



Clinical Study of Unknown Cough in Children (Tracheobronchial Foreign Body, an Emergency) and Review of Literature

KEYWORDS

Foreign body bronchus, rigid bronchoscopy, Stridor in children, Foreign body aspiration (FBA)

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ABSTRACT

Introduction: Foreign body aspiration remains a major cause of morbidity and mortality in children, without an early intervention. Clinical study of children admitted in the department of ENT KMC Kurnool with complaints of chronic cough and respiratory distress were investigated with X-RAY and CT scan. Cases found with no evidence of foreign body were planned for Diagnostic Bronchoscopy with a suspicion of aspiration revealed variable foreign bodies in the bronchus and lower airway. Management of FB aspiration in children requires emergency and multidisciplinary approach and it is lifesaving.

Material and methods: Clinical study of 10 cases of children with chronic cough and respiratory distress, cases referred from paediatric medical ward with infection not responding to antibiotics and in some cases with ATT treatment, and on referral to ENT department from Jan 2015 to July 2015 admitted, carefully evaluated with suspicion of Tracheobronchial foreign body aspiration, Planned for emergency rigid bronchoscopy and recovered variable foreign bodies with optical telescopic forceps.

Conclusion: Clinical study shown cases with unknown cough in children foreign body bronchus is the common cause of respiratory distress. In our study male children were more affected than female, average age group is 2-4 years, variable foreign bodies removed are vegetable seeds, seethaphal and tamarind seed, ground nut, wardrobe pin, whistle, pen cap knob, some foreign bodies are hollow plastic tube, Vegetable type FBs are more problematic than nonorganic material because they usually absorb moisture and swell thus increasing obstruction of airway distally, Foreign body aspiration (FBA) is a common cause of respiratory emergency in young Children between age group of 2-4 years, inspite of negative and no evidence of FB on radiological findings, Diagnostic Bronchoscopy revealed successful removal of foreign body with dramatic clinical improvement. Diagnosis of FBA and Retrieval of FB from the airway involves coordinated teamwork and it is life saving, rewarding.

Introduction:

Tracheobronchial (FBA) foreign body aspiration is a major cause of morbidity and mortality in children. The child may present acutely with evidence of respiratory distress or chronically with symptoms suggestive of respiratory infection or impairment Kim *et al*, Prompt diagnosis and expeditious removal of the inhaled foreign body is essential to minimize the associated morbidity and mortality **Material and methods:** Cases with history of chronic cough, and fever admitted in the Department of ENT from Jan 2015 To July 2015, children with unexplained cough and upper respiratory tract infection referred from Paediatric Medical Ward, We report a series of 10 cases illustrating the variable presentations of FBA in children and the management in age group of 2 years to 10 years.

Case reports and history; Case 1 A five year old boy admitted in paediatric medical ward with infection of lower air way and intermittent episodes of dry cough, on physical examination, he was not in any significant respiratory respiratory distress but there was reduced chest movement and air entry on the right side of the chest (fig1) and dullness to percussion on the right side. History of playing with whistle one week before and violent coughs was present on interrogation



Figure 1 Inspection of respiratory movements

Case 2: A previously healthy boy three years old admitted in paediatric medical ward with six months history of recurrent productive cough and symptoms of lower respiratory tract infection, before admission child had treatment of several courses of antibiotic including anti tuberculosis treatment for 3 months. On frequent exacerbations of cough and fever, no evidence of radiological improvement child was referred to ENT OPD. On clinical examination diminished air entry with wheeze and coarse crackling was present on auscultation at right lung base.

Case 3: A Previously healthy child 10 years old accidentally swallowed_wardrobe pin (fig 2) and denied history of FB

aspiration, presented with symptoms of unexplained cough and fever. On clinical examination of chest was unremarkable, no breathlessness or Stridor and radiograph of chest showed 1.5 cm pin in the left main bronchus



Figure 2 ward robe pin 1.5 cm removed from left bronchus

Case 4: A 3 year old female child was transferred from an outside hospital with suspected foreign body aspiration. Parents were unaware of FBA and it was not witnessed by anybody. The child upon evaluation complained of persistent fever and cough but denied difficulty in breathing or shortness of breath. Initial physical examination was negative and chest radiograph failed to display foreign body and any obstructive pathology

Investigations And Procedure: table1 All the ten children presented with similar unexplained cough and no evidence of history of foreign body aspiration were investigated with Hb-11.8gm/dlBT-1min45sec CT4min10sec TC 7800 cells / cmm DC P-64, L-30, E-3, M-3, B-0, ESR,Platelet count 2.3 lakhs/cmmRBS 99mg/dl S.Creatinine-0.5mg/dl B.Urea-23mg/dl normal, HIV HbsAg HCV screening tests are Non reactive. All the children were investigated with x-ray chest and CT scan of thorax. In one case there was peribronchial thickness with segmental pneumonic consolidation on the right and lower lobes (fig3) And in other case luminal narrowing of right segmental bronchi. Density with a central channel within the left principle bronchus was observed. HRCT scan of chest showed no evidence of any foreign body and reports are not suggestive of foreign body in remaining cases.

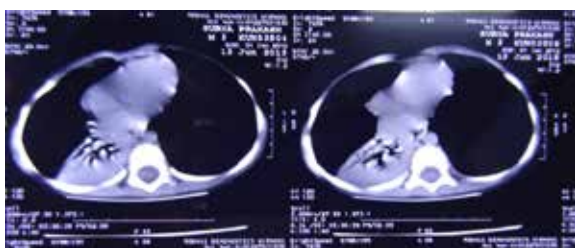


Figure 3 CT Scan of thorax pneumonic consolidation right lower lobe

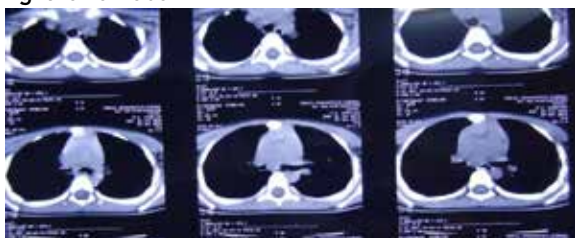


Figure 4 No evidence of radio opaque foreign body, or consolidation, and showing hyper inflation of right lung

All the cases were planned for Diagnostic Bronchoscopy under general anesthesia with intermittent oxygenation, and Karl Storz Rigid Bronchoscope of size 3, 3.5, 4 and 5

were used with optical cup forceps and FB grasping forceps. Jet ventilation was used as a preferred anesthesia in all cases than ventilating bronchoscope

Diagnostic Bronchoscopy; the following foreign bodies were recovered from the bronchus

1. Vegetable seed
2. ground nut
3. Seethaphal seed
4. Tamarind seed pieces
5. Whistle
6. Pen cap knob hollowed
7. Ward robe pin
8. Pieces of vegetable seeds
9. Mucous plug
10. One case No foreign body

Diagnostic Bronchoscopy: Showing removal of ground nut seed from right bronchus (fig5) and removal of Whistle main part (ring) of whistle from left bronchus, and rest of Whistle (plastic parts) from right bronchus with optical cup forceps on rigid bronchoscopy (fig 6, 7)

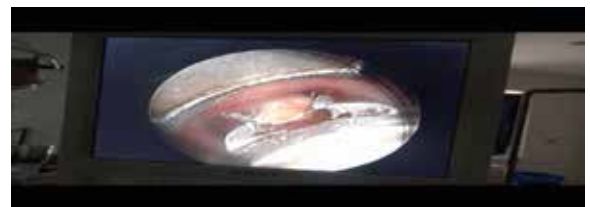


Figure 5 Ground Nut Seed Right Bronchus.

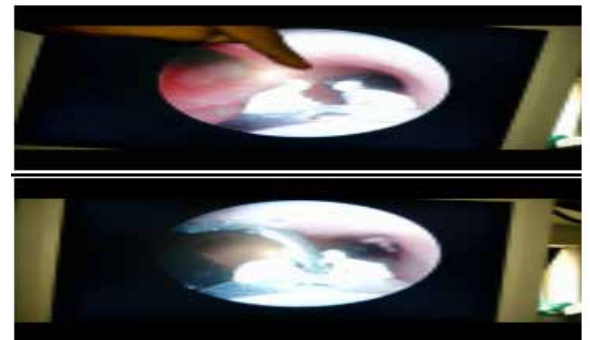


Figure 6 whistle left bronchus optical forceps



Figure 7 Parts of Whistle FB Bronchus

Figure (8, 9) Showing the foreign body pen cap knob and vegetable seed after removal with optical forceps from left bronchus. Fig 10 showing ward robe pin from left

bronchus and Fig11 showing technique of jet ventilation anaesthesia in 2 yrs child

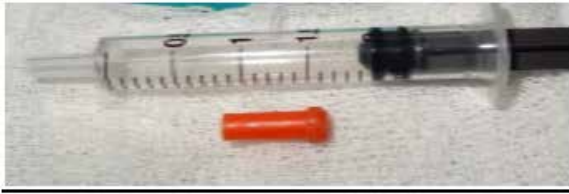


Figure 8 pen cap knob left bronchus



Figure 9 vegetable seed after removal

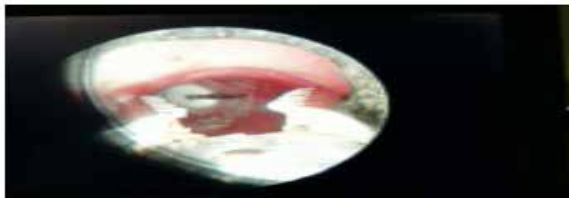


Figure 10 ward robe pin left bronchus



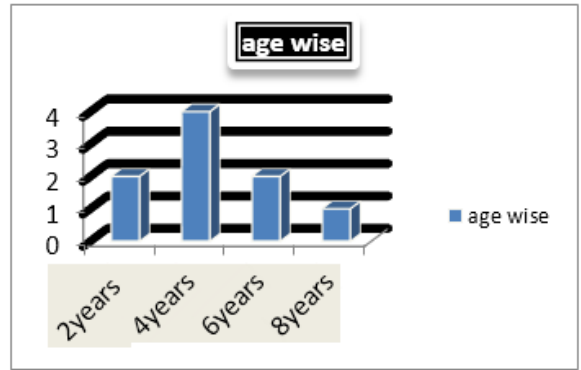
Figure11 Technique of Jet Ventilation in child

Table1 age, history of illness, symptoms signs, type of foreign body radiological findings in 10 cases

Age in years/cases	History of aspiration/cases	Symptoms/cases	Signs/cases	Site of foreign body/cases	Type of foreign body/cases	Radiology/cases
0-2 / 2	Positive History/2	Negative history /4	Diminished Air Entry/2	Right Bronchus/7	Vegetable Seed /2	Hyperinflation/2
2-4/ 4	On Interrogation/2	Cough& Wheeze/2	Rhonchi, Wheeze/2	Left Bronchus/2	Whistle, Pen Cap Knob; mucous plug / Each 1	Consolidation/1
4-5/ 2	No History/4	Respiratory Distress/2	No Signs/5	No Foreign Body/1	Seethaphal, Tamarind Groundnut Seed/Each 1	Radio opaque FB/2
5-10/ 2	Emergency/2	Fever Choking/2	Stridor/1		Wardrobe Pin, No Foreign Body / Each1	Normal X-ray/5

Post operative Follow Up: Immediate post operative period uneventful and cases followed for laryngeal edema and bronchospasm and treated with antibiotic, analgesics, hydrocortisone and O₂ nebulisation along with bronchodilator

Incidence of FBA and Discussion:



Children below four years FBA is more common cause of airway obstruction than above 4yrs. Many children tend to put objects impulsively more frequently into their mouth. Aspiration of Tracheobronchial foreign body is a common medical emergency in children especially in the age group of 1 to 8 years as reported by Harboyan. G. and Nasif. At this age group, children lack molars for proper mastication of food. Children are also more ambulant and curious to explore their surroundings. Incidence of FBs in our series was Right Bronchus 7 and Left Bronchus 2 and Male: Female sex ratio is 7: 3. The degree of respiratory distress is greater in the smaller child because of the relatively smaller size of the tracheo bronchial airways; Tracheo bronchial (FBA) foreign body aspiration is a life threatening emergency in children if the object completely obstructs the airway leading to asphyxia and rapid death.

Site of FB and Clinical Presentation: As noted from the present case series, the foreign body (FB) can be lodged anywhere along the Tracheobronchial tree, majority of objects were lodged in the main bronchi with a slight predilection for the right side over the left and It can be of any type of material. The presenting symptoms and signs can be very variable and the time from aspiration to diagnosis can range from minutes to days or months. Kim et al, shown only 6% came to the hospital as emergency cases.

Type of FB and Problems: The majority of FBs in children are organic and mainly of vegetable origin such as peanuts and ground nut seeds. Vegetable type FBs are more problematic than nonorganic material because they usually absorb moisture and swell thus increasing obstruction of airway distally and more likely induce intense inflammatory reaction, oedema and granulation tissue formation. During attempt to extract organic FBs they disintegrate, become more friable and the pieces disperse more distally. Most organic or vegetable FBs are not radiopaque, contributing delay in diagnosis. *Radio opaque foreign bodies can easily be detected in chest x-ray. Normal x-ray chest does not rule out the possibility of foreign body.* J.Srppnath, Vinay Mahendrakar as noted.

Time of Diagnosis: The signs and symptoms associated with FBA in children are highly variable. The diagnosis of FBA was made more correctly within the first 24 hours after aspiration in only about 50% of cases. Presentation can therefore vary from almost asymptomatic to life threatening airway obstruction. Most common symptoms in childhood FBA are choking, persistent coughing, wheezing, Stridor and pneumonia. In many children clinical history is often the most important (and sometimes the only) clue to diagnosis as physical signs and radiological investigations may be absent or even negative in the presence of a for-

foreign body airway. **Investigations:** Plain chest radiograph is the most common investigation carried out in patients with suspected FBA, while a chest radiograph is very helpful in diagnosis of FBA; many aspirated foreign bodies are not radiopaque. A radiolucent foreign body may be suggested only by secondary changes such as segmental or lobar collapse, air trapping, atelectasis, infiltration and bronchiectasis. These findings are however not specific and may be found in the absence of foreign bodies.

Diagnostic Bronchoscopy Aspirated FBs should be extracted as soon as possible as delays in diagnosis and extraction, are always associated with increase complications. The incidence of complications increase after 24-48 hours, making expeditious removal of the foreign body imperative. Since the physical and radiological examinations do not have very high sensitivity and specificity in the diagnosis of FBA in children, there should be a high index of suspicion of FB. In any child with suggestive symptoms and signs of choking, persistent coughing, wheezing or Stridor, or evidence of asthma like symptoms or respiratory tract infection which is unresponsive to usual therapy

Anaesthesia: Rigid bronchoscopy is the preferred technique for definitive diagnosis and extraction of inhaled foreign bodies in children with the advances in patient monitoring and the availability of safer anaesthetic agents. Anaesthesia for endoscopy has become very safe and straightforward. The goal of anaesthesia is to ensure unconsciousness and analgesia of the patient in addition to facilitating the endoscopic process by avoiding any coughing, bucking, straining or other sudden movements. *The main anaesthesia related problem is that of the 'shared airway' where by both the endoscopist and the anaesthesiologist are competing for the same airway.* **Surgical Complications:** Although rigid bronchoscopy is the preferred technique for removal of aspirated FB in children, the endoscopist must not rush without careful preparation. Hollinger has rightly said "if two hours are spent in preparation, the safe endoscopy procedure may take 2 minutes" it must be noted that complications can and do occur, these include *Bronchospasm Laryngospasm Hypoxia Cardiac arrhythmias Trauma to the airway, Haemorrhage surgical emphysema in addition to the anaesthetic related complications. No such complications are seen in our cases.* In summary, the case study suggest that rigid bronchoscopy is preferable first choice in all cases of asphyxia, a radio-paque FB, unilateral decreased breathsounds, obstructive emphysema, and children with significant mediastinal shift and persistent symptoms such as cough, dyspnoea, and fever or any abnormal physical or chest radiographic signs. If available, a flexible bronchoscopy should be used initially for diagnosis, preceding rigid bronchoscopy if necessary. And now The Hopkins rod lens system described by Ward et al., 1974 and the advent of ventilating bronchoscope (Hopkins, 1976) has greatly improved the illumination and jet ventilation techniques facilitates the endoscopist to remove foreign bodies easily.

Conclusion: Airway foreign bodies represent significant morbidity and mortality in the paediatric population. Patients who inhale hollow-bore foreign bodies may be able to ventilate through the lumen of the object delaying the diagnosis. Patients who initially appear stable may decompensate depending on the position of the foreign body and urgent surgical intervention is recommended in order to prevent potential airway compromise. In all our cases successful removal of foreign body done with rigid bronchoscopy but if in doubt, correlate with radiography and

with a flexible bronchoscope.

References:

1. Bitten court PF, Camargos PA, Scheinmann P, de Blic J. Foreign body aspiration: clinical, radiological findings and factors associated with its late removal. *Int J Paediatric Otorhinolaryngology* 2006;70:87984.
2. Cohen S, Avital A, Godfrey S, Gross M, Kerem E, Springer C. Suspected foreign body inhalation in children: what are the indications for bronchoscopy? *J Paediatric* 2009;155:27680.
3. Metrangolo S, Monetti C, Meneghini L, Zadra N, Giusti F. Eight years' experience with foreign body aspiration in children: what is really important for a timely diagnosis? *J Pediatr Surg* 1999;34:122931
4. Tan HK, Brown K, McGill T, Kenna MA, Lund DP, Healy GB. Airway foreign bodies (FB): a 10year review. *Int JPediatr Otorhinolaryngology* 2000;56:919.
5. Harris CS, Baker SP, Smith GA, Harris RA. Childhood asphyxiation by food: a national analysis and overview, *JAMA* 1984;251:22315.
6. Zhijun C, Fugao Z, Niankai Z, Jingjing C. Therapeutic experience from 1428 patients with paediatric tracheobronchial foreign body. *J Pediatr Surg* 2008;43:71821
7. Harboyan. G. and Nasif. R. Tracheobronchial foreign bodies. A review of 14 years experience. *Journal of laryngology and Otology* (1970). **84** : 403 - 412.
8. Jackson C and Jackson C. L. Diseases of the air and food passages of foreign body Origin; Saunders, Philadelphia.(1950)pp 13-34.
9. Kim et al., foreign body in the airway. A review of 202 cases; *Laryngoscope*: 1972.
10. Srpnath1 , Vinay Mahendrakar2 Management of tracheobronchial Foreign bodies –a retrospective analysis *Indian Journal of Otolaryngology and Head and Neck Surgery* Vol. 54 No. 2, April - June 2002