

Foreign Bodies in Trachea: A 25-years of Experience

Trakeadaki Yabancı Cisimler: 25 Yıllık Bir Tecrübe

Bayram Altuntas, Yener Aydın, Atilla Eroglu

Department of Thoracic Surgery, Atatürk University School of Medicine, Erzurum, Turkey

Abstract

Objective: Tracheobronchial foreign body aspirations may cause cardiopulmonary arrest and sudden death. The incidence in children is higher than in adults. Rapid diagnosis and treatment is life saving. In this paper, we aimed to present our experience in tracheal foreign body aspirations and rigid bronchoscopy for 25-years.

Materials and Methods: From January 1990 to January 2015, 805 patients with suspected tracheobronchial foreign body aspiration were admitted to our department. Hundred and twelve patients with tracheal foreign body were included in this study. We evaluated patients' records, retrospectively. Age, gender, clinical symptoms, physical examination findings, radiological evidences, type of foreign body and intervention types were noted.

Results: Sixty-five of the patients were female (58%) and 47 patients were male (42%), and mean age was 8.1 years (8 month-58 years). Coughing was the main symptom (n=112, 100%). Other symptoms and findings included dyspnoea and bilateral decreased lung sounds (n=73, 65.1%), bilateral rhonchi (n=68, 60.7%) and cyanosis (n=41, 36.6%). Rigid bronchoscopy was performed in all patients. The most common foreign body was nuts (n=75, 67%). The main radiologic finding was radiopaque image of the related foreign body in 27 patients (n=27, 24.1%). Cardiopulmonary arrest occurred in 11 patients and two of them died.

Conclusion: Tracheobronchial aspirations of foreign bodies are life-threatening events. If not diagnosed and treated rapidly, distressful results can be seen. Warning people by skilled persons on this topic will reduce the incidence of foreign body aspirations.

Keywords: Asphyxia, bronchoscopy, foreign bodies

Öz

Amaç: Trakeobronşiyal yabancı cisim aspirasyonları kardiyopulmoner arrest ve ani ölüme sebep olabilir. Çocuklardaki insidansı yetişkinlerden daha fazladır. Hızlı teşhis ve tedavi hayat kurtarıcıdır. Bu makalede biz, 25 yıllık dönemde trakeal yabancı cisim ve rijid bronkoskopiyle ilgili tecrübelerimizi sunmayı amaçladık.

Gereç ve Yöntem: Ocak 1990'dan Ocak 2015'e kadar, trakeobronşiyal yabancı cisim aspirasyonlu 805 hasta bölümümüze kabul edildi. Trakeal yabancı cisimli 112 hasta çalışmaya dahil edildi. Hasta kayıtlarını retrospektif olarak inceledik. Yaş, cinsiyet, klinik semptomlar, fizik muayene bulguları, radyolojik veriler, yabancı cisim ve müdahale tipi not edildi.

Bulgular: Hastaların 65'i kadın (%58) ve 47'si erkekti (%42) ve ortalama yaş 8,1 yıldır (8 ay-58 yıl). Öksürük ana semptomdu (n=112, %100). Diğer semptom ve bulgular dispne ve bilateral azalmış solunum sesleri (n=73, %65,1), bilateral ronküs (n=68, %60,7) ve siyanozdu (n=41, %36,6). Tüm hastalara rijid bronkoskopi yapıldı. En sık yabancı cisim kuruyemişlerdi (n=75, %67). Ana radyolojik bulgu ilgili yabancı cismin radyoopak görüntüsüydü (n=27, %24,1). Kardiyopulmoner arrest 11 hastada görüldü ve onların ikisi öldü.

Sonuç: Trakeobronşiyal yabancı cisim aspirasyonları yaşamı tehdit eden hadiselerdir. Eğer hızlı teşhis ve tedavi edilmezse can sıkıcı sonuçlar görülebilir. Uzman kişilerce toplumun bu konuda uyarılması, yabancı cisim aspirasyon riskini azaltacaktır.

Anahtar Kelimeler: Asfiksi, bronkoskopi, yabancı cisimler

Introduction

Airway obstruction may occur as a result of many conditions. Foreign body aspiration is one of the preventable causes of this horrible incident. After tracheobronchial foreign body aspirations, cardiopulmonary arrest and sudden death may be seen in patients, especially in children. In the United State of

America, 160 patients younger than 14 years died in 2000 [1]. The incidence in children and adults accounted for 85% and 15% of all tracheobronchial foreign body aspirations, respectively [2]. If diagnosis and management is delayed, permanent damage may occur in lungs. In this paper, we aimed to present our experience in tracheal aspirations of foreign bodies and rigid bronchoscopy during 25-years.

This study was presented at the 8th National Congress of Thoracic Surgery, April 23-26, 2015, Antalya, Turkey.

Received: May 10, 2015 / Accepted: June 30, 2015

Correspondence to: Bayram Altuntas E-mail: draltuntas@hotmail.com

©Copyright 2016 by the Atatürk University School of Medicine - Available online at www.eurasianjmed.com

DOI: 10.5152/eurasianjmed.2015.109



Materials and Methods

Between January 1990-January 2015, we retrospectively evaluated the records of 805 hospitalized patients who underwent bronchoscopy because of suspected tracheobronchial foreign body aspiration in the Department of Thoracic Surgery of Atatürk University. Patients consent forms were received. Patients with tracheal foreign body were included in this study. Detailed medical histories of patients were taken from themselves or their parents. Chest X-rays were obtained and all patients were examined before procedure. Rigid bronchoscopy (Karl Storz, Tuttlingen, Deutschland) was the principal method. After bronchoscopic evaluation, the aspirated foreign bodies were extracted and then physiological saline was poured into the tracheobronchial system. After tracheobronchial irrigation, secretions were suctioned. When the trachea was obstructed nearly completely by organic foreign body, the body was pushed to the right or left bronchial system. After the rising of partial oxygen saturation of the patient, it was crumbled by forceps and then pieces of organic body were extracted by suitable forceps and both bronchial systems were washed with saline. After washing, saline in the both bronchial system were aspirated.

Results

Foreign bodies were located in trachea in hundred and twelve patients (13.9%). Rigid bronchoscopy procedure was performed in all patients. Sixty-five of the patients were female (58%) and 47 patients were male (42%), and mean age was 8.1 years (8 month-58 years). Peak incidence of the tracheal foreign body aspiration occurred between 1-10 years, accounting for 71% of the total number (Table 1). The initial symptom was cough in all patients (n=112, 100%). Dyspnoea and bilateral decreased lung sounds (n=73, 65.1%), bilateral rhonchi (n=68, 60.7%) and cyanosis (n=41, 36.6%) were the most common symptoms and physical examination findings (Table 2). Time interval of the symptoms were between 30 minutes-4 hours. There was a medical history of foreign body aspirations in all patients.

Radiopaque foreign bodies were confirmed by chest X-ray in 27 patients (24.1%) (Figure 1, 2). Before bronchoscopy, routine chest X-ray was not obtained in thirteen patients due to severe respiratory distress. Radiographs of the remaining patients were normal.

The most common type of aspirated foreign bodies were nuts (n=75, 67%). Peanut and sunflower seed accounted for 33.9% (n=38) and 17.9% (n=20), respectively. Headscarf pins were the most common type of inorganic foreign bodies (n=21, 18.7%). Nuts and needles constituted the majority in this study (Table 3).

Table 1. Age distribution of the patients

Age range	n	%
1-10	79	71
10-20	25	22
20-30	5	4.4
30-40	2	1.7
40-50	0	0
50-60	1	0.9
Total	112	100

Table 2. Symptoms and physical findings

Symptoms and findings	n	%
Coughing	112	100
Diminished breath sounds	73	65.1
Dyspnoea	73	65.1
Rhonchi	68	60.7
Cyanosis	41	36.6



Figure 1. A 26-years old female patient, postero-anterior chest plain shows a headscarf pin in trachea.

Bronchoscopy indications included the presence of aspiration history, symptoms and examination findings supporting the aspiration and chest X-rays evidences. All foreign bodies were extracted by rigid bronchoscopy. Before bronchoscopy, 11 patients were intubated because of cardiopulmonary arrest related to foreign body aspiration. Two of them were intubated by paramedics outside the hospital, others were intubated in emergency service. Foreign bodies were removed in these patients but two patients died who were

Table 3. Types of aspirated foreign bodies

Type	n	%
Nuts	75	67
Peanut	38	33.9
Sunflower seed	20	17.9
Hazelnut	11	9.8
Roasted chickpea	4	3.6
Walnut	2	1.8
Pins	21	18.7
Kidney bean	6	5.3
Fragment of bone	4	3.6
Plastic object	3	2.7
Metallic object	2	1.8
Voice prosthesis	1	0.9
Total	112	100



Figure 2. The lateral chest X-ray of a 28-years old female patient. Headscarf pin was located in the trachea.

intubated outside the hospital. Settled bodies in trachea were peanut, kidney bean and roasted chickpea in 7, 3 and 1 patients, respectively. Localization of foreign bodies in dying patients is just above the carina.

Discussion

Tracheobronchial foreign body aspirations are common health problems worldwide. The most important anatomic location of foreign bodies settled in airways is trachea. Although, foreign bodies settle into the trachea lesser than both bronchial systems, tracheal foreign bodies can cause events that are more terrible. In our 25-years of experience on this topic, we have seen the most serious incidents in tracheal foreign body aspirations. Types of aspirated bodies are different according to socioeconomic situation, dietary habits, life style, poor mental level, deteriorated neuropsychiatric condition, sedative drug use, religious beliefs, presence of dental and voice prosthesis [3-7].

Furthermore, aspirated foreign bodies are dissimilar in children and adults [5, 8]. Although, tracheal foreign body aspirations are usually diagnosed in early period, some patients may be misdiagnosed with infection or asthma and diagnosis may be delayed [9, 10]. In our series, nuts were the most common aspirated foreign bodies (n=75, 67%) and peak incidence was the first decade (n=79, 71%). Nuts, especially peanuts and sunflower seeds, hold an important place in the daily diet in our geographic area. The type of most common inorganic body was headscarf pins (n=21, 18.7). In our region, headscarf pins are commonly used by Muslim girls and women to secure the headscarf.

Clinical symptoms and physical findings of tracheal foreign body aspirations are usually related to the type and size of aspirated body, age of patient and the time passed after aspiration. The first symptom is usually coughing and it may be intractable [11]. Occultation findings are usually bilateral. Cyanosis and dyspnoea are the most horrible symptoms in tracheal foreign body aspirations and they may be a precursor of cardiopulmonary arrest. The worst clinical scenario in foreign body aspirations is sudden death and cardiopulmonary arrest. These unwanted events are more commonly seen in children than in adults, because, the calibre of children's airways is smaller than adults [5].

Cardiopulmonary arrest may be seen a while after the swellable organic foreign bodies settled into the trachea, especially in children. Sudden arrest occurs when big and solid foreign body placed into the trachea. In case of cardiopulmonary arrest, intubation tube should be pushed to the right or left bronchial system after the patient was intubated, and the patient should be ventilated after the withdrawal of intubation tube from bronchial system. During bronchos-

copy, if the foreign body is organic, it should be crumbled by forceps [12]. After these life-saving manoeuvres, foreign body should be extracted by suitable forceps and bronchial tree should be washed with irrigation fluid. Lastly, secretions and small pieces of foreign body must be suctioned. In our series, coughing was present in all patients in medical history. Dyspnoea and bilateral diminished breath sounds were the most common physical findings (n=73, 65.1%). Other symptoms and findings included bilateral rhonchi (n=68, 60.7%) and cyanosis (n=41, 36.6%). In 11 patients, cardiopulmonary arrest was seen (9.8%). These 11 patients were children. Nine of them were intubated in the emergency services, the remaining two patients were intubated by paramedics in the ambulance outside the hospital. These patients were transferred to the operating room quickly. Rigid bronchoscopy was performed in these arrested patients. Foreign bodies were pushed to distal airways and then crumbled by forceps. Finally, bodies were extracted, bronchial tree was irrigated with saline and suction was performed. Although foreign bodies were removed in all patients, 2 patients could not be saved (1.8%). Patients, who died, were intubated outside the hospital. Peanut, kidney bean and roasted chickpea were extracted in 7, 3 and 1 patients, respectively.

Standard radiographs are initial diagnostic techniques in patient with suspected foreign body aspiration, but this principal method does not always support the diagnosis. Radiopaque objects such as metal and bone can easily be identified on the chest X-rays. However, even though foreign bodies settled in the trachea, chest X-rays may be normal. In this series, chest X-rays showed metallic objects in 27 patients (24.1%). Routine chest X-ray was not taken in thirteen patients due to severe respiratory distress, and the radiographs of the remaining patients were normal.

Rigid bronchoscopy is the principal treatment and diagnostic option in the foreign body aspirations, but there are studies suggesting fiberoptic bronchoscopy in the literature [13-15]. Rigid bronchoscopy is safer, because during this procedure, the patients can be ventilated and foreign body can be easily extracted or pushed to distal airways. Additionally, sharp bodies can be removed safely and airway damage risk diminishes. Open surgery may be required when complication such as tracheal perforation occurred. Furthermore, if there is no equipment to remove the foreign body, tracheotomy may also be required in patients with respiratory distress. We performed rigid bronchoscopy in all patients and no complication related to procedure was seen in any patient.

Every year, tracheobronchial aspiration of foreign bodies is seen in thousands of people and a part of them cannot be saved. This incident causes more dramatic results in children than adults. The basics of the management of this frightful

instance are early diagnosis and rapid intervention. When compared to the tracheal and bronchial foreign bodies, tracheal foreign bodies need a faster therapeutic intervention. Rigid bronchoscopy is the principal method in the diagnosis and management of this terrible event. The most important preventive measures against the foreign body aspirations are education of societies and personnel carefulness.

Ethics Committee Approval: Ethics committee approval was not received for this study from the ethics committee of Atatürk University School of Medicine.

Informed Consent: Written informed consent was obtained from patients and patients' parents who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - B.A., A.E.; Design - B.A.; Supervision - A.E.; Resources - B.A., Y.A.; Materials - B.A., Y.A.; Data Collection and/or Processing - B.A., A.E.; Analysis and/or Interpretation - B.A.; Literature Search ; B.A., Y.A.; Writing Manuscript - B.A.; Critical Review - A.E.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

References

- Zhang P, Zhang R, Zou J, Zhu T. A rare case report of tracheal leech infestation in a 40-year-old woman. *Int J Clin Exp Med* 2014; 7: 3599-601.
- Chen CH, Lai CL, Tsai TT, Lee YC, Perng RP. Foreign body aspiration into the lower airway in Chinese adults. *Chest* 1997; 112: 129-33. [\[CrossRef\]](#)
- Black RE, Johnson DG, Matlak ME. Bronchoscopic removal of aspirated foreign bodies in children. *J Pediatr Surg* 1994; 29: 682-4. [\[CrossRef\]](#)
- Mu LC, Sun DQ, He P. Radiological diagnosis of aspirated foreign bodies in children: review of 343 cases. *J Laryngol Otol* 1990; 104: 778-82. [\[CrossRef\]](#)
- Eroglu A, Kurkcuoglu IC, Karaoglanoglu N, Yekeler E, Aslan S, Basoglu A. Tracheobronchial foreign bodies: A 10-years experience. *Ulus Travma Derg* 2003; 9: 262-6.
- Tariq SM, George J, Srinivasan S. Inhaled foreign bodies in adolescents and adults. *Monaldi Arch Chest Dis* 2005; 63: 193-8. [\[CrossRef\]](#)
- Limper AH, Prakash UB. Tracheobronchial foreign bodies in adults. *Ann Intern Med* 1990; 15: 604-9. [\[CrossRef\]](#)
- Al-Sarraf N, Jamal-Eddine H, Khaja F, Ayed AK. Headscarf pin tracheobronchial aspiration: a distinct clinical entity. *Interact Cardiovasc Thorac Surg* 2009; 9: 187-90. [\[CrossRef\]](#)
- Davis SJ, Madden G, Carapiet D, Nixon M, Dennis S, Pringle M. Delayed presentation of paediatric tracheal foreign body. *Eur Arch Otorhinolaryngol* 2007; 264: 833-5. [\[CrossRef\]](#)

10. Palmer AR, Pollack ML. Delayed Diagnosis of Radiopaque Tracheal Foreign Body in A Child. *J Emerg Med* 2006; 31: 427-8. [\[CrossRef\]](#)
11. Musani MA, Khambaty Y, Jawed I, Khan FA, Ashrafi SKA. An Unusual Foreign Body in Trachea. *J Ayub Med Coll Abbottabad* 2010; 22: 178-9.
12. Oncel M, Sunam GS, Samı Ceran. Tracheobronchial aspiration of foreign bodies and rigid bronchoscopy in children. *Pediatrics International* 2012; 54: 532-5. [\[CrossRef\]](#)
13. Al-Azzawi AI. Utility of Fiberoptic Bronchoscopy for Retrieval of Aspirated Headscarf Pins. *European Scientific Journal* 2013; 9: 218-27.
14. Loo CM, Hsu AL, Eng P, Ong YY. Case Series of Bronchoscopic Removal of Tracheobronchial Foreign Body in Six Adults. *Ann Acad Med Singapore* 1998; 27: 849-53.
15. Debeljak A, Sorli J, Music, Kecelj P. Bronchoscopic removal of foreign bodies in adults: experience with 62 patients from 1974-1998. *Eur Respir J* 1999; 14: 792-5. [\[CrossRef\]](#)