

RIGID BRONCHOSCOPY FOR EXTRACTION OF FOREIGN BODIES TRACHEOBRONCHEAL TREE: AN EXPERIENCE OF 232 CASES

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ABSTRACT

Objective: To describe the clinical profile of patients and extraction of foreign bodies tracheobroncheal tree by rigid bronchoscopy in a tertiary care hospital.

Methodology: This descriptive study was conducted at the department of ENT, Head and Neck Surgery, Postgraduate Medical Institute Lady Reading Hospital Peshawar from Jan. 2009 to Dec. 2010 (02 years). This study included 232 patients of any age and either sex who were subjected to rigid bronchoscopy. The diagnostic criteria for Foreign Bodies airway was based on history, examination complemented with radiological investigations. Rigid bronchoscopy was performed under general anesthesia and the data was analyzed using SPSS v. 10.

Results: Our study with total duration of two years included 232 cases constituting 157 male and 75 female, with male: female ratio of 2.1: 1. The age of the patients ranged from 01-15 years with mean age of $6.40 \pm S.D$ 3.95 years. The clinical features of these patients were mainly cough, wheeze, breathlessness, reduced air entry and strider in descending order. Rigid bronchoscopy was performed in all cases and a variety of F.Bs were extracted from airway. Organic F.Bs were common than non-organic and peanuts were on top.

Conclusion: Cough, wheeze and breathlessness were the commonest symptoms while peanuts, peanut shell and whistles were the commonest foreign bodies tracheobroncheal tree.

Key Words: Foreign Body (F.B), Airway, Bronchoscopy, Tracheobroncheal Tree.

INTRODUCTION

Aspiration of foreign bodies (F.B) is a common cause of accident related deaths in children less than 5 years of age¹. Although initial choking, coughing and even protracted wheezing are cardinal symptoms of foreign body inhalation but it may causes atypical symptoms, such as dysphagia, stridor, and sometimes leads to complications like mediastinal shift, pneumothorax, pneumonia, or bronchiectasis^{2,3,4}. The occurrence of oedema in addition to the physical presence of the F.B results in a rapid increase in airway resistance^{5,6,7}. Coupled with the high oxygen consumption of infants and small children, hypoxia may rapidly occur^{8,9,10}. The majority of inhaled foreign bodies in children are generally organic in nature, though they vary widely according to

geographical location^{11,12}. In Turkey, watermelon seeds are the most common, dried pumpkin seeds are regularly encountered. In Greece and Asia fish bones are frequent cause of F.B inhalation^{6,11,13}. In the rest of the world, by contrast, peanuts, coins, and small toys constitute the most common foreign bodies, which is also common in Pakistan¹⁴. Overall, death caused by suffocation following F.B inhalation is the fifth most common cause of mortality world-wide^{7,8,13}. To establish the diagnosis promptly, a high index of suspicion and timely chest X-ray are necessary^{9,15}. If a child is well and co-operative, a plain chest X-ray may show the radio opaque F.B or any complications produced by F.B^{4,16}. Management of inhaled foreign body depends on the site of impaction of foreign body^{10,17}. Laryngeal and subglottic foreign bodies need urgent intervention in the form of

tracheostomy or urgent bronchoscopy, whereas foreign bodies in the right or left main bronchus cause comparatively less airway problem^{13,18}. Rigid bronchoscopy is the recommended treatment option in children with suspected F.Bs.¹⁴. The aim of this study was to highlight the importance of the rigid bronchoscopy and to describe the clinical profile of patients and extraction of foreign bodies tracheobroncheal tree, a common problem in developing country, by rigid bronchoscopy in a tertiary care hospital.

METHODOLOGY

This descriptive study was conducted at the department of Ear, Nose, Throat, Head and Neck Surgery, Postgraduate Medical Institute Lady Reading Hospital Peshawar from Jan. 2009 to Dec. 2010 (02 years). This study included 232 patients. All the patients of any age and either sex who were subjected to rigid bronchoscopy and Foreign Body (F.B) were retrieved from Tracheobroncheal Tree (T.B.T) were included in this study. The patients with repeat bronchoscopy, those who were subjected to bronchoscopy in other hospitals and those who were lost from follow up were excluded from the study. The diagnostic criteria for F.B airway was based on history of F.B inhalation, physical findings on examination complemented with radiological investigations. All these patients were admitted into E.N.T ward. A detailed history

regarding F.B inhalation was taken from parents or relatives of the patient and thorough examination specifically focusing on chest finding was performed. Base line investigations especially pre-op chest X-Rays were carried out in all cases. A well informed consent was taken from parents/relatives explaining the procedure, its risks, and benefits and associated complications and the study was approved by the hospital ethical committee. Patients were put on intravenous inj. Ceftriaxone 250mg twice a day and inj. Dexamethasone 1cc thrice a day for 02 days, bronchodilator and O2 inhalation according to the need of the patients. Rigid bronchoscopy was performed under general anesthesia on emergency basis. Post-operative Chest X-Ray was done in all cases and if stable patient was discharge on 2nd day. All these patients were followed up to one month. The data was collected on a preformed proforma and statistical analysis was performed using the statistical program for social sciences (SPSS version 10).

RESULTS

Our study with total duration of two years included 232 cases constituting 157 male and 75 female, with male: female ratio of 2.1:1. The age of the patients ranged from 01-15 years with mean age of $6.40 \pm S.D 3.95$ years. Most of the patients presented in the age range of 01-03 years with

Table 1:Source of patients admission into ENT ward (n=232)

S. No.	Source of admission	No. of Cases	Percentage
1	Casualty	98	42.24%
2	OPD	41	17.67%
3	Paeds Ward	27	11.63%
4	Pulmonology Ward	18	7.75%
5	Peripheral Hospitals	35	15.08%
6	Private Hospitals	13	5.60%

Table 2: Demographic Distribution of patients (n=232)

S. No.	Catchments area	No. of Cases	Percentage
1	Northern Districts of Khyber Pakhtunkhwa	58	25.00%
2	Southern Districts of Khyber Pakhtunkhwa	51	21.98%
3	Eastern Districts of Khyber Pakhtunkhwa	29	12.50%
4	Tribal Areas	37	15.94%
5	Western Punjab	24	10.34%
6	Afghanistan	33	14.22%

average age of 02 years. These patients were admitted into ENT ward through casualty or OPD and some of the patients were referred from pediatric and Pulmonology wards (Table 1). We received the patients across the Khyber Pukhtoon Khwa (KPK) province and from Afghanistan (Table 2). The clinical features of these patients were mainly cough, wheeze, breathlessness, reduced air entry and strider in descending order (Table 3). The duration of F.B inhalation was 6-24hours in 215 cases (92.67%), 1-6days in 11cases (4.74%), 1-3 months in 5cases (2.15%) and in one case F.B was lying for 7 months. Site of impaction

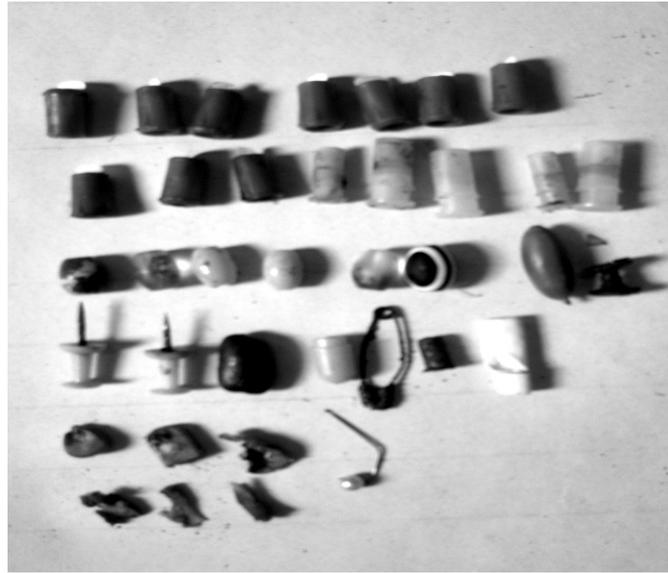
of F.Bs was that in 98 cases (42.24%) right main bronchus, in 64 cases (27.58%) left main bronchus, in 49 cases (21.12%) lower end of trachea and in 21 cases (9.05%) sub glottis was involved. Rigid bronchoscopy was performed in all cases and a variety of F.B was extracted from airway (Figure 1 and 2). Organic F.Bs were common than non-organic and peanuts were on top (Table 4). Chest X-rays were carried out in all cases (100%) and these were normal in majority of patients (97.84%, n=227). In this study there was no morbidity while mortality was 0.43% because one patient suffered from cardiac arrest during procedure.

Table 3: Clinical Features of the patients (n=232)

S. No	Clinical Feature	No. of Cases	Percentage
1	Cough	232	100.0%
2	Wheeze	211	90.94%
3	Breathlessness	193	83.18%
4	Reduced air entry	83	35.77%
5	Strider	57	24.56%
6	Fever	31	13.36%
7	Cyanotic Spell	22	09.48%

Table 4: Types of Foreign Bodies retrieved on rigid bronchoscopies (n=232)

S. No	Type of Foreign Body	No. of cases	Percentage
A	Organic		
1	Peanuts	105	45.25%
2	Peanut Shells	11	04.74%
3	Maize grains	17	07.32%
4	Beans	21	09.05%
5	Plastic pieces	04	01.72%
6	Chicken piece	01	0.43%
B	Inorganic		
1	Whistles	52	22.41%
2	Beads	11	04.74%
3	Safety pen	01	0.43%
4	Pebble	01	0.43%
5	Nail	01	0.43%
6	Paper pens	05	02.15%
7	Screw	01	0.43%
8	Battery bulb	01	0.43%

Figure 1: Types of Foreign Bodies retrieved on rigid bronchoscopies.**Figure 2: Chest X-Ray of the Patient showing Bead in right main bronchus**

DISCUSSION

Most of patients in our study were in age group less than 3 years similar to those reported in other local¹⁹, national⁶ and international studies.^{20, 21} The cough, wheeze and breathlessness were the common symptomatology in our study which are comparable to the study of Lima AG and colleagues.²² The type of the F.B inhalation usually depends upon the demographic and cultural distribution of the population. In our part of the world the use of peanut by the people especially in

cold weather is common that's why its incidence in our study was 45.25%. Saki²³ and colleagues found peanut 63.87% which is more than our study, the reason is that he studied a large no (1015) of patients. We studied that the duration between impaction and removal of F.B varies from hours to months depends upon the age, type of F.B and access to health facility. In our study majority of the patients (92.67% n=215) presented in 1st 24 hour of inhalation which is in accordance to the studies conducted by Mani and colleagues²⁴, Rina²⁵ and Pak²⁶. In our study right main bronchus was

involved in 98 cases (42.24%) followed by left main bronchus (27.58% n=64) which is comparable to the study carried out by Ma²⁷ who found that F.B in right main bronchus was (38.9%, n=98). Rigid bronchoscopy was performed in all cases (100%) while it was accompanied by tracheostomy in 2 cases. In one case the F.B was a screw in right main bronchus which could not be extracted through bronchoscope while in other case the F.B was bone stuck in sub-glottis and tracheostomy was done for ventilation as it was not possible to pass bronchoscope. Singh²⁸ also recommended tracheostomy in difficult cases of F.B Tracheobroncheal tree. In our study one case expired during procedure thus our mortality accounts 0.43% which is in accordance to the study of Hasdiraz and colleagues²⁹ that had mortality of 0.77% while there was no morbidity in our study like other national⁶ and international studies²⁰. Although flexible bronchoscopy³⁰ is used for removal of F.B but it has good results in diagnostic purposes rather than therapeutic one and rigid bronchoscopy is the recommended tool for extraction of F.B tracheobroncheal tree.

CONCLUSION

Cough, wheeze and breathlessness were the commonest symptoms while peanuts, peanut shell and whistles were the commonest foreign bodies tracheobroncheal tree.

REFERENCES

1. Louie MC, Bradin S. Foreign body ingestion and aspiration. *Pediatr Rev* 2009;30:295-7.
2. Blanco ABM, Moran MA, Paredes AI, Vidal MJ. Bronchoscopy in children with foreign body aspiration. *Acta Otorrinolaringol Esp* 2008;59:183-9.
3. Shlizerman L, Mazzawi S, Rakover Y, Ashkenazi D. Foreign body aspiration in children: the effects of delayed diagnosis. *Am Otolaryngol* 2010;31:320-4.
4. Shah RK, Patel A, Lander L, Choi SS. Management of foreign bodies obstructing the airway in children. *Arch Otolaryngol Head Neck Surg* 2010;136:373-9.
5. Ramos MB, Fernandez-Villar A, Rivo JE, Leiro V, Garcia-Fontan E, Botana MI, et al. Extraction of airway foreign bodies in adults: experience from 1987-2008. *Interact Cardiovasc Thorac Surg* 2009;9:402-5.
6. Ishaq M, Saqib NU, Shabbir A, Malik S. Removal of inhaled foreign body from trachea a unique approach. *Pak Armed Forces Med J* 2009;4:30-4.
7. Jiaqiang S, Jingwu S, Yanming H, Qiuping L, Yinfeng W, Xianguang L. Rigid bronchoscopy for inhaled pen caps in children. *J Pediatr Surg* 2009;44:1708-11.
8. Ramamani M, Korula G, Chacko J. A large foreign body in the bronchus: anaesthetic and surgical challenges. *Internet J Anesthesiol* 2008;17:18-22.
9. Cheng L, Yang J, Wu H, Meng G. Application value of dual-source CT in the diagnosis of suspicious airway foreign bodies in children. *Lin Chung Er Bi Yan Hou Tou Jing Wai Ke Za Zhi* 2010;24:700-2.
10. Blanco ABM, Moran MA, Paredes AI, Vidal MJ. Bronchoscopy in children with foreign body aspiration. *Acta Otorrinolaringol Esp* 2008;59:183-9.
11. Perez-Frias J, Caro-Aguilera P, Perez-Ruiz E, Moreno-Requena L. Foreign body management. Combined bronchoscopy in a paediatric pulmonology unit. *An Pediatr (Barc)* 2010;72:67-71.
12. Perez-Frias J, Caro-Aguilera P, Perez-Ruiz E, Moreno-Requena L. Foreign body management. Combined bronchoscopy in a paediatric pulmonology unit. *An Pediatr (Barc)* 2010;72:67-71.
13. Nohara J, Lee S, Noguchi T, Sakaguchi Y, Kono T, Terada Y. Three cases of removal of intrabronchial metal nails. *Nihon Kokyuki Gakkai Zasshi* 2009;47:1098-102.
14. Jabbaradarjani H, Kiani A, Azadeh AA, Masjedi M. Foreign body removal using bronchoscopy and argon plasma coagulation. *Arch Iran Med* 2010;13:150-2.
15. Han KA, Kim HJ, Byon HJ, Kim JT, Kim HS, Kim CS, et al. Cardiac arrest induced by tension pneumothorax during ventilating bronchoscopy: a case report. *Korean J Anesthesiol* 2010;59:123-6.
16. Holliday T, Jackson A. Emergency use of extracorporeal membrane oxygenation for a foreign body obstructing the airway. *Crit Care Resusc* 2010; 12:273-5.
17. Roda J, Nobre S, Pires J, Estevao MH, Felix M. Foreign bodies in the airway: a quarter of a century's experience. *Rev Port Pneumol* 2008;14:787-802.
18. Fraga Ade M, Reis MC, Zambon MP, Toro IC, Ribeiro JD, Baracat EC. Foreign body aspiration in children: clinical aspects, radiological aspects and bronchoscopic treatment. *J Bras Pneumol* 2008;34:74-82.

19. Hussain G, Iqbal M, Khan SA, Iqbal M, Zaman J. An Experience Of 42 cases of bronchoscopy At Saidu group of teaching hospitals, Swat. *J Ayub Med Coll Abbottabad* 2006;18:59-62.
20. Zaupa P, Saxena AK, Barounig A, Höllwarth ME. Management strategies in foreign-body aspiration. *Indian J Pediatr* 2009;76:157-61.
21. Massie J, Fink M. Suspected foreign body inhalation in children: what are the indications for bronchoscopy? *J Pediatr* 2010;156:690-1.
22. Lima AG, Santos NA, Rocha ER, Toro IF. Bronchoscopy for foreign body removal: where is the delay? *J Bras Pneumol* 2008;34:956-8.
23. Saki N, Nikakhlagh S, Rahim F, Abshirini H. Foreign body aspirations in Infancy: a 20-year experience. *Int J Med Sci* 2009;6:322-8.
24. Mani N, Soma M, Massey S, Albert D, Bailey CM. Removal of inhaled foreign bodies--middle of the night or the next morning? *Int J Pediatr Otorhinolaryngol* 2009;73:1085-9.
25. Rina MT, Reyes-Quintos. Pediatric rigid bronchoscopy for foreign body removal. *Philippine J Otolaryngol Head Neck Surg* 2009;24:39-41.
26. Pak MW. Foreign bodies in children's airways: a challenge to clinicians and regulators. *Hong Kong Med J* 2009;15:4-5.
27. Ma YY, Jiao AX, Jiang QB, Rao XC, Pan YN, Liu XC. Clinical analysis of bronchial foreign bodies in 246 children. *Zhonghua Yi Xue Za Zhi* 2010;90:1272-4.
28. Singh JK, Vasudevan V, Bharadwaj N, Narasimhan KL. Role of tracheostomy in the management of foreign body airway obstruction in children. *Singapore Med J* 2009;50:871-4.
29. Hasdiraz L, Oguzkaya F, Bilgin M, Bicer C. Complications of bronchoscopy for foreign body removal: experience in 1,035 cases. *Ann Saudi Med* 2006;26:283-7.
30. Tang LF, Xu YC, Wang YS, Wang CF, Zhu GH, Bao XE, et al. Airway foreign body removal by flexible bronchoscopy: experience with 1027 children during 2000-2008. *World J Pediatr* 2009;5:191-5.

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