Foreign Body Removal by Endoscopic Urology Dormia Basket: A Case Report and Literature Review

Lim Li Yun^a Prakash Seelan Muttusamy^b Mohd Faeiz Pauzi^c
Baharudin Abdullah^a

^aDepartment of Otorhinolaryngology – Head and Neck Surgery, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Malaysia; ^bDepartment of Anesthesiology, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Malaysia; ^cAnaesthesiology Unit, Medical Faculty, Universiti Sultan Zainal Abidin, Kuala Terengganu, Malaysia

Keywords

Foreign body · Pediatric airway · Bronchus · Sunflower seed · Dormia Basket

Abstract

Pediatric foreign body inhalation is a medical emergency that is both challenging and tricky to treat. We report a 6-year-old child who presented with a foreign body in the right main bronchus that was removed successfully using an endoscopic urology Dormia basket. We reviewed the literature and proposed a recommendation to assist clinicians in dealing with pediatric foreign body inhalation.

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Introduction

Foreign body (FB) in the upper airway is common in children aged less than 5 years. Most common FB inhaled are organic materials such as peanuts, seeds, and nuts [1]. FB in the pediatric airway may result in grave outcome. Evacuation of FB is necessary in all these cases. The small pediatric airway with fragile mucosa together with the

shared airway for anesthesia poses a challenge during the retrieval process of the FB [2]. Precise and delicate removal is required as the aim is to avoid mortality at any cost. We described an emergency removal of an inhaled FB in the right main bronchus with the assistance of an endoscopic urology Dormia basket when the conventional method of using an FB forceps failed.

Case Report

A 6-year-old boy presented to the emergency room with a 2-h history of choking after ingesting a sunflower seed. On examination, the boy was in severe respiratory distress with subcostal recession and tracheal tug, audible inspiratory and expiratory stridor, and occasional barking cough. Auscultations of the lungs revealed reduced air entry bilaterally. He was able to maintain good oxygenation under high-flow mask oxygen. Initial chest X-ray showed bilateral hyperinflated lungs. After informed consent was taken from the mother, emergency rigid laryngoscopy and bronchoscopy were performed under general anesthesia. In the operating theater, the child was induced using total intravenous anesthesia with propofol and remifentanyl. He was then intubated with an uncuffed endotracheal size 5.0 with spontaneous ventilation. A rigid laryngoscope (Benjamin-Lindholm laryngoscope, pediatric size, 11 cm; Karl Storz 8587KK) was inserted and laryngeal examination was done and showed no FB in that area. A pediatric

Fig. 1. The sunflower seed lodged in the right main bronchus. The seed became slippery due to the presence of mucus, which made extraction difficult.

Fig. 2. The Dormia basket holding the sunflower seed securely without damaging the surrounding mucosa.

ventilating bronchoscope (DOESEL-HUZLY Bronchoscope; Karl Storz) size 4.5 was inserted and the sunflower seed was found lodged in the right primary bronchus (Fig. 1). Initial attempts to remove the seed with a flexible bronchoscopy grasping forceps were unsuccessful as the seed became slippery due to the presence of mucus. We struggled to grasp the seed as every time we grasped it, it moved even further downwards. When we managed to hold it, it slipped again as it was too big to be extracted from the vocal cord area and it fell downwards to the right main bronchus. We had difficulty in retrieving the FB as by using the FB grasping forceps, we could not pass through the vocal cord area. This is due to the size of the FB together with the added size of the FB grasping forceps. Subsequently, we used an endoscopic urology Dormia basket (Graspit™ Nitinol Stone Retrieval Forceps – Boston Scientific 2.6F × 120 cm) which was inserted through the lateral channel of the rigid bronchoscope and easily maneuvered to the right bronchus. Using the Dormia basket to grasp the sunflower seed was convenient and secure. The seed was firmly held in the basket, pulled upwards, and successfully evacuated without any injury to the tracheobronchial tree mucosa (Fig. 2, 3). The patient was discharged home well after 48 h of hospitalization for observation. Follow-up after 1 week showed the boy was well and we discharged him with advice to the parents to be extra careful when the boy eats anything similar in future. Informed consent was obtained from the mother before reporting the case.

Discussion

For pediatric FB aspiration, the general rule would be to retrieve it promptly. The most frequent method of retrieval is by using a bronchoscope, either rigid or flexible. With direct visualization of the FB by an endoscope, it can be removed with a grasping forceps or by suction. However, an FB covered with mucus tends to be slippery and

Fig. 3. The sunflower seed removed from the child's right main bronchus held by the Dormia basket.

hard to hold, which often complicates the procedure, making the retrieval process difficult. In addition, when an FB in the airway is left too long, there is risk of airway edema as well as infection. Consequently, retrieval of an FB in the pediatric airway can be difficult and tricky.

Dormia basket for bronchial FB removal was first described in the English literature in 1971 [3]. Since then, it has been used successfully for FB removal from the esophagus, gastrointestinal tract, and airway [2, 4, 5]. Although it is very useful and convenient to use, it is not standard practice for clinicians to use it on a regular basis. One of the reasons is probably that it is not designed to be used

for bronchoscopy FB removal. The other reason might be poor awareness on the part of the clinicians of the benefit of its use. This is understandable as data from randomized studies are lacking [6]. Thus, as a guide for the busy clinicians, we would like to highlight and recommend the use of the endoscopic urology Dormia basket for the following circumstances [2, 7–9]:

- 1 Rigid bronchoscope, flexible bronchoscope, and combined rigid and flexible bronchoscope procedures for retrieval of FB.

- 2 Children with any FB.

- 3 Both adults and children with a spherical round-bodied FB, whether organic or inorganic, which is difficult to grasp with the standard FB forceps.

The initial finding of reduced air entry bilaterally on auscultation in our patient, despite the FB being in the right bronchus, during bronchoscopy is due to movement of the FB in the airway. When the patient breathed, the FB moved up and down. This is a known phenomenon seen in cases of FB in the airway. The use of total intravenous anesthesia and spontaneous ventilation has been reported to be more superior to endotracheal intubation in the pediatric airway [10]. However, in our patient the anesthetist preferred to use endotracheal intubation as resuscitation would be easier if the patient's condition deteriorated.

Recently, a report of a purposely built basket device designed for tracheobronchial tree FB retrieval has emerged [11]. However, this device is not widely available and may not be a priority in resource-limited countries, and clinicians may still need to rely on the endoscopic urology flexible Dormia basket for FB removal when other methods have failed.

Conclusions

The use of an endoscopic urology Dormia basket facilitates the urgent removal of a slippery FB and avoids mucosal damage and injury to the tracheobronchial tree. The use of an endoscopic urology Dormia basket can be part of a special tool in tracheobronchial FB retrieval.

Statement of Ethics

The authors have no ethical conflicts to disclose.

Disclosure Statement

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Author Contributions

The authors verify that they have met all the criteria for authorship and are qualified to be listed as authors of this work by their substantive contribution to the conception and design of the case report or analysis of the data, their drafting or critical revision of the content of this manuscript, and their approval of the final version to be published. L.L.Y., P.S.M., M.F.P., and B.A. participated in the management of the patient, the design of the case report, drafting the manuscript, collection of data, analysis of data, and revision of the manuscript for critical content. All authors read and approved the final version of the paper.

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