ORIGINAL ARTICLE

RIGID BRONCHOSCOPY FOR TRACHEOBRONCHIAL FOREIGN BODIES IN CHILDREN: EXPERIENCE AT HOLY FAMILY HOSPITAL RAWALPINDI

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ABSTRACT

Background: Foreign body aspiration claims thousands of lives each year.[1]It is the fourth leading accidental cause of death under three years of age and the third cause of death under one year of age. The aim of the study was to evaluate the presentation and management of different types of foreign bodies in tracheobronchial tree in children.

Material & Methods: This descriptive study carried out in the ENT department of Holy Family Hospital Rawalpindi, from January 2011 to June 2013. Children from emergency /OPD of ENT or pediatric unit with suspicion of foreign body aspiration were included in the study. Relevant history and demographic details were recorded. The findings of chest x-ray were also documented. All patients underwent rigid bronchoscopy under general anesthesia. Bronchoscopic findings with type and location of retrieved foreign body were noted down.

Results: A total of 168 cases went under bronchoscopy for the removal of foreign body. 69% were male. Mean age was 2.9 years. Cases which presented directly (direct cases) to us were 131(78%) and rest were referred from pediatric unit (referred cases). Total chest x-rays performed were 105 (62.5%) though visible foreign body was present in only 16.19% cases. Paroxysm of cough was the main symptom (51.7%) and decreased breath sound was the main sign on presentation (88.6%). Foreign body was recovered in 94% of direct cases and 75.6% in referred cases. Ground nuts were the most common foreign body (71.52%) and the right bronchus was the most common location of foreign body lodgment (58.27%).

Conclusion: Rigid bronchoscopy is an effective procedure for the removal of foreign bodies in tracheobronchial tree in children.

KEY WORDS: Trachea; Bronchus; Foreign body; Rigid bronchoscopy.

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INTRODUCTION

Foreign body (FB) aspiration claims thousands of lives each year.[1] It is the fourth leading accidental cause of death under three years of age and the third cause of death under one year of age.[2,3] It usually affects children under three years of age.[4,5] Foreign body inhalation is common in children due to easy accessibility of different types of nuts and other solids to very young children and lack of proper attention to children in the lower socio-economical group. Immediate attention and proper management of foreign body in children is necessary because of the small size of tracheobronchial tree. Definite history, positive findings and radiological evidence are important in confirming the diagnosis although foreign bodies were found in the absence of any of these findings.

During the 19thcentury, treatment of FB aspiration was largely ineffective and mortality rate was estimated at 23%. This rate plummeted with the development of bronchoscopic techniques for the removal of these foreign bodies.[6] Bronchoscopy is a life-saving procedure for foreign body removal in emergency as a therapeutic procedure and also a diagnostic tool in the tracheobronchial tree[7]. Most of the procedures are carried out with the rigid ventilating bronchoscope and grasping forceps, under general anesthesia. This system has brought miracles to the medical profession and hassaved precious lives up till now.

The aim of this study was to evaluate the presentation, clinical profile and management of tracheobronchial foreign bodies with rigid bronchos-

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copy in a tertiary care setting and to compare it with other studies in world literature.

MATERIAL AND METHODS

This descriptive study was conducted at ENT Department of Holy Family Hospital, Rawalpindi. It included all patients of age group of 0-12 years who underwent bronchoscopy for the treatment for tracheobronchial foreign body aspiration from January 2011 to June 2013.

We received patients through two routes; directly in Emergency/OPD of ENT with complaints of acute respiratory distress with history and clinical examination indicative of FB aspiration(Direct Cases) and referred cases from pediatric unit, who were being treated as cases of pneumonia or lung collapse and were not responding to conservative treatment raising suspicion of tracheobronchial foreign body (Referred Cases).

Written informed consent was obtained from parents /attendants. In direct cases, chest x-rays were carried out only in stable patients. Bronchoscopy was carried out under general anesthetic with rigid bronchoscope (Carl Storz) and removal of foreign bodies by means of different forceps under direct vision. All the patients were kept under observation in the ward for 24 hours after the procedure and discharged after doing check chest x-rays. The patients referred from Pediatric Units were sent back to the respective units after 24 hours observation. All the patients were given dexamethasone injection before the procedure to minimize edema formation.

The data was entered in a proforma which included age, gender, elapsed time in seeking medical care, main signs and symptoms, findings of chest radiographs, results of bronchoscopy along with location and type of FB, if retrieved.

RESULTS

A total of 168 patients underwent the rigid bronchoscopy. Out of these, 102 (69%) were males and 66(31%) females. Patient's age ranged from 8 months to 12 years with a mean of 2.9 years. Age wise distribution is further elaborated in Table1.

Out 0f 168 patients, 131(78%) were Direct Cases and 37(22%) were Referred cases.

Elapsed time in seeking medical attention was from 10 minutes to 9 hours with a mean of 3.7±2.2 hours in direct cases. Elapsed time for bronchoscopy in referred cases ranged from 17 days to 29 days.

The most common presenting symptom was cough followed by dyspnoea in direct cases. Among these cases direct witness of aspiration could be determined in 61(47%) cases. Fever with non-resolving chest infections were the main manifestations in referred cases. Decreased unilateral breath sounds were the most common finding on examination followed by rhonchi and stridor. (Table 2 & 3)

Table 1: Age distribution of patients with foreign body bronchus (n=168).

Age group	Number of patients
<5 years	117(69.7%)
5-12 years	51(30.3%)

Table 2: Main presenting symptoms (n=168).

Presenting symptoms	Number of patients
Cough	87(51.7%)
Dyspnoea	70(41.6%)
Choking	40(23.8%)
Fever	13(7.7%)
Cyanosis	4(2.3%)

Table 3: Main clinical signs (n=168).

Clinical findings	No. of patients
Decreased unilateral breath sounds	149(88.6%)
Rhonchi	87(51.7%)
Stridor	40(23.8%)

Table 4: Chest x-ray distribution (n=105).

Types of cases	Chest x-ray	Foreign body seen
Direct(131)	68(51.9%)	15(11.4%)
Referred(37)	37(100%)	2(5.4%)
Total(168)	105(62.5%)	17(16.19%)

Table 5: Chest x-ray findings (n=105).

Findings	No. of patients
Emphysema	43(40.9%)
Pneumonia	18(17.1%)
Segmental lung collapse	15(14.28%)
Atelectasis	11(10.4%)
Normal	47(44.7%)

Chest x-ray was performed in 105(62.5%). Only in 17 (16.19%) cases foreign bodies could be visualized on chest x-ray. Details given in Table 4 & 5.

Total number of foreign bodies recovered was 151(89.8%). Out of 131 direct cases, FB was recovered in 123(94%) cases. Among referred cases FB was recovered in 28 (75.6%) out of 37 cases. Among

Table 6: Type of foreign body(n=151).

Type of foreign body	Number of patients
1.Organic:	
a. Peanuts	64(42.38%)
b. Betel nut	27(17.88%)
c. Other nuts/seeds	13(8.60%)
d. Fishbone	2(1.32%)
e. Chicken bone	1(0.66%)
f. Meat lump	1(0.66%)
Total	**108(71.52%)**
2. Inorganic:	
a. Plastic beads	11(7.28%)
b. Plastic whistle	8(5.29%)
c. Plastic toy piece	7(4.63%)
Total	**26(17.21%)**
3. Metallic:	
a. Pins	6(3.97%)
b. Needles	5(3.31%)
c. Coins	3(1.98%)
d. Beads	2(1.32%)
e. Tracheostomy tube	1(0.66%)
Total	**17(11.25%)**

Table 7: Location of foreign body (n=151).

Site	Location
Larynx	8(5.29%)
Trachea	16(10.59%)
Left bronchus	39(25.82%)
Right bronchus	88(58.27%)

referred cases, in 4(10.8%) cases only dry mucous plug was removed, which was obstructing the airway. The most common FB recovered was pea nut and the most common site for lodgment was the right bronchus. (Table 6 & 7)

DSCUSSION

A FB in the airway is an extreme emergency and urgent management of foreign body aspiration in child age group is even more important because it is a major cause of accidental death in childhood.[8]Rigid bronchoscopy remains the gold standard procedure for removing foreign materials, as the greater diameter of the rigid bronchoscope allows instruments to be more easily inserted through it.[9-11]

Mean age of the patients in our study was 2.9 years. This is in accordance with other national[12,13] and international studies.[14,15] This fact can be justified as children are in the habit of putting objects into their mouth to determine their texture and taste and to chew on when teething.[16] In our study, the youngest patient was a baby girl who was 8 months old and aspirated maize seed which was inserted in her mouth by her sibling. The oldest patient was a 12 years old boy who aspirated a metallic nut.

Male preponderance in our study is also in line with other published studies.[17-19] There is only one study by Falase et al which documents a male to female ratio of 1:1.[20] The cause of this male preponderance can be the more adventurous and inquisitive nature of boys than the girls.

In our study we observed that elapsed time in seeking medical attention of 3.7 hours in direct cases which is in accordance to the studies conducted by other colleagues.[21-23] Significantly prolonged elapsed time was observed in referred cases which ranged from 17 to 29 days. The shorter time to diagnosis in children may be partly due to parental alertness in infants and children, but it could also be related to the more central location of the aspirated foreign body in the children.[24]

Cough followed by dysopnea and choking were the main symptoms of the patients and decreased breath sound on auscultation was the main sign identified in our study. Other studies also showed these to be the main presenting signs and symptoms[12,16,25-28] In our study direct evidence could be established in 47% of cases. A variable incidence of direct evidence of aspiration has been mentioned in the published literature.[29-31]

Fever with non-resolving chest infection was the main symptom of patients re referred to us with suspicion of FB aspiration; similar findings were seen in study by Baharloo et al.[11]

Chest x-ray was performed in 62.5% of cases but FB could only be visualized in 16.19% cases. Study done by Tahir et al showed 72.58% of cases had normal chest x-ray.[16] Study done by Gulshan et al also documented only 9.52% cases with visible FB on chest x-rays.[12] Most common finding seen on radiographs was emphysema followed by patchy consolidations which is in consistent with other studies.[11,32] The proportion of normal radiographs reported in the literature is high mainly due to organic nature of the foreign bodies. Thus a normal chest radiograph should not rule out the possibility of a FB.

Bronchoscopy was successful in 89.8% cases. Foreign body retrieval was high in direct cases 94% which dropped to 75.6% in referred cases. In 4 cases of referred patients only mucous plugs was retrieved.

Tang et al. reported successful removal by bronchoscopy in 91.3% of children with FB aspiration.[33]

Organic foreign body was seen in 71.52% of cases with nuts being the most common. Most common location of foreign body was right bronchus i.e.58.27% of cases. The results of five local are consistent with our results.[12,16,34-36] In our view the main cause of high number of organic foreign bodies especially nuts is due to the fact that these commodities are widely used in our part of world. Most of the foreign bodies were in the right main bronchus, this is related to the fact that right main bronchus is more vertical and wider than the left one.[37,38]

CONCLUSION

Rigid bronchoscopy is a useful method for foreign body removal. We recommend that bronchoscope facility should be made available at least at every district hospital to save precious lives by-making an early intervention possible.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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None declared.