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CLINICAL REPORT

Atypical presentation of an impacted radiolucent esophageal foreign body

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Abstract Patients with impacted esophageal foreign bodies usually present with gastrointestinal and rarely with respiratory symptoms. Impacted esophageal foreign bodies may be identified by radiologic studies. Ingested radiolucent foreign bodies may be more difficult to diagnose, especially if the patient presents with minimal symptoms. We report a rare case of a child who presented with stridor and obstructive sleep apnea. The cause of respiratory symptoms was thought to be due to enlarged tonsils and adenoids, and the patient was scheduled for tonsillectomy and adenoidectomy. On re-evaluation by the surgeon on the day of surgery, the procedure was changed to diagnostic microlaryngoscopy and bronchoscopy to rule out any other cause. The patient's respiratory symptoms were resolved when an incidental discovery and retrieval of the radiolucent esophageal foreign body was made. The diagnosis of radiolucent esophageal foreign body can be difficult and can be easily missed without reasonable clinical suspicion.

Keywords Stridor in a child · Obstructive sleep apnea · Impacted foreign body · Radiolucent foreign body

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Introduction

Foreign body (FB) ingestion by children is usually asymptomatic and uncomplicated. In the majority of cases, the FB passes through the gastrointestinal tract without complications; however, in a few cases, esophageal FB can be a potentially serious cause of morbidity and mortality [1]. The common presenting symptoms of esophageal FB are, for the most part, gastrointestinal and include excessive drooling, poor feeding, dysphagia, vomiting, and recurrent aspiration pneumonia [1–3]. More rarely, esophageal FB may cause respiratory symptoms such as cough, stridor, tachypnea, dyspnea, wheezing, and respiratory distress [2, 3]. The diagnosis of retained esophageal FB may be missed if the patient presents with subtle signs and symptoms. We report an interesting case of an incidental finding of an impacted radiolucent FB in the esophagus of a 3-year-old patient with symptoms of obstructive sleep apnea (OSA).

Case report

A 3-year-old, 13-kg female patient was scheduled for routine tonsillectomy and adenoidectomy (T&A) for OSA. She had a history of snoring, straining, and struggling to breathe at night for several months. She also had a mild stridor. There was no history of cough, fever, choking, poor feeding, dysphagia, vomiting, or excessive salivation during this period. She was previously healthy, with no significant medical or surgical history. On examination, she had enlarged tonsils and hypertrophied adenoid tissue, and a clinical diagnosis of OSA was made. Radiograph of the neck showed a widened upper esophagus with no apparent FB. However, the surgeon changed the procedure to

diagnostic microlaryngoscopy and bronchoscopy (MLB) on the day of surgery to rule out other causes because he felt the tonsils and adenoids were not enlarged enough to cause obstructive symptoms. As such, our anesthetic plan changed to keep the patient breathing spontaneously for diagnostic MLB after inhalation induction. The patient was alert, in no apparent distress, but had a mild biphasic stridor. Her vital signs included a heart rate of 116 beats/min, blood pressure of 98/64 mmHg, oxygen saturation of 100% on room air, and a temperature of 36.8°C. History and airway examination did not indicate the presence of difficult airway. The rest of the physical exam was within normal limits. The patient was premedicated with oral midazolam 5 mg and taken to the operating room. After placing the standard American Society of Anesthesiologist (ASA) monitors, inhalation induction was achieved with 30% oxygen, 70% nitrous oxide, and 8% sevoflurane. A 22-gauge intravenous access was easily secured in the left upper extremity. A propofol infusion was started and titrated to keep the patient breathing spontaneous. After achieving an adequate depth of anesthesia, the surgeon performed the MLB. The proximal trachea appeared normal but the mid to distal portion was remarkable for severe, nearly complete, tracheomalacia that appeared to be due to external compression from the posterior aspect of the trachea. The patient's airway was secured with an uncuffed 5.0-mm inner diameter (ID) endotracheal tube passed beyond the narrow portion of the trachea. In order to ascertain the cause for tracheomalacia, an esophagoscopy was performed with a 5-mm rigid esophagoscope. The proximal esophagus was minimally edematous and erythematous. Also noted was granulation tissue approximately 4 cm or so down into the esophageal lumen. On removing the granulation tissue with the endoscopic biting forceps, the edges of a FB could be visualized (Fig. 1). Numerous attempts were made over the next hour and half to retrieve the FB endoscopically. The FB was, however, firmly embedded and the attempts were unsuccessful. The surgeon then proceeded to do an esophagostomy to retrieve the FB. Using the esophagoscope as a guide, the FB was located and dissected out from the esophagus. The FB was noted to be a small plastic penny used in children's board games and similar to the United States Lincoln cent. It had a diameter of 19 mm and was 2-mm thick. The patient was kept intubated and the endotracheal tube positioned right above the carina past the area of tracheomalacia. A Dobhoff® tube (DHT®) was placed to feed the patient enterally until oral feeds could be tolerated. The patient was taken to the intensive care unit and kept ventilated and sedated. She was extubated 2 days later and discharged home on the fifth postoperative day. The DHT® was removed after 2 weeks. Over the course of a few more weeks, the stridor and other symptoms of OSA resolved, and the patient did not require a T&A.

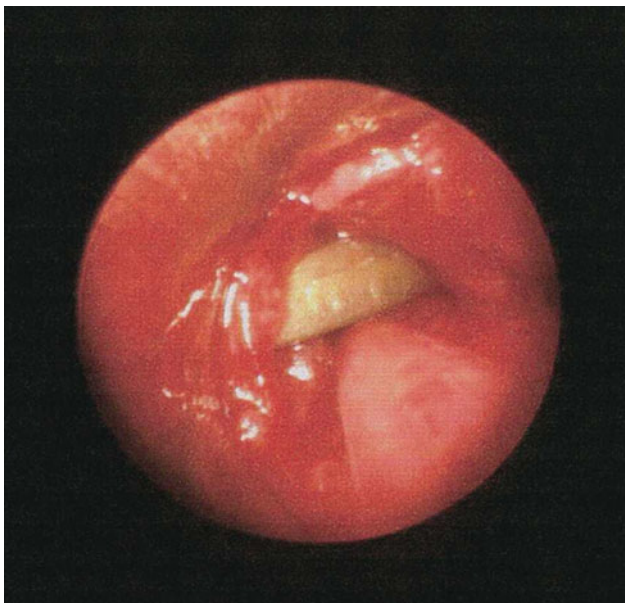

Fig. 1 Plastic penny impacted in the esophagus

Discussion

FB ingestion is common in children, with a peak incidence between the ages of 6 months to 3 years [1, 3]. Coins and small toys are the most common type of esophageal FB seen in children [1, 4]. Common sites of impaction are the proximal esophagus, at the level of the aortic arch and at the level of gastroesophageal junction [5]. Most FBs lodged in the esophagus are symptomatic, but asymptomatic cases may be seen [2]. Patients with acute FB ingestion usually have gastrointestinal symptoms; however, with chronic ingested esophageal FB there is a greater incidence of respiratory symptoms. In patients with chronic esophageal FB, the primary symptoms in 72% are respiratory: usually cough, fever, stridor, wheezing, apnea, or pneumonia [4]. Watson and Kapur [6] reported the development of OSA in a patient following esophageal aspiration of two FBs that were later discovered incidentally. In about 28% of patients with chronic esophageal FB, the symptoms are gastrointestinal, including nausea, vomiting, and dysphagia [4].

When ingestion is known or suspected, plain radiography is used to locate, confirm, and possibly identify the FB. Plain radiography should include the neck area; FB lodged in the hypopharynx may otherwise be missed. On a radiograph, a coin in the esophagus is usually seen in a coronal plane on anteroposterior view. Plain radiograph showing an increase in the distance between the cervical vertebrae and the larynx and trachea may lead to the suspicion of radiolucent FB in the esophagus [7]. Common radiolucent FB seen in children are wooden, plastic, or glass [3]. If a radiolucent FB is suspected, contrast-enhanced esophagography is used. This may outline the

suspected FB or show irregularity of the contrast medium column or esophageal mucosa and possible deviation in the anatomical course of the esophagus. It can be difficult to differentiate with magnetic resonance imaging (MRI) between FB and structures such as scar tissue, tendons, and calcification [8]. MRI detects plastic or wooden foreign bodies, but artifacts are seen with FBs containing glass or graphite. MRI is more expensive and therefore is not the initial imaging of choice for the workup of impacted esophageal FB [9]. Contrast-enhanced computed tomography is the imaging modality of choice when an esophageal FB is suspected, but plain radiographic findings are negative and/or contrast-enhanced esophagographic findings are positive [10]. Once impacted esophageal FB is diagnosed, it should be removed early, as the incidence of complications increases significantly after 24 h [11].

Atypical symptoms (as in this patient) pose a diagnostic difficulty, especially if the FB is radiolucent. The presence of the esophageal FB was not suspected in this patient either from the anesthesiologist nor the surgeon. However, this patient presented with a definite history of progressive stridor, OSA, and radiological findings that in retrospect were suspicious of FB. Since the ingestion was not witnessed, it was not initially suspected as a cause of symptoms. Progressive stridor for several months as seen in this patient may be attributed to laryngomalacia, subglottic stenosis, tracheal stenosis, vocal cord dysfunction, laryngeal cysts, laryngeal hemangiomas, and tracheomalacia. This patient's FB, like in a majority of other FB cases, became impacted in the cricopharyngeal area because of anatomical and functional narrowing [11]. Direct pressure by the FB on the membranous posterior tracheal wall or by secondary esophageal dilatation, causing compression of the lower cervical trachea, can cause respiratory symptoms. This can cause cough, stridor, OSA, and wheezing or may mimic upper respiratory tract infection [12]. Chronic pressure by the impacted esophageal FB on the small and compressible tracheal lumen in children makes it more likely that the symptoms are respiratory [4]. Mohiuddin et al. [13] reported patients with esophageal FB ingestion incorrectly diagnosed and treated for asthma or upper respiratory tract infection.

The incidence of complications is related to the duration of FB impaction [11]. Prolonged retention of an FB may evoke inflammatory changes resulting in periesophagitis, intramural abscess, or the object imbedding in the wall of the esophagus producing an FB granuloma. These changes can cause compression of the trachea and stridor [14]. Partially obstructed esophagus can cause dysphagia and predispose a patient to recurrent tracheal aspiration and symptoms of pneumonia [15]. The FB may even erode the wall of the esophagus and create a tracheoesophageal fistula [4]. Newman [14] reported that a delay in diagnosing radiolucent esophageal FB resulted in tracheoesophageal fistula in two patients although they had respiratory symptoms for several months. Complications secondary to the esophageal FB itself include erosion/perforation, stricture, migration, and airway complications. Macpherson et al. [16] reported complications including aorto-esophageal fistula, an extraluminal migration of a coin, and a large esophageal diverticulum.

Management will vary with type, size, location, and the duration of the impacted FB. The patient may be dehydrated from dysphagia or vomiting associated with the impacted FB and may need fluid resuscitation [4]. Retrieval of an impacted esophageal FB may be best done under general anesthesia with a protected airway [17]. Since these patients may have partial or complete esophageal obstruction, rapid sequence induction (RSI) and endotracheal intubation may be indicated to decrease the risk of aspiration [15]. RSI was not done in this patient, since the esophageal FB was not initially considered to be the cause of her signs and symptoms and patient presented no symptoms of esophageal obstruction. Although difficult airway was ruled out by evaluation, appropriate standby airway rescue options including fiberoptic bronchoscope and a surgical tracheostomy tray were readily available in case the airway needed to be secured emergently.

FB impaction at the subglottic level may cause tracheal edema requiring intubation with a smaller endotracheal tube [18]. Nitrous oxide may not be used to avoid expansion of pneumomediastinum or pneumothorax, which can occur as a possible complication during retrieval. FB removal should be followed by endoscopic examination for detailed inspection of the esophageal mucosa for any tissue damage [4, 11]. Patients with an uncomplicated retrieval may need to be observed overnight for possible airway edema, which is treated with airway humidification, nebulized epinephrine, and corticosteroids [17]. Patients with significant airway edema, perioperative complications, or extensive surgical procedure for FB retrieval may need to be kept intubated postoperatively.

Radiolucent esophageal FB can be difficult to diagnose the patient presents with atypical or respiratory symptoms, as in this case. This can lead to ineffective medical treatment, delay in diagnosis, unnecessary procedures, and consequences of prolonged impaction [1, 5–14]. It is critical for physicians to be familiar with the presentation, appropriate radiological procedures, differential diagnosis, and early removal of esophageal FB before serious complications arise.

Conclusion

This case illustrates important diagnostic and management issues. FB ingestion in children is often not witnessed, may

be asymptomatic, and may present with atypical symptoms and signs; hence, clinical suspicion of FB ingestion should remain high. The decision to perform radiological examination for suspected FB is often based on clinical history in a child with chronic respiratory or gastrointestinal symptoms; this diagnostic workup should exclude the possibility of FB ingestion [11, 19]. Diagnosing radiolucent esophageal FB can be difficult, as evidenced by this case, and radiographic evidence can be subtle. Without reasonable clinical suspicion, a radiolucent FB in the esophagus can be easily missed.

Conflict of interest statement None.

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