Foreign Body Bronchus and Rigid Bronchoscopy– Our Experiences at a Tertiary Care Hospital

Santosh Kumar Swain[1], Surya Kanta Pradhan[2], Sanjeev Gupta[2], Kamalakanta Jena[2], Priyanka Debta[3]

[1]Professor, Department of Otorhinolaryngology, IMS and SUM Hospital, Siksha 'O' Anusandhan (Deemed to be University), K8, Kalinga Nagar, Bhubaneswar-751003, Odisha, India, [2]Clinicians, Department of Otorhinolaryngology, Apollo Hospital, Bhubaneswar-751003, Odisha, India, [3]Professor, Department of Oral Pathology and Microbiology, Institute of Dental Sciences, Siksha 'O' Anusandhan (Deemed to be University), K8, Kalinga Nagar, Bhubaneswar-751003, Odisha, India

Abstract

Background: Foreign body inhalation is often encountered in emergency department. Foreign body can be lodged in any site of the tracheobronchial air way. Rigid bronchoscopy is one of the established technique for removal of the inhaled foreign body with fewer complications.

Material and Method: We have done a retrospective study in our tertiary care center to determine the clinical presentation, nature of foreign body, age of presentation, location of foreign body, management of foreign bodies and duration of hospital stay in our population.

Result: The most common foreign body in our study was peanut(15.7%) followed by ground nut (12.2%), coconut pieces (7%), small led bulbs (7%) and corn (7%).Most common sites for foreign body lodgment was right main bronchus (40.3%) followed by left main bronchus (29.8%) and trachea (17.5%).

Conclusion: Rigid bronchoscopy is an effective technique for removal of the foreign body from tracheobronchial airway with fewer complications.

Keywords: *Foreign body bronchus, Rigid bronchoscopy, X-ray chest, CT scan Chest, Ventilating bronchoscope.*

Introduction

Foreign body in ear, nose and throat is not uncommon. We as otolaryngologists handle these situations almost every day. Fortunately, most of these situations are not life threatening and can be managed in emergency department or in OPD. But foreign bodies in airway are life threatening emergencies and should be managed promptly to avoid asphyxia and death. These are most commonly seen in children of 1-4 years and sometimes reported in adult patients. Most cases present with sudden onset difficulty in breathing but sometimes they present as cough, wheezing, dyspnoea, pneumonia and emphysema. In maximum number of cases there is a clear history of foreign body aspiration and clinical features correlate with radiological features and diagnosis can be made promptly. But in certain cases CT scan neck and chest is required before going for definitive treatment. Rigid bronchoscopy with foreign body removal is the treatment of choice but some surgeons remove foreign bodies using flexible bronchoscopes. We have done a retrospective study in our tertiary care centre to determine the clinical presentation, nature of foreign body, age of presentation, location of foreign body, management of foreign bodies and duration of hospital stay in our population.

Corresponding Author:
Dr. Santosh K. Swain
Professor, Department of Otorhinolaryngology, IMS and SUM Hospital, Bhubaneswar, Odisha, India
e-mail: santoshvoltaire@yahoo.co.in

Material and Method

We have conducted a retrospective study in the Department of ENT & Head and Neck Surgery, Apollo hospitals, Bhubaneswar from January 2010 to January 2019. 57 Patients coming to the hospital with acute onset respiratory distress with suspected history of foreign body aspiration were included in the study. All the patients were investigated as per the protocol and X- ray chest was done in all most all cases and CT scan chest with or without virtual bronchoscopy was done in doubtful cases. Rigid bronchoscopy was done in all cases under general anaesthesia and in most of the cases we have successfully retrieved the foreign body. Our inclusion criteria was any patient with acute onset respiratory distress with suspected foreign body aspiration and our exclusion criteria was critically ill patients with other comorbidities and fever.

Results

57 patients were studied in this period of 8 Years (January 2010 to January 2019). 24 (42.1%) patients were in the age group of 1-3 years followed by < 1 year 16 (28.0%). The incidence is lowest in above 10 years' children 2 (3.5%).

Table 1: Incidence Rate

Age	No	Percentage
<1	16	28.0
1-3	24	42.1
3-5	8	14.0
5-10	7	12.2
>10	2	3.5

The number of male and patients 29 (50.8 %) are slightly more than female patients 28 (49.1%) but the ratio is nearly equal.

Patients who presented to us with acute onset respiratory distress and history of foreign body ingestion/ aspiration X- ray chest was done and 17 (29.8%) patients had definitive diagnosis of foreign body in airway. In 24 (42.1%) doubtful cases CT scan chest was done and it had confirmed the diagnosis in 23 cases. All these patients under went rigid bronchoscopy and foreign body was retrieved in 53 cases and in 4 cases there was thick mucus plug and debris which was cleaned.

Table 2: Sex ratio description

Sex	No	Percentage
Male	29	50.8
Female	28	49.1

We have also studied the location of foreign body lodgment and the data showed the most common site was right main bronchus 23 (40.3%) followed by left main bronchus 17 (29.8%) and trachea 10 (17.5%). The least common site is glottis followed by bilateral bronchus. We did not find foreign bodies in 4 (7%) cases and there was thick mucus plug causing airway obstruction. And these patients were managed conservatively.

Table 3

Location	No	Percentage
Glottis	1	1.7
Trachea	10	17.5
Right Main Bronchus	23	40.3
Left Main Bronchus	17	29.8
B/L Bronchus	2	3.5
No Foreign Body	4	7.0

The most common foreign body in our study was peanut 9 (15.7%) followed by ground nut 7 (12.2%), coconut pieces 4 (7%), small led bulbs 4 (7%) and corn 4(7%). We have removed various types of vegetative, plastic and metallic foreign bodies.

Table 4

Type of Forign Body	Broom Stick	Nail	Coconut	Screw	Peanut	Led Bulb	Tamarind Seed	Plastic Piece	Corn	Ground Nut	Whistle	Tracheostomy Tube	Spring	Vegetable Piece	Bengal Gram	Safetypin	Earpin	Beatle Nut	No Fb
No	1	3	4	2	9	4	2	3	4	7	3	1	1	3	2	4	1	1	2
Percentage	1.7	5.2	7.0	3.5	15.7	7.0	3.5	5.2	7.0	12.2	5.2	1.7	1.7	3.2	3.5	7.0	1.7	1.7	3.5

We have also studied the duration of hospital stay and the requirement of ventilator. Most of the patients 44 (77.1%) were discharged next day and few patients required long term ventilation and stayed for more than 2 days in the hospital 13 (22.8%).

Table 5

Day of Discharge	No	Percentage
Next Day	44	77.1
> 2 Days	13	22.8

One of our patients had some hypoxic injury after the surgery but he had recovered well after the ICU care and we had zero mortality in our series.

Discussion

Foreign body (FB) in airway is an uncommon but life threatening emergency in Otorhinolaryngology practise. Most of the cases are accidental. It is the fourth leading cause of accidental death in children of less than 3years. [1] It's most commonly seen in children of the age group 1-3yrs.[2] It' similar as per our study as we have maximum patients in the age group of 1-3 years. [3] The etiological factors affecting children may be lack of molar tooth, talking or laughing during eating, putting things in mouth while playing and lack of coordination between deglutition and laryngeal closure. In adults FB aspirations are seen in semi-comatose and elderly people. It is a challenge to ENT specialists to diagnose and treat FB in airway. Some patients given proper history of FB aspiration but most of the time parents and relatives are unknown of FB aspiration. A high index of suspicion is needed to diagnose a case of FB aspiration and quick management to avoid dreaded complication and respiratory arrest. Any patient coming to the emergency with complaints of sudden onset cough, stridor, dyspnoea and refractory LRTI and single sided pneumonia should be evaluated in the line of FB aspiration.[4] As per our study most of the foreign bodies are vegetative and most common is peanut (15.7%) which is in similarity with the literature.[5] These are the most difficult FBs to remove. Other foreign bodies which are commonly found are pins, nails, seeds, plastic parts of toys and pens and screws. The organic foreign bodies react with the surrounding and form granulations and can cause complete blockage of the airway. Depending on size of the foreign body it may lodge in different segment of airway i.e. larynx, sub glottis, trachea and bronchus. Larger foreign bodies get impacted in larynx and smaller ones go into the bronchus. Most of these FBs predominantly found in right main bronchus (40.3%) also go as per literature.[6, 7] But few studies by Piva et al and Fraga et alstate that the FBs are mostly seen in left main bronchus.[8, 9] There are three phases in foreign body aspiration. Initially there will be chocking, coughing and gasping, after that there will be a silent phase and finally there will be a complication phase like pneumonia and atelectasis. Clinical presentation depends on the site of lodgement. It may range from complete obstruction when the size is large and site is larynx to no symptoms when the size is small and the site is terminal bronchiole.[10]Sometimes they mimic other respiratory problems like asthma with features of cough wheezing and mild dyspnoea but the unilateral signs differentiate them from asthma. Most of the times FB can be diagnosed with X-ray neck and chest but a negative X-ray can't rule out FB aspiration as most of the foreign bodies are radiolucent. In our study only 29.8 % cases were diagnosed with X-ray chest. They may also reveal pneumonia, emphysema and atelectasis which help in confirming diagnosis. HRCT neck and chest is required when there is doubt about the history of aspiration and presence of radiolucent foreign body is suspected. It also confirms the location of foreign body. Virtual bronchoscopy is the reconstructive image of CT scan which also helps in localisation and confirmation of foreign body. A study by Behera et al indicated that virtual bronchoscopy using multidetector computed tomography (MDCT) scanning is effective in diagnosing the presence of radiolucent vegetable foreign bodies in the tracheobronchial airway.[11] When the history is doubtful and all the radiological tests are negative then a conservative approach should be followed and rigid bronchoscopy can be avoided.[12] Rigid bronchoscopy is the gold standard for treatment of foreign body in trachea or bronchus. It is always done under General anaesthesia. After giving GA the air way is examined using a telescope and the position of the FB is confirmed. Then the ventilating bronchoscope is introduced and kept just above the FB. Any secretion around the FB is cleaned and after that it has to be taken out. Check bronchoscopy is done to confirm any residual FB. The procedure should be done quickly after receiving the patient in the emergency. Ventilating bronchoscope is the instrument of choice through which the anaesthesiologist maintains the saturation of the patient and the surgeon removes the FB in the mean time. Most of the patients get discharged on the next day (77.1%) but some patients require long term ventilation (22.8%) and longer hospital stay. In the expert hands the mortality is near zero if it's done in

correct time. Sometimes for larger foreign bodies we may have to do a tracheostomy and remove the FB from trachea.

Conclusion

Foreign body in airway is mostly seen in children and always accidental and life threatening. It should always be diagnosed and managed quickly to save the patient. History with clinical signs and sometimes X-ray and CT scan diagnose these conditions. Ventilating rigid bronchoscopy and FB removal under general anaesthesia is the procedure of choice. In experienced hands the mortality is near zero. All the parents and caregivers should be educated how to avoid such conditions.

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