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Original Research Paper

Otorhinolaryngology

FOREIGN BODY IN THE PEDIATRIC AIRWAY IN URBAN POPULATION – AN AMBISPECTIVE STUDY IN A METROCITY

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ABSTRACT Introduction: Tracheo-bronchial foreign body aspiration is common in pediatric population which causes life threatening complications and may lead to death necessitating prompt recognition and early intervention. This study is aimed to report our experiences in children landing up with different varieties of foreign body

aspiration.

Materials and Methods: This is a retrospective study carried out in the department of ENT, Institute Of Child Health and Hospital for Children, Egmore, Chennai. This case series includes 42 children who were admitted with history of foreign body aspiration during the period of June 2017 to July 2018 and undergone rigid bronchoscopy under general anesthesia.

Results: This study comprises of pediatric age group with 24 males and 18 females, with majority of the children falling under the age of 4 and maximum being 10 years. The most common foreign body was removed was peanut. All the children who underwent foreign body removal by rigid bronchoscopy completely recovered from their ailments.

Conclusion: Rigid bronchoscopy is the treatment of choice for prompt removal of foreign bodies in the lower respiratory tract. It could be used both as diagnostic and therapeutic tool. In our metrocity range of child's age at presentation is from infancy to 12 years. Though it is more common in toddlers incidence is rising in infancy and 4-12 years age group also.

KEYWORDS : Tracheo-bronchial, Rigid Bronchoscopy, Aspiration.

INTRODUCTION

Aspiration of foreign body into the tracheobronchial tree is a common problem in children, necessitating prompt recognition and early intervention. A delay in diagnosis and retention of foreign bodies usually increases the morbidity and mortality, ranging from recurrent respiratory infection, unresolving asthma, fatal airway obstruction, asphyxia and eventually death. Hence rigid bronchoscopy under general anesthesia, using jet ventilation is a lifesaving procedure for removal of foreign bodies in an emergency crisis¹. This study indicates different varieties of tracheobronchial foreign bodies in pediatric population, their mode of presentation, management and outcome after foreign body removal.

MATERIALS AND METHODS

This is a retrospective study carried out in the department of ENT, Institute of Child Health and Hospital for Children, Egmore, Chennai after getting clearance from the ethical committee during the period of June 2017 to July 2018. This study included 42 children with age group ranging from neonate to 12 years of age presenting with history of foreign body aspiration. Chest radiograph was taken for all and diagnostic flexible bronchoscopy in children with unclear history where the reliability is poor before proceeding for rigid bronchoscopy procedure.

INCLUSION CRITERIA

- 1) Children with history of foreign body aspiration
- 2) Unilateral unresolving wheezing
- 3) Sudden onset of cough

EXCLUSION CRITERIA

- 1) Children in shock requiring vasopressor support
- 2) Children in respiratory failure requiring mechanical ventilation

within 24 hours of onset of breathing difficulty. Some of them presented with unexplained cough as they were treated as bronchial asthma because of lack of clear history. One child treated as near fatal asthma and cardiogenic shock. Some cases with their history and presentation are given below.

CASE 1: An 11 yr old male child presented with history of accidental ingestion of pen cap...h/o cough And breathlessness, x-ray chest PA view showed - collapse of left lung. Rigid bronchoscopy done and pen cap was removed from left main bronchus.

CASE 2: A 3year old male child treated as near fatal asthma and cardiogenic shock. Pulmonologist did Fiber Optic Bronchoscopy and found blackish foreign body. Rigid bronchoscopy done and same foreign body removed in pieces and was found to be betel nut.

CASE 3: 1 yr Old female child came with chief complaints of cough for 25 days acute onset of breathlessness and a CT thorax suggested? Foreign body in the right main bronchus. Rigid Bronchoscopy showed a seed of bitter gourd in right main bronchus and same removed in-toto. Post OP X-ray-Lung fields clear.

CASE 4: A 2 yrs old female child came with complaints of unexplained cough and breathlessness 25 days. X-ray and CT were taken which showed FB in left main bronchus. Rigid bronchoscopy done but FB could not be made out. Then flexible FOB done, which shows FB in right main bronchus, mobile foreign body watermelon seed noted and same removed by rigid bronchoscopy.

CASE 5: A 2 yrs old male child came with history of accidental ingestion of tamarind seed and with history of cough and breathlessness Rigid bronchoscopy done FB in right main bronchus removed .Patient recovered from cough and breathlessness

CLINICAL PRESENTATION

Most of the children were brought to the emergency room

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Figure 1: Case 5 preop X ray chest and intraop removed foreign body

CASE 6: A 2 yrs old child came with sudden onset of Cough and breathlessness. Pulmonologist did FOB and referred as FB bronchus for rigid bronchoscopy. On rigid bronchoscopy FB with granulations present. On attempt of removal patient developed pneumothorax pneumo-mediastinum and pneumoperitoneum, ICD inserted, pneumothorax subsided.

CASE 7: Parents of one and half year female child Presented with Alleged H/O Foreign Body(peanut) aspiration came with Fever and breathlessness. X-ray showed collapse of left lung. Rigid Bronchoscopy was Done and Peanut was removed .post op child stable.

CASE 8: History of Accidental Ingestion of Safety Pin in a 3 year old male X ray showing Radio Opaque FB in left main Bronchus. Luckily pin was closed type. Rigid Bronchoscopy was done and The Foreign Body was removed without injuring the lung parenchyma.

Figure 2: Case 8 preop x ray chest and intra-op removed safety pin



CASE 9: A 2 Year Old Female presented with Breathlessness and Excessive cry. CXR showed radio opaque FB. Rigid Bronchoscopy was done and metallic foreign body was removed intoto. Post operatively child was stable.

Figure 3: 3 different cases. foreign bodies with pre-op chest x ray and removed foreign body picture



Figure 4: 4 different cases. foreign bodies with pre-op chest x ray and removed foreign body picture



Hence varieties of foreign bodies are reported in our institute.

RESULTS SEX AND AGE DISTRIBUTION

Out of 42, 24 were males and 18 were female; all the children were less than 12 years of age. The most common age group in aspiration of foreign body was 1 to 3 years with 47.6 % (n=20)

Table 1: Sex distribution

SEX	NUMBER	PERCENTAGE
MALE	24	57.2
FEMALE	18	42.8

Table 2: Age distribution

Age group (in years)	NUMBER	PERCENTAGE
<1	6	14.2
1 -3	20	47.6
4-6	8	19
7-9	6	14.2
10-12	2	4.7

Among the foreign bodies aspirated ,organic foreign bodies (88%, n = 37) were more common compared to inorganic foreign bodies. Among organic type of foreign bodies, peanuts (whole /broken) were the most common 78% (n=33). Inorganic foreign bodies found were metal hair pins , safety pins ,pen caps, electric socket.

Table 3: Types of Foreign bodies removed from the bronchus

FOREIGN BODIES ASPIRATED	NUMBER	PERCENTAGE
Peanut(whole/broken)	33	78.5
Custard seed	1	2.3
Pistachio	1	2.3
Betel nut	1	2.3
Bitter gourd seed	1	2.3
Cement stone	1	2.3
Pen cap	1	2.3
Metal hairpin	1	2.3
Metal safety pin	1	2.3
Electric socket	1	2.3

A definite history of foreign body aspiration was given only in 60% of cases .The most common symptom with which children presented were unexplained cough40.4% (n=17), refusal of feeds 11.9(n=5), difficulty in breathing (n=4). The most common physical findings were reduced breath sounds and rhonchi and fever; Few did not have any signs on physical examination .

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Table 4: Various presentations

PRESENTING COMPLAINTS	NUMBER	PERCENTAGE
Unexplained cough	17	40.4
Fever	3	7.14
Refusal of feeds	5	11.9
Noisy breathing	1	2.3
Difficulty in breathing	4	9.5
None	12	28.5

On investigation radio opaque foreign bodies (direct radiological signs) were seen only in 7.14% cases (n = 3), but in most cases x ray implied the presence of foreign body with indirect radiological signs like lung collapse, atelectasis, obstructive emphysema, pneumonia etc.

Foreign body most commonly was impacted in Right main bronchus 59.5%, (n = 25) followed by Left main bronchus 38%(n=16) and lastly the trachea 2.3 %(n=1).

Table 5: Sites of bronchus foreign body lodgement

SITE OF LOCALIZATIO	NUMBER	PERCENTAGE
Trachea	1	2.3
R main bronchus	25	59.5
L main bronchus	16	38

DISCUSSION:

Foreign body aspiration is always accidental and most common in pediatric age group. It is more frequent in between the ages of 1 and 3 years.⁽²⁾ According to the literature, 41% of the present patients ⁽³⁾ were aged 1–3, in our series also we found that the 1-3 years of the age group was the most common as shown in Table 2.

The main reasons for this increased incidence in pediatric age group specially in infants and young children are due to the tendency to explore objects with the mouth, due to lack of molar teeth, poorer mastication, tendency to put things in mouth, playing with things in mouth, immature protective laryngeal reflexes.⁽⁴⁾

Among the foreign bodies in the tracheo bronchial tract, nuts were the commonest which is commonly available in our locality ⁽⁵⁾. Foreign body aspiration may lead to life threatening conditions like asphyxia and death; hence, urgent intervention is needed to save the child. If not diagnosed in a proper time, the partial obstruction may turn into total obstruction because of mucosal edema and granulations will occur around the site of FB lodging in case of organic foreign bodies like peanut. Hence any child with sudden onset of intractable cough or stridor or recurrent lower respiratory tract infections, Otorhinolaryngologist should always consider the foreign body aspiration in the airway as one of the differential diagnosis⁽⁶⁾. Once its considered, rapid identification and localization are required.

Regarding the symptoms and presentation, episode of chocking associated with cough , breathlessness and fever due to delayed presentation 5 ,diminished breath sounds were present in 92% in this study . Rhonchi and crepitations were present in 50 % $^{\prime\prime}$ The most important step in diagnosis is a detailed history $^{(0)}$ confirmed by physical and radiological examinations. Radiographic imaging can be helpful if the object aspirated is radiopaque or if there are signs of hyper expansion on expiration. However negative-imaging studies, does not exclude the presence of a foreign body in the airway. The flexible bronchoscopy is an alternative tool to detect tracheobronchial foreign body when there is no definite history of aspiration. But, it is difficult to perform in very young children and also has a chance of negative bronchoscopy: 12% ⁽⁹⁾ and 38% ⁽¹⁰⁾. Longer the foreign body resides in the airway, the more likely is to migrate distally and give an inflammatory reaction leading to granulation and impaction .When this occurs, symptoms of chronic cough and wheezing may mimic asthma. When the chest radiograph is normal and

the clinical diagnosis suggests aspirated foreign body, helical CT of chest and virtual bronchoscopy can be considered in order to avoid needless rigid bronchoscopy⁽¹¹⁾though it can be also used as a diagnostic tool. Foreign bodies are more common in right bronchus because it is more in line with trachea, more wider right the lung ,higher air intake during inspiration causing negative suction effect.

The preferred treatment is rigid bronchoscopy and removal of foreign body removal in children.^(4,6) Rigid bronchoscopy has wide instrument channel and lumen which allows both ventilation and easy access to the target simultaneously.⁽¹²⁾ Post-operative monitoring of the patients were needed, which included antibiotics with steroids and nebulization with oxygen and bronchodilators in few cases

CONCLUSION

As children have tendency to put anything in their mouth or nose, it may lodge in bronchus as foreign body. High degree of clinical suspicion should be there in any child with unexplained cough and sudden onset of respiratory difficulty. Wide knowledge about the complications of rigid bronchoscopy and wise attempt to manage airway edema if any while removing foreign body should be always kept in mind in cases of migrating and multiple foreign bodies. As sharing of the airway is a part of the procedure, good rapport with anesthetist is essential. Sensitizing the public about the foreign body aspiration and its complications is the key in preventing pediatric foreign body aspiration^{(13).} We conclude by stating that in our metrocity of Chennai, incidence of foreign body in airway is not restricted to toddlers but even in infants and older elementary school group children as well. The most common foreign body being peanut with unexplained cough as presentation and most common site of lodgement of foreign body in right main bronchus.

COMPLIANCE WITH ETHICAL STANDARDS: DECLARATION:

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