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RESEARCH ARTICLE

Characteristics of bean aspiration in children

Çocuklarda fasülye aspirasyonunun özellikleri

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ABSTRACT

Objectives: We aimed to evaluate the characteristics of the bean aspiration in children and its difficulties encountered during removing.

Materials and methods: Ten children with bean aspiration (4 female, 6 male, 9 months-5 years old, mean 34.5 months) were admitted between 2005 and 2011. The data recorded were reviewed according to age, gender, history about aspiration, complaints, reason for bronchoscopy, location of foreign body and problems encountered during bronchoscopy. For the beans removal, we used optical forceps adapted to telescope and extracted the foreign body under direct vision.

Results: The main findings were cough, decreased breath sound on physical examination and emphysematous appearance on plain films. Beans were found on right main bronchus in 5 patients and left main bronchus in 4 patients. The bean was not found in one patient despite the positive family history for bean aspiration. In early cases (n=7), bean could extracted more easily but in delayed cases (n=2), it took more time and challenging due to lung infection, intolerance to anesthesia, and need of more tracheal washing and aspiration. In one case, shell of bean adhered to bronhcial mucosa and coated with fibrin. It could have not been noticed until prompt washouts and aspiration.

Conclusions: Success of removal of swollen foreign objects such as bean from bronchial airway depends on sufficient experience of anesthesia as well as pediatric surgeon. Using optic forceps bronchoscope rather than direct vision bronchoscope and extracting foreign subject via forceps that adapted to optical telescope increases rate of successful bronchoscopy. *J Clin Exp Invest 2012; 3(1): 18-21*

Key words: Bronchoscopy, foreign body aspiration, bean

ÖZET

Amaç: Çocuklarda fasülye aspirasyonunun özelliklerini ve çıkarılması sırasında karşılaşılan zorlukları değerlendirmeyi amaçladık.

Gereç ve yöntem: Çalışmaya 2005-2011 arasında fasülye aspire eden 10 çocuk (4 kız,6 Erkek, 9 ay-5 yaş, ortalama yaş 34,5 ay) dahil edildi. Kaydedilen veriler yaş, cinsiyet, aspirasyon hakkında öyküsü, yakınmaları, bronkoskopi nedeni, yabancı cisim yeri ve bronkoskopi sırasında karşılaşılan problemlere göre gözden geçirildi. Fasülyeleri çıkarmak için, teleskoba uyarlanan optik forseps kullanıldı ve yabancı cisim doğrudan görülerek çıkarıldı.

Bulgular: Öksürük, fizik incelemede azalmış solunum sesi ve direk filmde amfizematöz görünüm başlıca bulgulardı. Fasülyeler, 5 hastada sağ ana bronş, 4 hastada sol ana bronşta bulundu. Bir hastada, aile öyküsü olmasına rağmen fasülye bulunamadı. Erken olgularda (n=7), fasülye daha kolaylıkla çıkarıldı fakat gecikmiş olgularda (n=2), akciğer enfeksiyonu, anestezi intoleransı ve daha fazla trakeal yıkama ve aspirasyon ihtiyacı nedeniyle çıkarılma daha fazla zaman aldı ve zor oldu. Bir olguda, fasülyenin kabuğu bronşial mukozaya yapışmış ve fibrinle kaplanmıştı. Kabuk, yıkamayla temizleme ve aspirasyona kadar fark edilemedi.

Sonuç: Fasülye gibi şişen yabancı cisimlerin bronşial hava yolundan çıkarılmasında ki başarı, çocuk cerrahı kadar anestezistin yeterince deneyimli olmasına bağlıdır. Doğrudan görüşlü bronkoskop yerine optik forseps bronkoskop kullanılması ve yabancı cismin optik teleskoba uyarlanan forcepsle çıkarılması başarılı bronkoskopi oranını artırır.

Anahtar kelimeler: Bronkoskopi, yabancı cisim aspirasyonu, fasülye

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INTRODUCTION

Foreign Body (FB) aspirations are potentially fatal and emergent conditions in childhood especially less than 3 years, who have the tendency to put everything they grasp into their mouth. Therefore toys with small pieces, seeds and foods are potentially hazardous materials for aspiration.[1,2,3] In males, the FB aspiration occurs more frequently than females.[3,4,5] In some series, bean aspiration is the leading cause of FB aspiration in children.[6] The management of aspiration of bean is sometimes challenging. We aimed to evaluate the children with bean aspiration and their management.

MATERIALS AND METHODS

All children with FB aspiration between 2005 and 2011 that admitted to our department have been reviewed with special emphasis on bean aspiration. All patients underwent rigid bronchoscopy. The outcome parameters were age, sex, time lasting from the aspiration to admission, symptoms, the findings at bronchoscopy (localization, size of the FB) and challenges during removal of FB. Rigid bronchoscopes (Karl-Storz, Germany) with 2,5-5 mm diameters and 20-30 cm length, 0° optical view and foreign body forceps adaptable to bronchoscope have been used for the removal of FB (Figure 1).

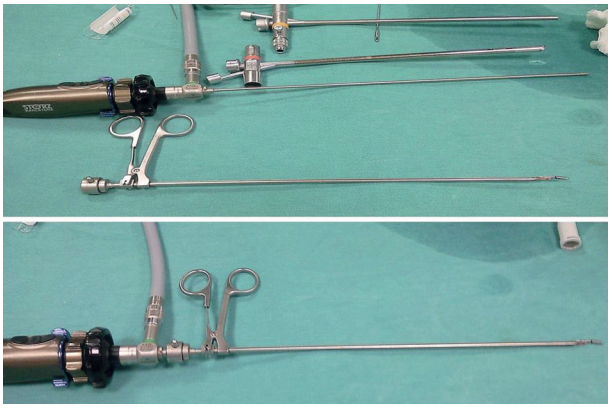

Figure 1. Rigid bronchoscopes with 2,5-5 mm diameters and 20-30 cm lenght, 0° optical view and foreign body forceps adaptable to bronchoscope have been used for the removal of FB.

RESULTS

Totally ten patients (4 female, 6 male) aged from nine months to five years (mean 34.5 months) have been reviewed. Nine beans were extracted from airways by bronchoscopy. Five of them (50%) were in right main bronchus and four of them (40%) were within the left main bronchus. In spite of positive family history about bean aspiration, it could not be found in one patient during bronchoscopy (10%). Age and gender of patients, family history about bean aspiration, type of extracting bean were shown in Table 1.

Table 1. Age, gender, history and localization of foreign body (FB)

Patients	Age	Gender	History of FB aspiration	Localization of FB
1	5 y	F	+	RMB
2	1.5 y	M	+	RMB
3	1 y	M	+	RMB
4	9 mo	M	+	LMB
5	3 y	M	-	LMB
6	3 y	M	+	LMB
7	3 y	M	+	RMB
8	1.5 y	F	+	RMB
9	2 y	F	+	-
10	9 mo	F	+	LMB

RMB: Right main bronchus, LMB: Left main bronchus

Table 2. Clinical picture and radiologic findings

Complaints	Cough	10 (100%)
	Sudden cyanosis	6 (60 %)
	Dispnea	6 (60%)
	Recurrent lung infection	2 (20%)
Physical examination	Reduction in respiratory sounds	7 (%70)
	Unequal breath sounds	5 (%50)
	Rales-Rhonchi	2 (%20)
Radiologic finding	Emphysematous / air trapping	7 (%70)
	Pneumonic infiltration	3 (%30)

The main complaints of patients were cough, sudden cyanosis, respiratory distress and recurrent lung infection. Among physical examination findings; there were unequal breath sound on both hemithoraxes, rales/rhonchi on auscultation, decreased/non-present breath sounds. Radiological findings were summarized on Table 2 and mainly contain air trapping on affected site, emphysematous appearance and pneumonic infiltration. During bronchoscopy, beans were seen as swollen due

to bronchial secretions and mostly obstructing the main bronchus (Figure 2). Usually, beans peeled off easily from their shell leading us to apply excessive effort for extracting the shells as well as the bean (Figure 3). All beans were removed piece by piece from the airways. Seven patients were admitted before 24 hours after FB aspiration (Early group). The duration of bronchoscopy was short in those patients. However in two late cases (admission after 24 hours), bronchoscopies took more time because of intolerance to anesthesia with the presence of lung infection and more frequent need of bronchial wash out - aspiration during bronchoscopy. In one late case, bean shell was adhered to mucosa very tightly and covered over fibrin. This bean had been noticed and extracted after prompt and meticulous washouts and aspirations (Figure 4).

Figure 2. Bean in the right main bronchus

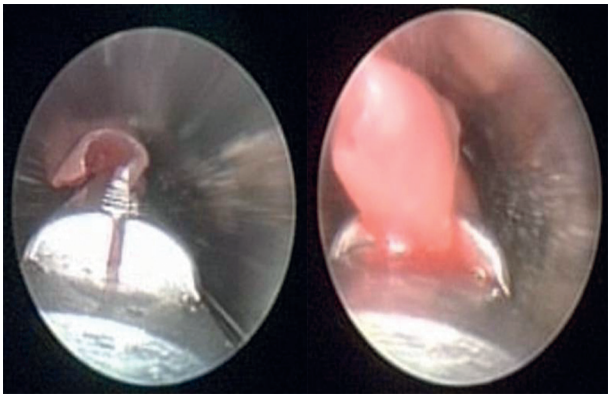

Figure 3. Shell beans requires the utmost attention and experience. Optical forceps is extremely helpful at this stage

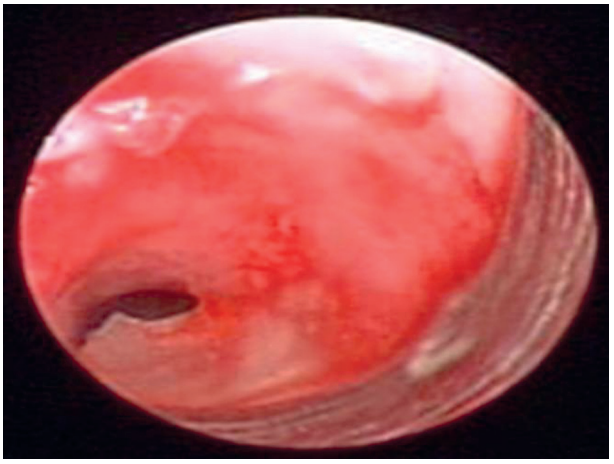

Figure 4. Bean shell adhere to mucosa so tightly and cover over fibrin. Shell beans of the mimicking bronchial mucosa stripped off

DISCUSSION

Foreign body aspiration is a common and life-threatening problem among children younger than 3 years of age.[3,7] Though new technological advances providing better quality videoscopic vision, optical forcepces for easier grasping of FB and improvement in anesthesia, removal of the FB is still challenging and more than 3000 deaths have been reporting due to FB aspiration annually.[8,9] An important consequence of FB aspiration is the sequel subsequent to hypoxia. Sometimes the diagnosis of the FB aspiration is difficult. It should be suspected in case of recurrent pneumonia in small children, even if there was no history of aspiration.[6] The most common objects aspirated by children are foods, pieces of toys and housewares and seeds. As we previously reported, hazelnut is the most common cause of aspiration in our region.[10] Lone et al reported the bean aspiration was most frequent among their series of children.[6] Beans may cause serious problems when aspirated by small children. They may totally or partially occlude one of the main bronchi, even the trachea. After a while of aspiration, beans may become larger; edema and secretion accompany. Swelling of bean may lead to total obstruction of airway. Consequently, partial obstruction and milder symptoms become total obstruction with serious clinical picture of the patient, especially in case of long standing of the aspirated bean within the airway.[8,11] The removal of the occluded and enlodged beans is also challenging. Usually, en-bloc removal of the aspirated bean is not possible and only fragments thereof can be taken out.

There are many risks of bean aspiration. As in one of our cases, the outer surface of the aspirated bean may have become lodged on the bronchial mucosa and it might have covered by bronchial secretion leading to failure of extraction. After prompt washout, it is verified to be a FB and removed. The outer surface of the bean may also cause a valve mechanism within the bronchus resulting in air-trapping and total occlusion. In early cases, if the bean is not lodged in the bronchus, the aspirated FB may be extracted en-bloc. However, these cause another danger: The attempt of removal may fail just at the level of vocal cords causing lodgment of FB in the trachea and obstructing the airway totally. In that case, the bean should be immediately pushed in any of bronchi to relieve the air passage. Furthermore, during the removal of aspirated bean, some fragments may run off into the opposite bronchus. Consecutive washing-out, fragmentation of the bean and removal of the fragments seem the safer method for the removal of the aspirated bean. The critical point there is the experience and coordination of both the surgeon and anesthesiologist.

In conclusion, as in all cases with FB aspiration, bean aspiration is a life-threatening condition as well as its removal is challenging because of swelling of the object and danger of airway obstruction. The pediatric surgeon and anesthesiologist's experience have the critical role for the safety of the patient. The visual removal by optical forceps enhances the safety of the procedure.

REFERENCES

1. Bodart E, de Bilderling G, Tuerlinckx D, Gillet JB. Foreign body aspiration in childhood: management algorithm. Eur J Emerg Med 1999; 6(1): 21-5.

2. Ozdemir C, Uzun I, Sam B. Childhood foreign body aspiration in İstanbul, Turkey. Forensic Sci Int 2005; 153(2-3):136-41.

3. Brkić F, Umihanić S. Tracheobronchial foreign bodies in children. Experience at ORL clinic Tuzla, 1954-2004. Int J Pediatr Otorhinolaryngol. 2007;71(6):909-15.

4. Skoulakis CE, Doxas PG, Papadakis CE, Proimos E, Christodoulou P, Bizakis JG, et al. Bronchoscopy for foreign body removal in children. A review and analysis of 210 cases. Int J Pediatr Otorhinolaryngol 2000; 53(2): 143-8.

5. Kıyan G.,Uygun I., Karadag B., Tugtepe H., Iskit SH., Dagli TE. Çocuklarda yabancı cisim aspirasyonu. Kulak Burun Boğaz İhts Derg. 2004;12(5-6):128-33.

6. Lone SA, Lateef M. Foreign Body in Tracheobronchial Tree. JK Science 2004;6(2):77-80.

7. Black RE, Choi KJ, Syme WC, Johnson DG, Matlak ME. Bronchoscopic removal of aspirated foreign bodies in children. Am J Surg 1984; 148(6): 778-81.

8. Friedman EM. Tracheobronchial foreign bodies. Otolarygol Clin Nor Am 2000; 33(1): 179-85.

9. Cataneo AJM, Reibscheid SM, Ruiz RL, Jr, Ferrari GF. Foreign body in the tracheobronchial tree. Clin Pediatr 1997; 36(12) : 701-5.

10. Tander B, Kırdar B, Aritürk E, Rizalar R, Bernay F. Why nut? The aspiration of hazelnuts has become a public health problem among small children in the central and eastern Black Sea regions of Turkey. Pediatr Surg Int. 2004;20(7):502-4.

11. McGuirt WF, Holmes KD, Feehs R, Browne JD. Tracheobronchial foreign bodies. Laryngoscope 1988; 98(6): 615-8.