Section: ENT

Original Research Article

CLINICAL STUDY OF PRESENTATION, DIAGNOSIS & MANAGEMENT OF VARIOUS TRACHEO-BRONCHIAL FOREIGN BODIES AT TERTIARY CARE CENTER

Praveenkumar Jayaraj[1], Somasundaram Subramaniam[2], Paramesh Waran Arumugam[3]

[1]Assistant Professor, Department of ENT, Karpagam Faculty of Medical Sciences and Research Coimbatore, Tamilnadu, India.
[2]Professor, Department of Otolaryngology, Karpagam Faculty of Medical Sciences and Research Coimbatore, Tamilnadu, India.
[3]Post Graduate, Guntur Government Medical college and Hospital, Guntur, Andhra Pradesh, India.

Received : 21/10/2022
Received in revised form : 22/11/2022
Accepted : 06/12/2022

Keywords:
tracheo-bronchial foreign body, bronchoscopy, ENT emergency, foreign body.

Corresponding Author:
Dr. Praveenkumar Jayaraj,
Email: jpsae2k4@yahoo.in
ORCID: 0000-0002-4191-0532

DOI: 10.47009/jamp.2022.4.5.156

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2022; 4 (5); 747-751

Abstract

Background: Foreign bodies in air passages are challenging clinical problems among ENT emergencies. The severity of the clinical manifestation depends on the nature of the foreign body, site and degree of obstruction and duration of foreign body retention in the tracheobronchial tree. Present study was aimed to study presentation, diagnosis & management of various tracheo-bronchial foreign bodies at tertiary care center. **Material and Methods:** Present study was retrospective, case-record based study, conducted with case records of patients with confirmed tracheobronchial foreign body (TFB) aspiration. **Results:** Among 38 cases, majority were children below 2 years of age (39.47 %) followed by 3-4 years age group (28.95 %). Male to female ratio was 1.7:1. On admission, common symptoms noted were history of dry cough (73.68 %), respiratory distress (57.89 %), noisy breathing (55.26 %) & witnessed choking (50 %). While unilateral reduced air entry (60.53 %) was most common sign observed, followed by unilateral wheeze (55.26 %), whistling and clicking sounds (28.95 %) & no signs (21.05 %). On radiological evaluation, Chest X-Ray findings were consolidation (73.68 %), lobar collapse (65.79 %), hyperinflation (57.89 %), ipsilateral emphysema (39.47 %) & no abnormality detected (23.68 %). Location of foreign body was left main bronchus (55.26 %) followed by right main bronchus (31.68 %), carina (7.89 %) & left main and secondary bronchus (5.26 %). Intra operative granulations were present in 21.05 % cases. Ground nut (34.21 %), seeds (31.58 %), peanut (18.42 %) & supari/betel nut (5.26 %) were common foreign bodies observed in study. **Conclusion:** Preoperative history taking, radiological assessment followed by rapid intervention by skilled and experienced surgical and anesthetic team helps in successful retrieval of the foreign body with less incidence of complications.

INTRODUCTION

Foreign bodies in air passages are challenging clinical problems among ENT emergencies. The severity of the clinical manifestation depends on the nature of the foreign body, site and degree of obstruction and duration of foreign body retention in the tracheobronchial tree.[1]

Foreign body aspiration is more common in children than in adults. The peak incidence in children is during the second year of life and during the sixth decade in adults. Mortality and diseases caused by airway foreign bodies are more common among children due to their narrow airway and immature protective mechanisms.[2] In adults, foreign body aspiration is more common in the setting of advanced age, underlying neurological disorder, poor dentition, alcohol consumption and sedative use.[3]

Diagnosis and treatment of this condition require high awareness and an enquiring attitude to all aspiration symptoms. False or delayed diagnosis can lead to significant complications.[4] Early diagnosis and prompt intervention saves the life and helps in avoiding pulmonary complications. The removal of a foreign body from the respiratory tract usually leads to a rapid recovery. Present study was aimed to study presentation, diagnosis & management of

ISSN (O): 2687-5365; ISSN (P): 2753-6556

various tracheo-bronchial foreign bodies at tertiary care center.

MATERIAL AND METHODS

Present study was retrospective, case-record based study, conducted in Department of ENT, Karpagam Faculty of Medical Sciences and Research Coimbatore, Tamilnadu, India. Case records of patients with confirmed tracheobronchial foreign body (TFB) aspiration were studied for last 4 years (January 2018 to December 2021). Study approval was taken from institutional ethical committee.

Cases with history of aspiration, sudden onset of breathlessness or choking sensation in a healthy person, recurrent respiratory infections with clinical or radiological evidence, and suspicion of foreign body & later had confirmed evidence of TFB were considered for present study. Patients with bronchial asthma, acute laryngo-tracheobronchitis, COPD, bronchiectasis were not considered for present study.

Clinical details (age, sex, nature, site of foreign body lodgement, duration between inhalation or symptoms and admission in a hospital), clinical signs & symptoms, investigations (X- ray chest, CT scan chest), findings of rigid/flexible bronchoscopy were noted. Data was collected and compiled using Microsoft Excel, statistical analysis was done using descriptive statistics.

RESULTS

In present study, 38 case records of patients with confirmed tracheobronchial foreign body (TFB) aspiration were studied. Majority were children below 2 years of age (39.47 %) followed by 3-4 years age group (28.95 %). Male (63.16 %) to female (36.84 %) ratio was 1.7:1.

Table 1: General characteristics

Characteristics	No. of cases	Percentages
Age (years)		
0-2	15	39.47%
3-4	11	28.95%
5-6	5	13.16%
7-10	3	7.89%
11-20	2	5.26%
>20	2	5.26%
Gender		
Male	24	63.16%
Female	14	36.84%

On admission, common symptoms noted were history of dry cough (73.68 %), respiratory distress (57.89 %), noisy breathing (55.26 %) & witnessed choking (50 %). While unilateral reduced air entry (60.53 %) was most common sign observed, followed by unilateral wheeze (55.26 %), whistling and clicking sounds (28.95 %) & no signs (21.05 %).

Table 2: Clinical features on admission

Clinical features	No. of cases	Percentages
Symptoms		
Dry cough	28	73.68%
Respiratory Distress	22	57.89%
Noisy Breathing	21	55.26%
Witnessed choking	19	50.00%
Fever	5	13.16%
Lethargy	4	10.53%
Signs		
Unilateral reduced Air Entry	23	60.53%
Unilateral Wheeze	21	55.26%
Whistling and clicking sounds	11	28.95%
No Signs	8	21.05%

On radiological evaluation, Chest X-Ray findings were consolidation (73.68 %), lobar collapse (65.79 %), hyperinflation (57.89 %), ipsilateral emphysema (39.47 %) & no abnormality detected (23.68 %). Among 24 patients CT Bronchogram was done, findings of foreign body were confirmed in 19 cases.

Table 3: Radiological findings

Radiological findings	No. of cases	Percentages
Chest X-Ray Findings		
Consolidation	28	73.68%
Lobar Collapse	25	65.79%
Hyper inflation	22	57.89%

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Ipsilateral Emphysema	15	39.47%
No abnormality detected	9	23.68%
CT Bronchogram Findings		
Not Done	14	36.84%
Foreign Body	19	50.00%
? Foreign Body/Mucus Plug	5	13.16%

In present study, location of foreign body was left main bronchus (55.26 %) followed by right main bronchus (31.68 %), carina (7.89 %) & left main and secondary bronchus (5.26 %). Intra operative granulations were present in 21.05 % cases.

Table 4: Intraoperative findings

Intraoperative findings	No. of cases	Percentages
Location		
Left Main Bronchus	21	55.26%
Right Main Bronchus	12	31.58%
Carina	3	7.89%
Left Main and Secondary Bronchus	2	5.26%
Intra operative granulations		
Present	8	21.05%
Absent	30	78.95%

Ground nut (34.21 %), seeds (31.58 %), peanut (18.42 %) & supari/betel nut (5.26 %) were common foreign bodies observed in study.

Table 5: Types of foreign body

Foreign body	No. of cases	Percentages
Ground nut	13	34.21%
Seeds	12	31.58%
Peanut	7	18.42%
Supari/betel nut	2	5.26%
Bone piece	1	2.63%
Button	1	2.63%
Plastic object	1	2.63%
Metallic fragment	1	2.63%

In majority of cases, instruments used for foreign body removal were three-teethed forceps (28.95 %), alligator forceps (21.05 %), biopsy forceps (18.42 %) & combinations of 2 or more instruments (15.79 %).

Table 6: Removal tools

Removal tools	No. of cases	Percentages
Three-teethed forceps	11	28.95%
Alligator forceps	8	21.05%
Biopsy forceps	7	18.42%
Combinations of 2 or more instruments	6	15.79%
Wire basket	3	7.89%
Ureteric forceps	3	7.89%

During bronchoscopy, oral cavity injuries (7.89 %) & pulmonary edema (5.26 %) was noted. Cardiac arrest & mortality was noticed in elderly patient during bronchoscopy.

Table 7: Complications encountered during bronchoscopy

Complication	No. of cases	Percentages
Oral cavity injuries	3	7.89%
Pulmonary oedema	2	5.26%
Cardiac arrest	1	2.63%
Death	1	2.63%

DISCUSSION

The nature/type of FB and the site of arrest or impaction along the tracheobronchial tree decide the clinical course and outcome of inhaled FBs. TFBs can develop complications such as nonresolving pneumonia, hemoptysis, pulmonary atelectasis, bronchiectasis, and even deaths are reported.[5]

Standard radiological evaluations include posterior-anterior, lateral chest X-ray and neck soft-tissue radiography; all of which should be conducted in patients with suspected foreign-body aspiration. The most common x-ray findings if present are air trapping, atelectasis, and consolidation. Negative radiography and fluoroscopy should not preclude

ISSN (O): 2687-5365; ISSN (P): 2753-6556

bronchoscopy in patients with a strong history of FBA.

The reasons for high incidence of TFB in young children are their absence of molar teeth, insufficient chewing, less developed airway protection reflex, and their high interest in exploring environmental objects with mouth.[6] On the basis of the tracheobronchial anatomy, an inhaled foreign body is more likely to enter the right bronchial tree than in the left, in children of all ages. However, the variability in the position of the carina with respect to the mid-trachea may explain why this right-sided preference is less marked in children as compared to adults.[7]

Indrajit R,[8] studied 42 cases, most were male (69%) and below 5 years age (53%). Most of the patients presented with choking (40%) while few were asymptomatic (12%). Most common complication due to delayed removal of foreign body was pneumonia. X-ray was suggestive of foreign body only in 6 cases (14%). Most common location of foreign body was in right bronchial tree (52%). Seeds were most common foreign bodies (38%).

K S Munish[9] studied 52 cases of tracheobronchial foreign bodies, majority were from age group of 1-2 years (46.15%). Sex ratio was 1.6:1 showing male preponderance. 50% of the airway foreign bodies presented within 24 hours of onset of symptoms. Cough (84.61%), respiratory distress (61.53%) were the predominant symptoms and decreased air entry (84.61%) followed by rhonchi (69.23%) were the main signs of airway foreign bodies. Ground nut and tamarind seeds were the most common foreign bodies inhaled. In the airway right main bronchus (59.61%) was the frequent site of lodgment.

In study by Abhishek J et al.,[10] most common age of presentation was between 1 and 3 years (56.4%). Most common symptom in our study was Cough, wheezing and respiratory distress (63.4%). Most common clinical signs at presentation were diminished breath sound in unilateral lung field seen in 36.6% cases. Most common radiological finding on chest radiograph was collapse seen in 41.65% cases. Most common type of foreign body below 3 years of age was food material (seeds, beans) removed in 48.78%. Complications were encountered in 14.6% cases of which most common complication was bronchospasm and acute respiratory distress seen in 41.6% cases.

In study by Yogi, M. et al.,[11] among 37 patients, common age of presentation was 1 - 3 years with male preponderance. History of foreign body was obtained in 64.86% of cases. Normal X-ray was found in 27.02% of cases. In 75.67% FB detected on rigid bronchoscopy was also revealed on virtual bronchoscopy. False positive percentage was 5.40% and false negative was 2.70%. Sensitivity and specificity was 96.5% and 75% respectively. Ground nuts were the commonest foreign bodies aspirated.

In study by Darwin Kaushal et al.,[12] 17 patients were studied, 44.4% of the patients had delayed presentation (> 1 month). The majority of the patients had an organic foreign body (Supari or betel nut). All patients underwent rigid bronchoscopy, followed by optical forceps-assisted removal of the foreign body. A total of 82% of the patients had granulations around the foreign body.

As technology advanced, technique spread, and practitioners became more experienced, flexible bronchoscopy gradually supplanted rigid bronchoscopy as the most commonly used technique in adults and has de facto become the modality of choice for a majority of patients.[13] While, rigid bronchoscopy remains the traditional gold standard, particularly in children.[14] The key factors for preventing complications in the definitive management of tracheobronchial foreign bodies are preoperative planning, multi-discipline teamwork, surgeon expertise and technique.

CONCLUSION

Preoperative history taking, radiological assessment followed by rapid intervention by skilled and experienced surgical and anesthetic team helps in successful retrieval of the foreign body with less incidence of complications.

REFERENCES

1. Eroğlu A, Kürkçüoğlu IC, Karaoğlanoğlu N, Yekeler E, Aslan S, Başoğlu A. Tracheobronchial foreign bodies: a 10 year experience. Ulus Travma Acil Cerrahi Derg 2003;9(04):262–266
2. Abdollahi Fakhim Sh, Badbarin D, Goljanan Tabrizi A. Studying delay causes in the diagnosis of patients with airway foreign body aspiration. J Iran University of Medical Sciences 2008;15 (59) :119–24.
3. Rahulan V, Patel M, Sy E, Menon L. Foreign body aspiration in elderly: an occult cause of chronic pulmonary symptoms and persistent infiltrates. Clin Geriatr 2003; 11:41-43
4. Vijaykumar T, Kalyanappagol NH, Kulkarni LH. Management of Tracheobronchial Foreign body aspirations in Pediatric age group – A 10-year retrospective analysis. Indian J Anaesth 2007; 51(1):20–3.
5. Sahin A, Meteroglu F, Eren S, Celik Y. Inhalation of foreign bodies in children: experience of 22 years. J Trauma Acute Care Surg 2013;74:658–63.
6. Higo R, Matsumoto Y, Ichimura K, Kaga K. Foreign bodies in the aerodigestive tract in pediatric patients. Auris Nasus Larynx 2003;30:397–401.
7. Tahir N, Ramsden WH, Stringer MD. Tracheobronchial anatomy and the distribution of inhaled foreign bodies in children. Eur J Pediatr.2009 Mar;168(3):289-95.Epub 2008 May 24.
8. Indrajit Rana, Jugindra Sorokhaibam, Removal of Tracheobronchial Foreign Bodies Using Flexible Bronchoscopy - A Retrospective Study, OSR Journal of Dental and Medical Sciences (IOSR-JDMS).Volume 15, Issue 7 Ver. IV (July. 2016), PP 70-73
9. K S Munish, Clinical Profile and Management of Tracheobronchial Foreign bodies, Medica Innovatica, December 2013, Volume 2 - Issue 2
10. Abhishek Jaswal, Utpal Jana, Pradip Kumar Maiti, Tracheo-Bronchial Foreign Bodies: A Retrospective Study and Review of Literature, Indian J Otolaryngol Head Neck Surg (January 2014) 66(Suppl 1):S156–S160

ISSN (O): 2687-5365; ISSN (P): 2753-6556

11. Yogi, M., Surender, K., Jadi, L., Chavan, S. and Prathiba, P. (2016) Advantage of Computed Tomography (CT) Virtual Bronchoscopy in the Evaluation of Children with Suspected Foreign Body Airway. International Journal of Otolaryngology and Head & Neck Surgery, 5, 59-64
12. Darwin Kaushal, Amit Goyal, Kapil Soni, Bikram Choudhury, et al, Challenges in Management of Tracheobronchial Foreign Bodies with Delayed Presentation: An Institutional Experience, Int Arch Otorhinolaryngol 2022;26(1):e5–e9.
13. Sehgal IS, Dhooria S, Ram B, et al. Foreign Body Inhalation in the Adult Population: Experience of 25,998 Bronchoscopies and Systematic Review of the Literature. Respir Care 2015;60:1438-48.
14. Eren S, Balci AE, Dikici B, Doblan M, Eren MN. Foreign body aspiration in children: experience of 1160 cases. Ann Trop Paediatr. 2003;23:31-37.

ISSN (O): 2687-5365; ISSN (P): 2753-6556