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Original Research Article

Efficacy of HRCT in Detection of Tracheobronchial Foreign Body

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Abstract

Background: Aspirated foreign bodies in the airway continue to present challenges to the otorhinolaryngologist and interventional pulmonologists. To established the role of HRCT in diagnosis of foreign bodies in suspected cases.

Methods: 30 patients with suspected FB inhalation on the basis of clinical history and symptoms like respiratory distress, stridor, and history of chocking were recruited for study in department of Otorhinolaryngology in DMCH, Darbhanga.

Results: 29 patients (96.67%) with foreign bodies were identified on chest CT. For the patients with tracheobronchial foreign bodies, the occurrence of unilateral hyperlucent lung and post-obstructive lobar or segmental infiltrates on plain chest X-ray was 43.33%. 17 patients (56.67%) had no abnormalities on plain X-ray. The difference between multidetector CT and plain X-ray results was statistically significant.

Conclusion: Foreign bodies are missed by clinical and X-ray examination in many cases and that is only picked up by HRCT. Thus it is the ideal modality in diagnosis of foreign bodies to avoid the morbidity and mortality associated with missing foreign body.

Keywords: Foreign Bodies, High Resolution Computed Tomography, X-ray.

Introduction

Aspirated foreign bodies in the airway continue to present challenges to the otorhinolaryngologist and interventional pulmonologists. Inhalation of foreign bodies is common in pediatric age group and 94 % of them occur in infants and children, with peak incidence in the age group of 1-3 years and is very rare in adults. [1] Adults frequently have an underlying condition associated with impairment of airway Protection such as mental retardation neurological disorder, alcohol or sedative abuse [2-4]. The symptoms and signs produced depend upon the size, nature, location and area of lodgment ofthe foreign body in the trachobronchial tree. A large foreign body occluding the upper airwaymay lead to sudden death, whereas a small foreign body lodged in the bronchial tree may present with less severe system. The radiological diagnosis of FB inhalation is challenging for several reasons. Chest radiography may show a variety of findings including air trapping, consolidation, and atelectasis and bilateral over aeration. Only 10 % of FB is radiopaque. The findings of chest radiography are normal in up to 30% of children who inhaled a FB and the presence of pulmonary infiltrates may misdirect the management of FB inhalation. [5] Bronchoscopy is often performed for definitive diagnosis and

management, however, it is invasive and procedure related serious complications may occur. Recently developed high resolution computed tomography (HRCT) and virtual bronchoscopy is a noninvasive technique that provides realistic 3D views of the tracheobronchial tree. In addition to the detection of foreign body HRCT and virtualbronchoscopy can help the surgeon plan for operative bronchoscopy and safe removal of foreign body. [6-7]

Objective

HRCT thorax in detection of tracheobronchial foreign body.

Material and method

30 patients with suspected FB inhalation on the basis of clinical history and symptoms like respiratory distress, stridor, and history of chocking were recruited for study in department of Otorhinolaryngology in Darbhanga Medical College and Hospital Darbhanga Laheriasarai, Bihar. These patients were further underwent chest X-Ray and findings were noted followed by HRCT was performed in all patients and images were taken. The presence of FB, its location, size and density were determined by consultant radiologist. Associated findings i.e. collapse, consolidation; emphysema, mediastinal shift and pneumothorax were also noted. The finding in form of age, sex, type and site of FB noted and results of HRCT compare with X-ray and bronchoscopy.

The patients were qualified for the procedure of bronchoscopy on the basis of preliminary examination, clinical symptoms and X-ray examination. From the clinical point of view, the predominant symptoms involved the unilateral ones indicating respiratory inflammation (wheezing and crepitations) or lowered vesicular murmur. X-ray examination confirmed signs of atelectasis and inflammation, or emphysema (check-valve effect) of a part of pulmonary parenchyma.

Results

Table 1: Socio-demographic variable

Socio-demographic variable		No of cases	Percentage
Age	< 1 yrs	3	10.00
	1-3 yrs	16	53.33
	3-6 yrs	9	30.00
	>6 yrs	2	6.66
Sex	Male	19	63.33
	Female	11	36.67

Maximum patients (53.33%) were 1-3 yrs age group and 63.33% patients were male.

Table 2: Diagnosis wise distribution

Diagnosis		No. of cases	Percentage
X-ray chest	Identified FB	13	43.33%
	Not Identified FB	17	56.67%
HRCT chest	Identified FB	29	96.67%
	Not Identified FB	1	3.33%

29 patients (96.67%) with foreign bodies were identified on chest CT. For the patients with tracheobronchial foreign bodies, the occurrence of unilateral hyperlucent lung and post- obstructive lobar or segmental infiltrates on plain chest X-ray was 43.33%. 17 patients (56.67%) had no abnormalities on plain X-ray.The difference between multidetector CT and plain X-ray results was statistically

significant.

Discussion

The foreign body into the tracheobronchial tree occurs in all age groups, infants and smallchildren suffer most commonly. The anatomic relation of the larynx, shouting, crying andplaying while eating and lack of parental supervision contributes to this hazard. Most patients in the present study were below 3 years and smallest child was 6 months old with male to female ratio was 2:1which is similar to the that reported in other study. [8]

In our study for the patients with tracheobronchial foreign bodies, the occurrence of unilateral hyperlucent lung and post- obstructive lobar or segmental infiltrates on plain chest X-ray was 43.33%. 17 patients (56.67%) had no abnormalities on plain X-ray. and these findings supported by other study [9] Sensitivity of chest X-ray in foreign body detection is low in our study although it is much lesser than the previous studies thus, although chest radiography may help, it seems neither sufficiently sensitive nor specific for the diagnosisof foreign body aspiration. [10,11] 29 patients (96.67%) with foreign bodies were identified on chest CT. Multidetector CT scan chest is the diagnostic technique used for detection of foreign bodies. It not only can reveal foreign bodies in the bronchial tree but also is very sensitive in detecting associated findings [12] Retained secretions and artifacts may result in false-positive findings; this may explain the case with false +ve results in our series. this was explained by the fact that this patient had small FB in the distal subsegmental bronchus and was obscured by the surrounding segmental lung consolidation that made confident reporting of FB difficult, but because the patient was under a strong clinical suspicion of inhaled FB, together with the ancillary findings. [13]

Conclusions

The diagnosis of foreign body aspiration of the airway in children can be accomplished by using chest HRCT. It is often useful in delineating the exact shape, location, volume and form of a bronchial foreign body and can help the surgeon plan for operative bronchoscopy and safe removal of the foreign body.

References

1. Rothman BF, Boeckman CR. Foreign bodies in the larynx and tracheobronchial tree in children. A review of 225 cases, Annal Otol, Rhinol Laryngol. 1980;89:434-6.
2. Prakash UBS, Cortese DA. Tracheobronchial foreign bodies. In Prakash UBS, ed. Bronchoscopy. New York Raven Press.1994:253-78.
3. Limper AH, Prakash UBS. Tracheobronchialbodies in adults. Ann Intern Medicine. 1990:112:604-9.
4. Chen CH, Lai CL, Tsai TT, Lee YC, Perng RP. Foreign body aspiration into lower airway in Chinese adults. Chest. 1997;112:129-33.
5. Khan MF, Herzog C, Ackermann H et al. Virtual endoscopy of the tracheo-bronchial system: sub-millimeter collimation with the 16- row multidetector scanner. Eur Radiol. 2004; 14:1400– 5.
6. Tan HKK, Brown K, McGill T, Kenna MA, Lund DP, Healy GB. Airway foreign bodies (FB): a 10- year review. Int J Pediatr Otorhinolaryngol. 2000; 56:91 –9
7. Finkelstein SE, Schrump DS, Nguyen DM et al. Comparative evaluation of super higher solution CT scan and virtual broncho scopy for the detection of tracheobronchial malignancies. Chest. 2004; 124:1834–40
8. Kalyanappagol VT, Kulkarni NH, Bidri LH. Management of tracheobronchial foreign body. aspirations in paediatric age group – a 10 year retrospective analysis. Indian J Anaesth. 2007;51 :23– 27.
9. Rogalla P, Stöver B, Scheer I, Juran R, Gaedicke G, Hamm B. Low- dose

spiral CT: applicability to pediatric chest imaging. Pediatr Radiol. 1998;28 : 365–69.
10. Zwirewich CV, Mayo JR, Muller NL. Low- dose high-resolution CT of lung parenchyma.Radiology. 1991; 180:413 –17
11. Black RE, Johnson DG, Matlak ME. Broncho scopic removal of aspirated foreign bodies in children. J Padiatr Surg. 1994; 29:682-4.
12. James B, Snow JR. Bronchology. In Disease ofthe nose, throat, ear, head and neck, 14th Ed. 1991; Volume 2: 1278-96.
13. Alafifi Mahmoud & Elkebir A. Renal Tumours: Risk Factors, Clinical Profile, and Histopronosis: A Review of 58 Cases. Journal of Medical Research and Health Sciences, 2022; 5(5): 2013–2017.