unusual presentation and no definite history. All patients referred to our Otorhinolaryngology Department with respiratory symptoms unresponsive to medical treatment and no definite history of foreign body aspiration were prospectively evaluated using virtual bronchoscopy. All patients underwent rigid bronchoscopy and foreign body removal with use of a maneuver in some cases.

Keywords Foreign bodies · Aspiration · Respiratory distress · Bronchoscopy

Introduction

Foreign body aspiration (FB) is leading cause of accidental death in children [1]. It is estimated that 1,000 children die annually in the USA because of FB aspiration [2]. But in our country incidence may be much more because of poverty and illiteracy, though no such data available.

It is commonest in children between 9 months and 3 years of age because: (a) exploration of their environment by putting objects into their mouths; (b) learning to walk and run; (c) inadequate dentition; (d) immature swallowing coordination; and (e) supervision by an older sibling [3]. But in children below 6 months of age as in our cases, they are non-ambulatory and it is the elder child/caretaker who puts the FB into younger child's mouth without knowing consequences.

Case 1

A 6 months/female presented with suspicion of FB aspiration (? *metallic scrap piece*). She had complaints of excessive crying and loss of voice while crying for last 5 h. Detailed history revealed that her elder brother had pushed FB into her throat. Examination showed severe respiratory distress, inspiratory stridor, intercostal space indrawing, flaring of nasal ala and tachypnoea. Saturation without oxygen was 84 %. On auscultation added sounds were present with reduced air entry in both lung fields.

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An urgent X-ray soft tissue neck lateral view showed irregular radio-opaque shadows at C2–C3 level in airway. Virtual bronchoscopy (VB) showed a radio-opaque FB at the level of glottis measuring 1×0.5 cm (Fig. 1a).

Patient was oxygenated and urgent bronchoscopy (Karl Storz 3.5 mm chevalier Jackson rigid and ventilating bronchoscope) was done under General anaesthesia (Ketamine, Propofol and Scoline each in dose of 1 mg/kg) which revealed a metallic FB between vocal cords. FB (metallic scrap piece, Fig. 2a) was removed with crocodile action serrated bronchoscopy forcep. Immediately air entry improved. Check bronchoscopy was done to remove secretions from airway. Post operatively nebulisation (salbutamol, asthalin and adrenalin—0.5 ml respule in 2 ml normal saline) 4 hourly, steroid (IV hydrocortisone—2.5 mg/kg/dose 8 hourly) and antibiotics (Inj Taxim-330 mg iv 8 hourly for 5 days) given. Patient made an uneventful recovery.

Case 2

A challenging case of 3 month/female, who presented with a FB in tracheobronchial tree. Parents gave history of

accidental ingestion of FB (? *betel-nut piece*) by child while playing with elder brother, who had put it into child's mouth, who suddenly inhaled, causing choking, breathlessness and cough. One piece was removed by mother by finger manipulation. Patient was then shown to a pediatrician in District Hospital who referred her to higher centre. Examination revealed severe respiratory distress, reduced air entry on right side with inspiratory stridor. Saturation was 82 % without oxygen and 96 % with oxygen. Intermittent gasping attacks were noted.

VB revealed a FB (5×3 mm) in carina occupying right main bronchus (Fig. 1b). Urgent bronchoscopy was done and FB removed (betel-nut piece, Fig. 2b) resulting in immediate improvement in air entry.

Case 3

This is an interesting case of a 4 month boy who presented with stridor and respiratory distress for 15 days. There was no definite history of FB aspiration. Retrospective history revealed that nose ring of mother was missing and that child was in habit of pulling mother's nose and ear ring frequently.

Fig. 1 a Virtual bronchoscopy showing radio opaque foreign body (arrow) at level of glottis. b Virtual bronchoscopy showing radio opaque shadow (arrow) in carina and right bronchus. c X-ray showing

radio opaque foreign body (arrow) in subglottis. d Virtual bronchoscopy showing radio opaque shadow (arrow) in left bronchus. e X-ray chest showing obstructive emphysema left side with mediastinal shift

Fig. 2 a Photograph showing metallic scrap piece removed from airway. b Photograph showing betel nut piece removed from right main bronchus, c Photograph showing nose ring removed from

patient's airway. d Photograph showing stone piece removed from left main bronchus. e Photograph showing babool seed removed from left bronchus

Examination showed significantly reduced bilateral air entry, intercostal space indrawing and flaring of nasal ala. X-ray soft tissue neck lateral view revealed a radio-opaque FB in subglottis (Fig. 1c). Urgent Bronchoscopy done and *nose ring* (Fig. 2c) removed from subglottis. Air entry improved dramatically.

Case 4

A 6 month/male presented with progressively increasing dry cough. There was no definite history of FB ingestion until its removal. Added sounds were present with reduced air entry in left lung. Oxygen Saturation was 90 %. X-rays and VB (Fig. 1d) revealed a radio-opaque FB at the opening of left main bronchus. Management of such unusual site FB was really difficult. After adequate pre-oxygenation, chest was given light blow in right lateral position to disengage FB which fell into main bronchus lumen. FB (*stone piece*, Fig. 2d) was then removed with bronchoscope. Patient improved dramatically.

Case 5

This is another challenging case of a FB *Gokhru seed* (commonly known as babool seed) in tracheobronchial tree.

A 6 month child presented with progressively increasing stridor, cough and respiratory distress for last 6 h with no definite history of FB aspiration. Examination revealed inspiratory stridor, localized wheeze and reduced air entry on left side. Oxygen saturation was 92 %. X-ray chest showed severe obstructive emphysema on left side with mediastinal shift (Fig. 1e). Urgent CT chest showed a FB in left main bronchus. This case was rare in that it is unusual for a FB to lodge in left bronchus. Sharp FB usually lodge in oral cavity or stuck in vocal cord, therefore it is difficult to explain how FB reached left bronchus.

Placing the bronchoscope in airway and using FB forceps, pointed end of the object was disengaged from the mucosa, moved distally and then removed (Fig. 2e). Post-operative period was uneventful.

Gokhru is readily available in jungle which sticks to field worker's clothes; thus reaches household and within reach of children.

Discussion

FB aspiration in children may present with respiratory symptoms days or months after aspiration has occurred [4]. Of patients with laryngotracheal foreign bodies, 67 % experience associated complications when the removal delay is more than 24 h [5].

History, as always, is the best determinant of how suspicious one should be of a potential aspiration. However, this is often unwitnessed, or witnessed by an older sibling who may have had a role in the aspiration and chooses not to say anything [3]. Similar was the problem in our cases where no definite history was present as it was revealed it only on repeated questioning.

X-ray chest (CXR) is commonly done but has only 67 % diagnostic accuracy as concluded by a study [6]. However, the affected lung may show hyperaeration and mediastinum shift because of the ball-valve effect of the bronchial FB [7]. Multi spiral CT & VB is used to diagnose radiolucent FB missed on plain X-ray. It reduces conventional bronchoscopy time, is non invasive and can go beyond the stenosed airway [8].

Sharp objects are extremely challenging for endoscopic removal where the pointed end tends to engage (as seen in case 5). The technique we used is supported by available literature [5].

In view of the fact that, angle made by the main bronchi with the trachea is similar until the age of 15 years resulting in equal incidence of FB in either bronchus, we found left-sided FB in two and right-sided in three cases [2]. Management of left bronchus FB in case 4 was done by

an innovative way, where patient was given light blow in lateral position to disengage FB to be removed.

Thus, any child presenting with cough, stridor and respiratory distress of acute onset should be suspected for FB aspiration unless proved otherwise. Parents usually have a tendency to put finger into child's mouth to remove a FB, which causes trauma, bleeding and pushes FB further into lower airways. This practice should therefore be discouraged.

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