FOREIGN BODY INHALATION - SITE OF IMPACTION AND EFFICACY OF RIGID BRONCHOSCOPY

Muhammad Asif, Shahid Ali Shah*, Farida Khan*, Rehman Ghani*
Department of ENT, Gomal Medical College, D.I.Khan, *Department of ENT, Ayub Medical College Abbottabad

Background: Foreign body inhalation is a relatively commonly encountered emergency in otolaryngology. Foreign body can get lodged at any site from the supraglottis to the terminal bronchioles. Rigid bronchoscopy is one of the well established methods of removing inhaled foreign body with fewer complications. **Methods:** This prospective study was conducted in the Department of ENT, Head & Neck Surgery, Ayub Teaching Hospital, Abbottabad, from January 2003 to June 2005. The total number of patients was eighty one. Patients in whom a foreign body was retrieved, were included in the study. **Results:** Foreign body was found in the right main bronchus in sixty patients (74.1%), left main bronchus in seventeen patients (21%), terminal bronchioles in two patients (2.5%) and one patient (1.2%) each in trachea and laryngeal inlet. Foreign body was successfully removed in seventy-nine patients (97.5%). Nineteen patients (23.5%) had postoperative airway edema, one (1.2%) had trauma to the false cord and laceration of the posterior pharyngeal wall. **Conclusion:** It was concluded that the right main bronchus is the most common site of impaction of inhaled foreign body. Rigid bronchoscopy is very effective procedure for inhaled foreign body removal with fewer complications.

Keywords: Foreign body; Bronchoscopy; Trachea

INTRODUCTION

Inhaled Foreign body remains a significant cause of morbidity and mortality especially in young children[1]. According to a study of US national safety council, foreign body inhalation carries a mortality rate of 1.2 per 100,000 people per year[2].

The right main bronchus has a predilection for foreign body impaction because it is wider than the left, the carina is slightly to the left of the midline and the right main bronchus has more direct extension of the trachea than the left main bronchus[3].

Management of inhaled foreign body depends on the site of impaction of foreign body. 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[4].

The purpose of this study was to find the common site of impaction of inhaled foreign body and to evaluate the efficacy of rigid bronchoscopy in the removal of inhaled foreign bodies.

MATERIAL AND METHODS

This prospective study was conducted in the Department of ENT, Head & Neck Surgery, Ayub Teaching Hospital, Abbottabad, from January 2003 to June 2005. Eighty one patients were included in the study and seventy nine were analyzed, where a foreign body was retrieved.

All the patients had had rigid bronchoscopy, based on definitive history or suspicion of foreign body inhalation.

All the procedures were conducted by senior registrar and consultant category clinicians.

RESULTS

Site of impactions .The most common site of impaction of inhaled foreign bodies was the right main bronchus which accounted for sixty patients (Table 1).

Complications: The most common complication of bronchoscopy was airway edema which occurred in nineteen patients (Table 2)

Success rate: In seventy-nine patients the inhaled foreign body was successfully removed (Table 3).

Table 1. Site of impacted foreign body (n=81)

Site	Number	%
Right main bronchus	60	74.1%
Left main bronchus	17	21%
Terminal bronchioles	02	2.5%
Trachea	01	1.2%
Laryngeal inlet	01	1.2%

Table 2. Complications of rigid bronchoscopy (n=20)

Complications	Number	%
Airway edema	19	23.5%
Trauma to false cord/ Laceration of posterior pharyngeal wall.	01	1.2%

Table 3. Success rate of bronchoscopy

Success rate	Number	%
Foreign body removed	79	97.5%
Foreign body not removed	02	2.5%

DISCUSSION

The inhaled foreign body can get impacted at any site from the laryngeal inlet to the terminal bronchioles. The location of foreign body in the right or left main bronchus depends on patient's age and physical position at the time of inhalation. The angle made by the main stem bronchi with the trachea is similar until the age of 15 years. So, naturally, up to this age the foreign bodies are found on either side with equal frequency. As a result of growth and development after the age of 15 years, the right and left main stem bronchi diverge from the trachea with very different angles. Thus the right main stem bronchus becomes more in line with the trachea and this makes a relatively straight path from the larynx to bronchus. Therefore, the inhaled objects that descend beyond the trachea are more commonly found in the right than the left side of the bronchial tree.

The same was the case in our study and we found that 74.1% of the inhaled foreign bodies were lodged in the right main bronchus and only 21% in the left main bronchus. Our results are very similar to the study of Rasheed D et al, Farooqi T et al and Black RE et al, in which it was observed that the right main bronchus was the commonest site of impaction followed by the left bronchus[5, 6, 7]. Contrary to that Yeh LC, in his study found that the foreign bodies were lodged in the left bronchus more commonly.[8]

Inhaled foreign bodies can be removed by rigid or flexible bronchoscope. However, rigid bronchoscopy offer good visualization and is the preferred method for foreign body removal. We in our patients used only the rigid bronchoscope.

In seventy-nine patients (97.5%) the foreign bodies were removed successfully and in two patients (2.5%) we could not remove the foreign body. Both of these patients had history of inhalation of a plastic foreign body. In one patient the foreign body was found firmly impacted in the right lower terminal bronchiole and repeated attempts for removal were unsuccessful. In the second patient who actually presented about 35 days after foreign body inhalation, the foreign body was seen in the right middle terminal bronchiole and there were lot of granulations around it. These granulations started profuse bleeding during removal and procedure had to be abandoned. Both of these patients were sent to thoracic surgeon for thoracotomy and both of them were lost for further follow up. According to Fadl FA et al and Tariq P, rigid bronchoscopy has been found to be the most suitable and successful procedure for removal of inhaled foreign body [9,10]. According to Baharloo F et al, rigid bronchoscopy is the most useful procedure for foreign body removal and flexible bronchoscope should be used only in adults[11]. Farooqi T et al in his study found a success rate of 97.8% with rigid bronchoscope and mortality of 2.2%[6]. Fortunately we had no mortality in our study. But it should be remembered that although bronchoscopy is mostly successful, thoracotomy may have to be considered in patient with peripheral foreign bodies which could not be removed endoscopically.

The complications of bronchoscopy for the removal of foreign body are relatively uncommon but can occur even in experienced hands. Complications like airway edema , perforation, stenosis or scarring have been mentioned. Other complications like injury to vocal cords requiring tracheostomy, tracheal laceration and severe subglottic edema have also been reported in the literature[12]. The most frequent complication that occurred in nineteen patients in this study, was airway edema. It manifested with cough, respiratory distress and stridor, but fortunately, it resolved quickly with medical treatment and did not require further surgical intervention. One patient who had impacted denture in the laryngeal inlet, had injury to left false vocal cord and laceration of the posterior pharyngeal wall as well, also had uneventful recovery but that patient was lost for long term follow-up.

CONCLUSIONS

Inhalation of foreign body is a life threatening emergency. The most common site of impacted foreign body is the right main stem bronchus. Rigid bronchoscopy is the most useful method for foreign body removal with fewer complications. It must be remembered that although bronchoscopy is the procedure of choice, this procedure requires experience as outcome of the procedure is better when the operator is experienced.

RECOMMENDATION

Public awareness through mass media needs attention to prevent foreign body inhalation.

ACKNOWLEDGEMENT

We are extremely thankful to Dr.Shah Jehan Baloch and Dr. Khan Afsar, for their extended support in completion of this article.

REFERENCE

1. Sisenda TM, Khwa-Otsyula BO, Wambani JO. Management of tracheo-bronchial foreign bodies in children. East Afr Med J 2002; 79(11):580-3.
2. Brain C. Spector. Endoscopy and removal of foreign bodies: Current opinion in Otolaryngology & Head and Neck surgery; 6: 416-420.
3. James B, Snow JR. Bronchology. In: Disease of the nose, throat, ear, head and neck, volume 2, 14th Ed. 1991. p 1278-1296.
4. Dunn GR, Wardrop P, Lo S, Cowan DL. Management of suspected foreign body aspiration in children. Clin Otolaryngol Allied Sci 2002 ;27(5):384-6.
5. Rashid D, Ahmad B, Muhammad S, Hydri AS, Anwar K. Foreign Body: Tracheobronchial tree. Pak Armed Forces Med J 1999; 49(2): 114-6.
6. Farooqi T, Hussain M, Pasha HK, Bokhari K, Hassan S. Foreign body aspiration in children: An experience at Nishtar Hospital Multan. Pak J Paed Surg 1999; 1-2:16-24.
7. Black RE, Johnson DG, Matlak ME. Bronchoscopic removal of aspirated foreign bodies in children. J Padiatr Surg 1994; 29(5):682-4.
8. Yeh LC ,Li HY ,Huang TS. Foreign bodies in tracheobronchial tree in children: a review of cases over a twenty-year period. Changgeng Yi Xue Za Zhi 1998;21(1):44-9.
9. Fadl FA ,Omer MI. Tracheobronchial foreign bodies: a review of children admitted for bronchoscopy at King Fahd Specialist Hospital, Al Gassim, Saudi Arabia. Ann Trop Paediatr 1997;17(4):309-13.
10. Tariq P. Foreign body aspiration in children - a persistent problem. J Pak Med Assoc 1999;49 (2):33-6.
11. Baharloo F, Veyckemans F, Francis C, Biettlot MP, Rodenstein DO. Tracheobronchial foreign bodies: presentation and management in children and adults. Chest 1999;115(5):1357-62.
12. Zerella JT, Dimler M, McGill LC, Pippus KJ. Foreign body aspiration in children: value of radiography and complications of bronchoscopy. J Pediatr Surg 1998;33(11):1651-4.

Address for Correspondence: Dr. Muhammad Asif, Baloch House, behind First women Bank, Supply, Mansehra, Road, Abbottabad.