

Pneumologia

Upper-airway foreign bodies: is a clinical approach enough for proceeding with invasive management? Evidence from a case

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Abstract

English:

Introduction: Upper-airway foreign bodies are a common condition in the emergency room, which can lead to death among different-aged populations, and a fast clinical recognition and management have led to improvement in the outcomes.

Objective: To present a clinical case of a male patient with an upper-airway foreign body, which only required clinical evaluation before surgical management.

Clinical case: We report the case of an 8-year-old Hispanic boy, who presented to the emergency room with upper respiratory symptoms, including dry cough, dysphagia, and chest discomfort; after clinical evaluation, a diagnosis of an upper-airway foreign body was made; the patient was taken to the operating room, and a tracheal foreign body was removed using rigid bronchoscopy. The post-operative course was uneventful, and the patient was discharged.

Discussion: The physiopathology, diagnosis, and management based on the presented case are discussed.

Conclusion: A good clinical history, along with a thorough physical examination and a high index of suspicion from the clinician, is enough for achieving a diagnosis, facilitating early management and reducing complications.

Keywords

foreign body • upper airways • bronchoscopy • bronchoscopic surgery

Corpii străini ai căilor aeriene superioare: este suficientă o abordare clinică pentru a continua cu managementul invaziv? Dovezi dintr-un caz clinic

Rezumat

Romanian:

Introducere: Corpii străini ale căilor aeriene superioare sunt o afecțiune comună în camera de gardă, care poate duce la deces în rândul diferitelor populații de vârstă, iar recunoașterea și managementul clinic rapid au condus la îmbunătățirea rezultatelor.

Obiective: Prezentarea unui caz clinic al unui pacient de sex masculin cu un corp străin al căilor aeriene superioare care a necesitat doar evaluare clinică înainte de managementul chirurgical.

Prezentarea cazului: Raportăm cazul unui băiat hispanic de 8 ani care s-a prezentat la urgență cu simptome ale căilor respiratorii superioare incluzând tuse uscată, disfagie și disconfort toracic, care, în urma evaluării clinice, a fost diagnosticat cu corp străin la nivelul căilor aeriene superioare; pacientul a fost dus în sala de operație, iar un corpul străin traheal a fost îndepărtat cu ajutorul bronhoscopiei rigide. Cursul postoperator a fost fără evenimente, iar pacientul a fost externat.

Discuție: Se discută fiziopatologia, diagnosticul și managementul pe baza cazului prezentat.

Concluzie: Un istoric clinic bun, alături de un examen fizic bun și un indice ridicat de suspiciune din partea clinicianului este suficient pentru realizarea unui diagnostic, facilitarea unui management precoce, și reducerea complicațiilor.


Cuvinte-cheie

corp străin • căi aeriene superioare • bronhoscopie • chirurgie bronhoscopică

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Introduction

Airway foreign-body aspiration represents a high cause of morbidity and mortality in the emergency services, becoming the fourth leading cause of death (1) among children in the USA, in patients between 1 year and 3 years old (2,3). This situation happens mostly in younger children for two reasons, the first one is that young children have an immature swallowing function and an ineffective chewing caused by the lack of teeth, particularly molars (4), and second, because their airway anatomy is not fully developed, which happens after they turn 8 years old (5); moreover, children's airways have a funnel shape (especially in the larynx) and a smaller transversal diameter (5 mm), making it easy for things to get stuck there.

The great majority of the foreign bodies get lodged in the bronchial tree (2,6,7), mostly in the right bronchus because it has a wider diameter and a lesser acute angle (2). Foreign bodies in the bronchial tree represent up to 88% of cases (6,7), but this location can change based on the age (1,2) and the foreign body (4). Other locations include – in order – the trachea and the carina. Most of the foreign bodies lodged in the respiratory airways include (1,2,6,7) peanuts, popcorn, cookies and apples. Clinical presentation is very wide, including mild symptoms such as cough, choking sensation, and dysphagia (4), which might progress to severe symptoms, including tachypnoea, air hunger, cyanosis, use of accessory respiratory muscles or interrupted breathing (1,4). The classic triad of cough, wheezing and decreased breathing sounds can be found only in up to 40% of the patients, but this triad has a high sensitivity (96%–98%) (4).

Radiological signs of foreign bodies in the upper airways include overinflation, atelectasis, mediastinal shifts and lung infiltrates (2,4,7), but it is important to note that radiolucent foreign bodies are more common than radiopaque bodies (2,4); therefore, in up to 50% of the patients, there is a normal X-ray.

In most cases, symptoms develop within the first 48 h (4,8); however, patients can be asymptomatic for years (9). We would like to present a case where consideration of a good clinical history and evaluation of the symptoms were very important for the diagnosis and further management of this clinical condition.

Clinical case

An 8-year-old Hispanic boy was brought to the emergency room by his mother after 3 days of dry cough, dysphagia and discomfort in the back of the throat. Mother denies choking,

cyanosis, respiratory distress, haemoptysis or any other symptoms; he was able to eat and drink without difficulties. The mother was not precise with the information provided; however, she said that the day before the beginning of the symptoms, the patient had a cough attack during lunch, but after he drank several sips of water, he felt better and became asymptomatic. There were no significant precedents in his medical records. Physical examination showed that he was afebrile and vital signs were within normal values; he did not show signs of respiratory distress. Cardiopulmonary auscultation was normal, but auscultation in the lateral aspect of the neck revealed a slight inspirational wheezing. He was admitted and evaluated by the surgical group of our institution; based on its findings and the clinical history, a diagnosis of an upper-airway foreign body was made, and no radiological studies were performed. The mother and patient were counselled about the diagnosis, and he underwent surgical extraction of the foreign body with a rigid bronchoscope after proper counselling and written informed consent. During the procedure, a chicken bone was found in the middle of the trachea, which generated a stenosis of approximately 50% (Figure 1). It was extracted without complications (Figure 2), and the patient's post-operative course was uneventful; he was discharged a few hours later.

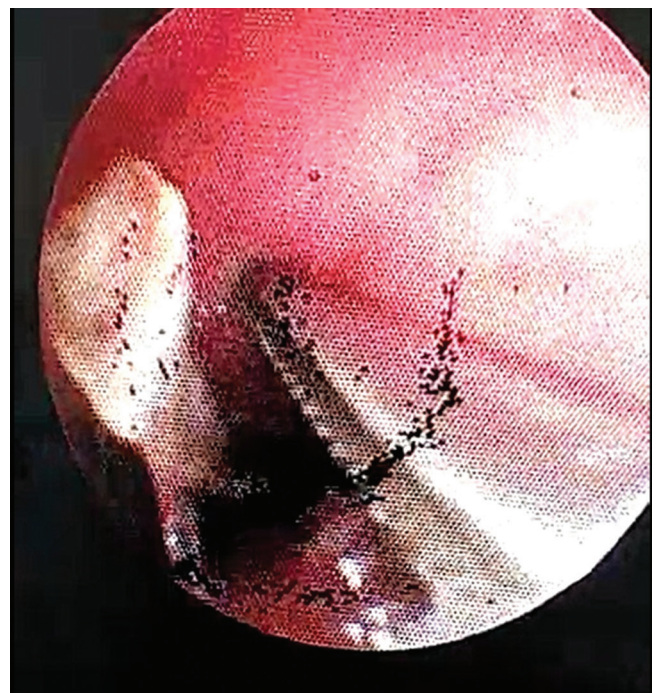


Figure 1. Rigid bronchoscopy showing the top of the foreign body in the trachea.



Figure 2. A chicken bone obtained from the patient's trachea.

Discussion

Tracheal foreign bodies represent <15% of total upper-airway foreign bodies (7,8); however, they can lead to fatal consequences if they are misdiagnosed (10). Most of the diagnosis algorithms include imagenology as a step (11) for the proper diagnosis of this situation; however, radiography has been shown to be not sufficiently accurate for showing the foreign body, because it depends on the characteristics of the foreign body (organic, inorganic) (12), radiopacity (3), duration of the symptoms (8) and the technique applied during the plaque taking (10,11). Management of this condition is invasive with bronchoscopy (4,6), usually with the rigid bronchoscopy; however, the implementation of flexible bronchoscopy has gained acceptance (2) because it is safe and has high success rates in retrieving foreign bodies.

The big dilemma regarding the management of foreign bodies in the upper airways is to use only the clinical features for proceeding directly to the bronchoscopy step, as in the case we present herein. Sink et al. (13) presented a study, in which they showed that a proper clinical evaluation will lead to a proper diagnosis, because a proper and wide clinical history had a sensitivity of 100% with a poor specificity (3%), findings in the physical examination had a sensitivity of 90% with a specificity of 33%, and, when they decided to implement imagenology, it had a sensitivity of 61% with a specificity of 77%. Kiyani et al. (14) evaluated a cohort of 207 patients, finding that if a proper clinical history was taken and if the symptoms were compatible with a foreign body lodging in the upper airways, the findings had a sensitivity of 97.8% with a specificity of 7.8%; when the physical examination findings were documented, they had a sensitivity of 96.4% and a specificity of 46.3%. They (14) also

evaluated the implementation of chest and neck X-ray, finding that 71.7% of their patients had a positive finding, leading to a sensitivity of 71.7% and a specificity of 74.1%; however, in their discussion, they showed that these values depend on the technique applied and they might be higher if the plaque is taken during both inspiration and expiration.

Bronchoscopy is relatively a safe and effective procedure, with a documented complication rate between 0.9% and 25.2% (14), with a mortality up to 1.4%; but an important variable regarding these two concepts is the lodging time (2,6,8–10), because the longer the lodging time, the higher are the rates of complications, with the interesting fact that regardless of the nature of the foreign body, the severity of the injury will be the same (12). Initially, only local injuries occur, and the characteristic of these injuries varies depending on the foreign body (5,12); on the third day (12), the histological features include mucosal haemorrhage, focally extensive epithelial thinning and granulation tissue; after the fifth day (5,12), there is pulmonary compromise, which includes mucopurulent discharge, dilated bronchioles, pulmonary oedema and atelectatic lungs, which lead to pneumonia and pulmonary abscess. All these features are related with high-complex bronchoscopy and an exponential complication rate (7,14).

Orji and Akpeh (15) evaluated a cohort of 103 patients who underwent rigid bronchoscopy, wherein they found that witnessed aspiration, choking crisis and unilateral decreased breath sounds were independent factors of proven foreign bodies in the upper airways ($P < 0.01$), with an important finding that only 27% of the radiographs performed showed a radiopaque object. Moreover, they showed that a choking crisis followed by a paroxysmal episode had greater sensitivity of the symptoms (73% and 86%, respectively; $P < 0.01$) and a witnessed aspiration and choking crisis had great specificity (89% and 83%, respectively; $P < 0.01$), with 95% of positive bronchoscopies when these symptoms were present; they concluded that a proper clinical history will reduce the spectre of differential diagnosis (mainly an asthma crisis), and only a convincing history of foreign body aspiration with related clinical features can be enough for performing a bronchoscopy. When these studies are applied on our case, a clinical history suggestive of aspiration of a foreign body, along with positive findings during the physical examination, was enough for performing a bronchoscopy, and based on the location and the nature of the foreign body, the prompt performance of the procedure reduced the development of complications significantly.

Conclusions

Upper-airway foreign bodies are common causes of morbimortality in children, adults and patients with particular

neurologic conditions. It is important to calm the parents for obtaining a good clinical history and to interview the patient, if possible; along with this, a good physical examination and a high index of suspicion from the clinician are enough for achieving a diagnosis, facilitating an early management and reducing complications. If a proper clinical approach is applied, its value will be shown in improved outcomes and reduced costs, but these should be proven in large cohort studies, with proper design and randomisation, but also considering possible limitations, including the clinical circumstances of the patients and local policies.

Conflict of interest statement

The authors declare that they have no conflicting interests.

Funding

The authors declare that they have not received funding to carry out this work. The present publication has been self-funded.

Informed consent

The article is supported by the mother of the patient, and she has signed informed consent.

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