



# Iatrogenic aspiration of a large piece of a wooden spoon in a 14-year-old epilepsy patient

## On dört yaşındaki epilepsi hastasında büyük bir tahta kaşık parçasının iyatrojenik aspirasyonu

Hilal SAZAK,<sup>1</sup> Ülkü YAZICI,<sup>2</sup> Mahmut GÜLGÖSTEREN,<sup>2</sup> Güler TOPÇUOĞLU,<sup>1</sup>  
Serdar ÖZKAN,<sup>2</sup> Eser ŞAVKILIOĞLU<sup>1</sup>

Foreign body aspiration in childhood is a common and life-threatening emergency. A 14-year-old male with history of mental retardation was transferred from another center to our hospital with diagnosis of foreign body aspiration. According to the anamnesis, he had been diagnosed with epilepsy a few years ago. Approximately 10 hours before admission, while at home, his parents had urgently placed a wooden spoon in the boy's mouth during a generalized tonic-clonic seizure to avoid possible airway injury. Nevertheless, he had inhaled a large piece of the wood after breaking the handle of the spoon with his teeth. Rigid bronchoscopic evaluation revealed the presence of a large piece of wood sitting vertically 2 cm beyond the glottis. Although bronchoscopic removal of the wooden piece from the trachea was difficult and prolonged, it was successful. Following this process, he presented with subcutaneous emphysema and pneumothorax in the intensive care unit (ICU). After improvement with the aid of chest tube drainage in the ICU, he was discharged from the hospital on the 3rd day of rigid bronchoscopy. Early diagnosis and urgent removal of a foreign body are very important for reducing mortality. However, complications related to the foreign body itself or the bronchoscopy may occur. In conclusion, the physical characteristics, position and location of the foreign body can influence the outcome, even in skilled hands.

**Key Words:** Epilepsy; foreign body aspiration; iatrogenic.

Yabancı cisim aspirasyonu çocukluk döneminde yaygın ve hayatı tehdit eden acil bir durumdur. Mental retardasyon öyküsü olan, 14 yaşında erkek hasta, yabancı cisim aspirasyonu tanısıyla başka bir merkezden hastanemize nakle edildi. Öyküsünden birkaç yıldır epilepsisi olduğu öğrenildi. Yaklaşık 10 saat önce, evde, jeneralize tonik-klonik kasılmalar sırasında, olası bir havayolu yaralanmasını önlemek amacıyla ailesi ağzına acilen tahta kaşık yerleştirmiş. Ancak hasta dişleriyle kaşığın sapını kırarak, aniden büyük bir tahta parçasını aspire etmişti. Rijit bronkoskopi yapılan değerlendirme, glottisin 2 cm ilerisinde, dikey olarak yerleşmiş, büyük bir tahta parçasının varlığını gösterdi. Bu büyük tahta kaşık parçasının trakeadan bronkoskopiyle çıkarılması uzun ve zor olsa da başarılı oldu. Ancak bu girişimi takiben, yoğun bakım ünitesinde hastada subkutan amfizem ve pnömotoraks olduğu görüldü. Yoğun bakım ünitesinde yerleştirilen toraks tüpü ile genel durumu düzelen hasta, rijit bronkoskopiden üç gün sonra taburcu edildi. Erken tanı ve yabancı cismin acilen çıkarılması mortaliteyi önemli ölçüde azaltmaktadır. Ancak yabancı cisme veya bronkoskopiye ait komplikasyonlar gelişebilir. Sonuç olarak, yabancı cismin fiziksel özellikleri, pozisyonu ve yerleşim yeri, tecrübeli ellerde bile, sonucu etkileyebilir.

**Anahtar Sözcükler:** Epilepsi; yabancı cisim aspirasyonu; iyatrojenik.

Tracheobronchial foreign body aspiration in childhood is common and can be an important cause of morbidity and mortality.<sup>[1,2]</sup> Iatrogenic foreign body aspiration cases seen in a health center, with varying ages, were reported previously.<sup>[3-5]</sup> Patients with

epilepsy are considered to be at risk of dental foreign body aspiration while experiencing seizure.<sup>[6]</sup> Cases of unusual foreign body aspiration during seizure have been presented.<sup>[7,8]</sup> Here, we report an iatrogenic, unusual and complicated case of foreign body aspira-

Presented at the 17th International Intensive Care Symposium (May 8-9, 2009, Istanbul, Turkey).

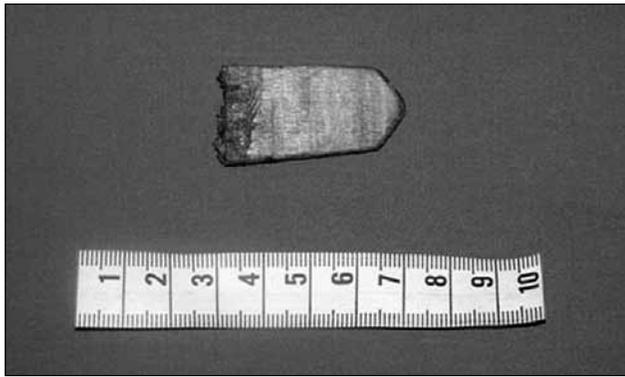
Departments of <sup>1</sup>Anesthesiology and Reanimation, <sup>2</sup>Thoracic Surgery, Atatürk Chest Disease and Thoracic Surgery Training and Research Hospital, Ankara, Turkey.

17. Uluslararası Yoğun Bakım Sempozyumu'nda poster bildirisi olarak sunulmuştur (8-9 Mayıs 2009, İstanbul).

Atatürk Göğüs Hastalıkları ve Göğüs Cerrahisi, Eğitim ve Araştırma Hastanesi, <sup>1</sup>Anesteziyoloji ve Reanimasyon Kliniği, <sup>2</sup>Göğüs Cerrahisi Kliniği, Ankara.

Correspondence (İletişim): Hilal Sazak, M.D. Osman Temiz Mah., 39. Sok., No: 10/10, Dikmen, Ankara, Turkey.

Tel: +90 - 312 - 355 21 10 e-mail (e-posta): hilalgun@yahoo.com



**Fig. 1.** The piece of a wooden spoon extracted from the trachea.

tion resulting from an epileptic attack in a 14-year-old male at home.

### CASE REPORT

A 14-year-old male with a history of epilepsy and mental retardation was transferred from another center to our hospital with diagnosis of foreign body aspiration. According to the anamnesis, he had been diagnosed with epilepsy a few years ago, but was not under follow-up for this illness. Approximately 10 hours before admission, while at home, his parents had urgently placed a wooden spoon in his mouth during a generalized tonic-clonic seizure to avoid possible airway injury. Nevertheless, he had inhaled a large piece of the wood after unintentionally breaking the handle of the spoon with his teeth.

The patient was scheduled promptly for rigid bronchoscopy under general anesthesia. On preanesthetic evaluation, cough, dyspnea, stridor, bilateral diminished breath sounds, rhonchi, and tachycardia were determined. Other investigations were in normal range including chest X-ray. He was transported to the operating room with venous access. Monitoring consisted of electrocardiography, peripheral oxygen saturation ( $SpO_2$ ), end-tidal  $CO_2$ , invasive arterial pressure measurements, and arterial blood gas analysis. Prior to the rigid bronchoscopy,  $SpO_2$  was 92% in room air. After preoxygenation, anesthesia was induced and maintained by intravenous agents. The ventilation was controlled conventionally with positive pressure and 100% oxygen via rigid bronchoscope, which was attached directly to the circuit of the anesthesia machine

with a sidearm adapter. Intravenous bolus of lidocaine, thiopental, midazolam, alfentanil, succinylcholine, and atracurium were used during the anesthetic process lasting one hour.

In both the preoperative and postoperative periods, intravenous steroid was administered. Rigid bronchoscopic evaluation revealed the presence of a large piece of wood sitting vertically 2 cm beyond the glottis. Multiple attempts at its removal by the first surgeon were unsuccessful. Later, it was extracted with difficulty by the second, senior surgeon simultaneously with withdrawal of the bronchoscope. The piece of wood measured 4 x 2 cm (Fig. 1). Throughout the procedure, blood pressure was within normal limits, whereas tachycardia persisted despite deep anesthesia. Arterial blood gas analysis demonstrated hypercarbia and respiratory acidosis during the rigid bronchoscopy. Values of arterial blood gases are shown in Table 1. Intubation with endotracheal tube and intermittent positive pressure ventilation were performed following bronchoscopy. He was extubated awake in the operating room after reversal of neuromuscular blockade. He was transferred to the intensive care unit (ICU) with slight hypercarbia and hypoxemia following extubation.

On ICU admission, unexpected dyspnea and cervical subcutaneous emphysema developed, and  $SpO_2$  was 90%. In the analysis of arterial blood gases, slight hypercarbia and hypoxemia continued while he was obtaining nasal oxygen. Chest X-ray showed pneumomediastinum and right-sided pneumothorax (Fig. 2).

He improved clinically after chest tube drainage. Follow-up chest X-ray and the results of arterial blood gas analysis also demonstrated improvement. Fiberoptic bronchoscopic evaluation was performed to clarify the cause of pneumothorax and revealed only slight erosion and a hyperemic area in the posterior membranous wall of the upper trachea. There was no tracheal rupture in the bronchoscopic examination, and the patient remained asymptomatic. He was discharged to the ward on the 2nd day and home on the 3rd day of rigid bronchoscopy uneventfully. The patient was invited to the hospital for a follow-up after three weeks, at which time he was examined and evaluated to be completely recovered.

**Table 1.** The results of arterial blood gas analyses

	During rigid bronchoscopy	After intubation	On ICU admission	45 min after chest tube	3 hr after chest tube	8 hr after chest tube
$PaCO_2$ (mmHg)	84.5	49.5	48.0	53.3	42.6	32.7
$PaO_2$ (mmHg)	134.7	62.4	66.2	83.1	96.5	77.3
pH	7.12	7.28	7.22	7.26	7.38	7.45

$PaCO_2$ : Arterial partial pressure of carbon dioxide;  $PaO_2$ : Arterial partial pressure of oxygen; ICU: Intensive care unit.

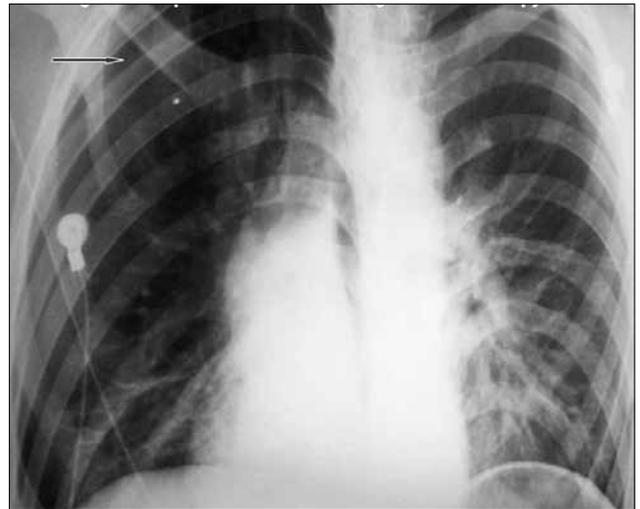
## DISCUSSION

Foreign bodies are inhaled frequently by children younger than 3 years old and usually lodge in the right followed by the left bronchial tree.<sup>[1,9,10]</sup> Peanut is reported as the most common type of foreign body according to previous articles.<sup>[2,10]</sup> Our case, a 14-year-old patient, aspirated a large piece of a wooden spoon, which was removed from the trachea. Hui et al.<sup>[2]</sup> recently reported 1428 pediatric patients with tracheo-bronchial foreign body. Of these cases, 8 (0.56%) were aged 7 to 14 years. Foreign bodies lodged in the trachea in only 75 cases (5.3%) in that study.<sup>[2]</sup> Immediate bronchoscopy is usually required only in cases with severe respiratory distress and for foreign bodies in the larynx or trachea.<sup>[10]</sup> Rigid bronchoscopy under general anesthesia is the procedure of choice for diagnosis and management of foreign body aspiration.<sup>[9]</sup>

A variety of difficulties and complications resulting from foreign body aspiration may be observed despite the advances in anesthetic and endoscopic techniques. Both the presence of and the attempts at removal of a large and sharp foreign body lodged in the trachea may be associated with life-threatening complications.<sup>[11]</sup> In the present case, pneumomediastinum, pneumothorax and slight erosion in the posterior membranous wall of the upper trachea were thought to have been caused by the sharp and irregular edge of the large foreign body that was subjected to repeated instrumentation.

Due to the hardness of the wooden foreign body, it could not be broken into pieces for easier extraction through the bronchoscope. To protect the surrounding tissues from damage, the removal of this large foreign body had to be conducted gently and with great care; thus, it was extracted with difficulty after multiple and prolonged attempts. The attention given to the extraction of the large and sharp foreign body and the usage of steroid during the procedure may have prevented potential laryngeal edema. The humidified oxygen given in the ICU might also have contributed to this prevention. Intravenous lidocaine and alfentanil administrations were expected to decrease reaction to the bronchoscope and probable arrhythmias. The subglottic localization of the large foreign body might have caused laryngospasm if the anesthesia had been inadequate. Fortunately, the stable vertical position of the foreign body protected the trachea from complete occlusion. There was no subglottic edema or requirement for urgent tracheotomy.

The hypercarbia, which developed during the procedure, was considered secondary to the periodic interruption of ventilation via bronchoscope during the multiple attempts at extraction. The hypoxemic and hypercarbic period observed after the procedure was explained by inadequate ventilation resulting from the



**Fig. 2.** Chest X-ray showing pneumomediastinum and right-sided pneumothorax after rigid bronchoscopy.

pneumothorax.

A retrospective study reviewed 912 rigid bronchoscopy patients, 269 of whom were aged between 0-12 years.<sup>[12]</sup> We agree with other authors about the importance of the operator's skill and experience in dealing with such cases.<sup>[2,11]</sup> Failure of attempts to remove such a large foreign body via bronchoscope would have necessitated urgent tracheotomy.

History and clinical examination might be very important even if the diagnosis of foreign body aspiration has not been supported with radiographic findings.<sup>[9,11]</sup> The presented patient also underwent rigid bronchoscopy based on history and clinical examination despite a normal chest radiograph. We agree with Eroğlu et al.<sup>[13]</sup> about the importance of community education on the causes and dangers of foreign body aspiration.

In summary, the sudden tracheal aspiration of a large foreign body may result in acute respiratory distress and even death. Early diagnosis and urgent removal of the foreign body are very important for reducing mortality. However, complications related to the foreign body itself or the bronchoscopy may occur. Attention must also be given to early diagnosis and prompt treatment of complications in order to reduce morbidity. We think that all of these facts strengthen the requirement of close collaboration between anesthesiologists and surgeons for airway management of such emergency cases. In this case report, we also emphasize that the physical characteristics (size, material, sharpness), position and location of a foreign body can influence the outcome, even in experienced hands.

## REFERENCES

1. Roda J, Nobre S, Pires J, Estêvão MH, Félix M. Foreign bodies in the airway: a quarter of a century's experience. *Rev Port Pneumol* 2008;14:787-802.

2. Hui H, Na L, Zhijun CJ, Fugao ZG, Yan S, Niankai ZK, et al. Therapeutic experience from 1428 patients with pediatric tracheobronchial foreign body. *J Pediatr Surg* 2008;43:718-21.
3. Dhar V, Al-Reefy H, Dilkes M. Case report--an iatrogenic foreign body in the airway. *Int J Surg* 2008;6:e46-7.
4. Salerno T, Cutrera R, Bottero S, Malena S, Bush A. 'Iatrogenic' tooth inhalation. *Pediatr Pulmonol* 2008;43:726.
5. Hari CK, Petheram T, Garth R. Unusual complication of reusable suction catheter during rigid bronchoscopy. *Eur Arch Otorhinolaryngol* 2007;264:1509-11.
6. Radnai M, Szontágh E, Fazekas A. Prosthetic rehabilitation of an epilepsy patient with dental implants. Case report. *Fogorv Sz* 2006;99:121-4. [Abstract]
7. Montero-Cantú CA, Garduño-Chávez B, Elizondo-Ríos A. Rigid bronchoscopy and foreign body. Obsolute procedure?. *Cir Cir* 2006;74:51-3. [Abstract]
8. Sklar DP, Tandberg D. Glass ingestion from fracture of a laryngoscope bulb. *J Emerg Med* 1992;10:569-71.
9. Benumof JL. Anesthesia for emergency thoracic surgery. In: Benumof JL, editor. *Anesthesia for thoracic surgery*. 2nd ed. Philadelphia: W.B. Saunders Company; 1995. p. 612-56.
10. Yadav SP, Singh J, Aggarwal N, Goel A. Airway foreign bodies in children: experience of 132 cases. *Singapore Med J* 2007;48:850-3.
11. Oliveira CF, Almeida JF, Troster EJ, Vaz FA. Complications of tracheobronchial foreign body aspiration in children: report of 5 cases and review of the literature. *Rev Hosp Clin Fac Med Sao Paulo* 2002;57:108-11.
12. Ulus F, Tunc M, Sazak HG, Savkilioglu E. Retrospective analysis of rigid bronchoscopy applications under general anesthesia. *Respiratory Diseases* 2004;15:137-43.
13. Eroğlu A, Kürkçüoğlu IC, Karaoğlanoğlu N, Yekeler E, Aslan S, Başoğlu A. Tracheobronchial foreign bodies: a 10 year experience. *Ulus Travma Acil Cerrahi Derg* 2003;9:262-6.