

Clinical Presentation and Management of Tracheobronchial Foreign Body Aspiration in Children: Our Experience

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ABSTRACT

Objective: To evaluate the clinical presentation and management of tracheobronchial foreign body aspiration in children.

Study Design: Observational / descriptive study.

Place and Duration of Study: This study was conducted at the Otorhinolaryngology and Head & Surgery Department Sandeman (Provincial) Hospital, Quetta, from April, 2014 to September, 2016.

Materials and Methods: This study included 113 paediatric patients of both gender with tracheobronchial foreign body aspiration. All patients underwent rigid bronchoscopy under general anaesthesia. Patient characteristics, history clinical and bronchoscopic findings were noted and results were analyzed statistically.

Results: The mean age of the patients was 4.03 ± 2.91 years and male to female ratio was 1.97:1. Majority of the patients (53.98%) were between 1 and 3 years. Cough was the commonest symptom (50.44%) and decreased air entry was commonest sign and was present in 15.93% cases. Air tripping was the most common chest X-ray finding (29.25%). Right bronchus was the most common sight of foreign body lodgement (59.29%), followed by left bronchus (32.74%). Watermelon seed was the commonest foreign body retrieved (18.59%). There was no mortality in this series.

Conclusion: Foreign body aspiration is a common respiratory emergency in young children. Rigid bronchoscopy is an effective procedure for removal of tracheobronchial foreign bodies.

Key Words: Tracheobronchial tree, Foreign body, Aspiration, Bronchoscopy, Children

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INTRODUCTION

Aspiration of foreign body is a common life threatening emergency in pediatric age group and accounts for an important proportion of accidental deaths in children less than 3 years of age.¹ It accounts for an important cause of morbidity and mortality. Children around the age of 3 years are particularly susceptible.² A high index of suspicion is required in its diagnosis. Diagnostic acumen and prompt treatment aids in decreasing complications, morbidity and mortality.³ Diagnosis of foreign body aspiration begins with a patient history and physical examination that can be strengthened by radiographic findings. Cough, fever and breathlessness are commonest symptoms with signs of respiratory distress, tachypnea, decreased air entry and rhonchi.⁴ Chest X-ray is an important tool to localize foreign body. However, chest radiographs are normal in about one third of patients with inhaled foreign body, and frequently insufficient for the diagnosis of foreign body aspiration.⁵

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Rigid bronchoscopy is diagnostic as well as therapeutic even when routine chest X-ray is normal.⁶ The aim of this study was to evaluate the clinical presentation and management of tracheobronchial foreign body aspiration in children.

MATERIALS AND METHODS

This prospective study was conducted in the Otorhinolaryngology and Head & Neck Surgery Department Sandeman (Provincial) Hospital, Quetta from April, 2014 to September, 2016. A total 113 paediatric patients of both gender with tracheobronchial foreign body aspiration were included in this study. Children with suspicion foreign body aspiration were brought to ENT Department through Emergency Department, OPD of ENT and Paediatric unit. All patients underwent rigid bronchoscopy under general anaesthesia after clinical and radiographic workup. Patients with negative bronchoscopic findings were not included in this study. Chest X-rays were performed in 106 cases while in 7 cases chest X-ray could not be performed due to their critical condition. Patient characteristics, history, clinical, radiographic and bronchoscopic findings were noted and results were analyzed statistically to draw inferences.

RESULTS

There were 113 paediatric patients of age 3 months to 12 years with a mean age of 4.03 ± 2.91 years. Out of 113 children 75 (66.37%) were male and 38 (33.63%) were female and male to female ratio was 1.97:1. Ninety one (80.53%) patients presented to our department through Emergency department, 10 (8.85%) cases admitted through ENT OPD and 12 (10.62%) cases were referred from paediatric unit. Majority of the patients (53.98%) were below 3 years (Table-1). The commonest symptom of presentation was cough, which was present in 57 (50.44%) cases, followed by dyspnoea in 14 (12.39%) cases, while decreased air entry on affected side of chest was the commonest physical finding and was present in 18 (15.93%) patients. Choking, wheeze, stridor and fever were other clinical features as shown in Table-2. Duration of lodgement of foreign bodies ranged from 1 hour to more than 1 month as outlined in Table-3. Chest X-rays was performed in 106 patients. Air trapping was the commonest radiographic finding (29.25%), followed by atelectasis (16.04%) and pneumonia (15.09%).

Table No.1: Age distribution of children with foreign body aspiration.

Age	No. of Patients	Percentage
< 1 year	3	2.65%
1-3 years	61	53.98%
3-5 years	19	16.82%
>5 years	30	26.55%

Table No.2: Clinical features of children with foreign body aspiration (n=113).

S.N.	Clinical features	No. of patients	Percentage
1.	Cough	57	50.44%
2.	Dyspnea	14	12.39%
3.	Choking	4	3.54%
4.	Wheeze	7	6.19%
5.	Stridor	4	3.54%
6.	Fever	6	5.31%
7.	Cyanosis	3	2.66%
8.	Decreased breathing sounds	18	15.93%

Table No.3: Duration of lodgement of aspirated foreign bodies (n=113).

Length of time	No. of patients	Percentage
1-6 hours	5	4.42%
6-12 hours	8	7.08%
12-24 hours	19	16.82%
1-7 days	57	50.44%
7-14 days	11	9.74%
14-30 days	7	6.19%
More than 1 month	6	5.31%

Table No.4: Chest X-rays findings (n=106).

Chest X-rays findings	No. of patients	Percentage
Air trapping	31	29.25%
Normal image	31	29.25%
Atelectasis	17	16.04%
Pneumonia	16	15.09%
Radio-opaque foreign bodies	11	10.37%

Table No.5: Site of lodgement of tracheobronchial foreign bodies (n=113).

Site of lodgement	No. of cases	Percentage
Laryngeal inlet	4	3.54%
Right bronchus	67	59.29%
Left bronchus	37	32.74%
Trachea/carina	3	2.66%
Both bronchi	2	1.77%

Table No.6: Types of foreign bodies (n=113).

Types of Foreign bodies	No. of cases	%age
Organic foreign bodies	71	62.83%
seeds		
Water melon seed	21	18.59%
Sun flower seed	12	10.62%
Orange seed	4	3.54%
Maize grain	5	4.42%
Pea grain	2	1.77%
Nuts		
Peanut	11	9.74%
Betel nut	9	7.97%
Miscellaneous		
Pistachio shell	1	0.88%
Piece of carrot	1	0.88%
Chicken bone	3	2.66%
Fish bone	1	0.88%
Piece of match	1	0.88%
Inorganic foreign bodies	42	37.17%
Beads	15	13.28%
Plastic objects	12	10.62%
Whistle	7	6.20%
Needle	2	1.77%
Nail	2	1.77%
Metallic screw	2	1.77%
Office pin	1	0.88%
Piece of stone	1	0.88%

Radio-opaque foreign bodies were found in 11 (10.37%) cases. In 31 (29.25%) cases, chest X-rays were normal (Table-4). Rigid bronchoscopy was done in all cases. The commonest site of lodgement was right bronchus. In 67 (59.29%) cases foreign bodies were retrieved from right bronchus and in 37 (32.74%) cases from left bronchus. Other sites of lodgement were laryngeal inlet in 4 (3.54%) cases, trachea/carina in 3 (2.66%) cases and both bronchi in 2 (1.77%) cases, (Table-5). Associated bronchoscopic findings were granulations in 2 (1.77%) patients, mucosal edema in

2(1.77%) patients and bleeding on contact in 3 (2.65%) patients. Organic foreign bodies (62.83%) were more common than inorganic foreign bodies (37.17%). Watermelon seed was the most common foreign body (18.59%) retrieved followed by sun flower seed (10.62%) and peanut (9.74%). Most common inorganic bodies were beads (13.28%), followed by plastic objects (10.62%) and whistles (6.20%) as outlined in Tbale-6. No mortality occurred in this series. However, post bronchoscopic complications occurred in 4(3.54%) patients. Two (1.77%) patients developed bronchospasm and 2(1.77%) patients laryngeal oedema after bronchoscopy. They were managed successfully by bronchodilators, antibiotics and steroids.

DISCUSSION

Tracheobronchial foreign body aspiration in children is a serious problem necessitating prompt recognition and management. In present study majority of the patients (53.98%) were below 3 years of age which is consistent with findings of other studies.^{2,4,6,7} The natural urge to explore the objects by mouth, immature dentition, crying and playing while eating and lack of parental supervision contributes to this hazard in this age group. Male to female ratio in our study was 1.97:1. Boys are more commonly affected than girls.⁸ Several other studies have shown male preponderance.^{3,4,6,9} Children with aspirated foreign bodies typically present with the symptoms of coughing, wheezing, cyanosis or stridor. The most predominant symptoms include choking episode with cough following ingestion of the foreign body.¹⁰ In this study cough, followed by dyspnea, wheeze and choking were the main symptoms while decreased air entry on the affected side of chest was the main sign. Stridor, fever and cyanosis were other clinical features in this study. According to Mushtaq A, et al, cough, respiratory difficulty, choking, fever and stridor are main symptoms and decreased air entry is the most common sign.¹¹ Several studies have documented the cough as the main symptom and decreased breathing sounds as the main sign.^{2,12-14} Chest X-ray was performed in 106(93.80%) cases, but only in 10.37% cases radio-opaque foreign bodies were visible. Air trapping (29.25%) was the most common radiographic finding. Chest X-ray was normal in 29.25% patients. Sattar A, et al, reported air trapping as most common radiographic finding.¹⁵ However, chest X-ray is not specific for diagnosis of foreign body aspiration in patients with a history of foreign body aspiration and positive physical examination. Rigid bronchoscopy is the procedure of choice for diagnosis and management of foreign body inhalation in pediatric patients.¹³ All patients underwent rigid bronchoscopy under general anesthesia. Right bronchus was the main site of lodgement (59.29%), followed by left bronchus (32.74%), Laryngeal inlet (3.54%) and trachea/carina in (2.66%) patients. In 2(1.66%) cases bilateral foreign

bodies were found. Many national and international studies have shown right bronchus as the main site of lodgement for aspirated foreign bodies.¹⁶⁻¹⁹ However, Baig MM reported left main bronchus as the commonest site of foreign body impaction.²⁰ Majority of foreign bodies (62.83%) were organic in nature with seeds and nuts being most common. Water melon seed (18.59%) was the commonest foreign body, followed by sun flower seed (10.62%). Saki N, et al, reported the seeds as the most common foreign body.²¹ Aydogan LB, et al and Mallick MS have shown water melon seed as the most common aspirated foreign body in their studies.^{22,23} In contrast several studies have shown peanut as the commonest foreign body.^{14,16,17,24} Mushtaq A, et al, and Shafi M, et al, have reported betel nut as most retrieved foreign body.^{11,18} Baig MM and Khan AR, et al, have reported whistle as most common inhaled foreign body.^{20,25} In this study peanuts retrieved from tracheobronchial tree in 11(9.74%) patients and betelnuts in 9(7.97%) patients. Various studies estimate the current morbidity rate from bilateral bronchial foreign body as between 0.24 and 2%.²⁶ In this series 2(1.99%) children had bilateral bronchial foreign bodies. Zhao ZG, et al, have reported bilateral bronchial foreign bodies.²⁷ Few foreign bodies have tendency to migrate which add further difficulties in the management.²⁸ Early and thorough bronchoscopic examination should be performed to rule out migration or bilateral foreign body.²⁹

CONCLUSION

Tracheobronchial foreign body aspiration is more common in 1-3 years old children. Cough, dyspnea and decreased air entry are common clinical features. Rigid bronchoscopy is an effective method for removal of foreign body from tracheobronchial tree. Right bronchus is the main site of foreign body lodgement.

Recommendations: Emergency bronchoscopy facility should be available at the District Head Quarter level. Mass awareness should be created through print and electronic media, to decrease the incidence of foreign body aspiration in children.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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