CASE REPORT

Overlooked radiographic finding results in delayed diagnosis of a retained oesophageal foreign body

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SUMMARY

Ingestion of foreign bodies in children is a commonly occurring event worldwide. Swallowed foreign bodies usually pass successfully through the alimentary canal, from the mouth to the anus, but occasionally they may become lodged in the lumen of the oesophagus and cause complications. Accurate diagnosis of a retained foreign body is crucial in anticipating and preventing complications, but diagnostic delay can occur. We present a case of delayed diagnosis of a foreign body ingestion in an infant. Based on our experience, we emphasise the importance of accurate interpretation of X-rays with particular attention paid to the region of highest suspicion by the first touch physician.

BACKGROUND

Foreign body (FB) ingestion is very common in infants and young children with a wide range of foreign bodies documented. Ingested FBs usually pass through the alimentary canal without any complications, but occasionally they may become lodged in the lumen of the oesophagus. The consequences of impaction of an FB in the oesophagus are potentially serious with oesophageal stenosis, perforation and acquired tracheoesophageal fistulas being among the complications already reported. Diagnostic delay should be avoided to prevent these complications. We report a case of delayed diagnosis of oesophageal FB ingestion in an infant and discuss some of the factors that can lead to diagnostic delay in infants and children with FB ingestion.

CASE PRESENTATION

A 10-month-old female baby was brought to our emergency department (ED) by her mother secondary to concerns for possible FB ingestion or aspiration. Her mother noted that the patient was in her normal state of good health when she suddenly began crying accompanied by episodes of retching and gagging. At the time of evaluation in the ED, the patient was no longer symptomatic and her examination was unremarkable. An anteroposterior (AP) chest X-ray (figure 1) and a lateral soft tissue neck X-ray (figure 2) were obtained and were interpreted by the examining physician as normal. The patient was discharged home. She was brought back to the same ED 4 days later because of intermittent difficulties swallowing solids. Her mother noted she was able to take liquids without problems. Examination during the second ED visit was again unremarkable. The decision was carried out to repeat an AP chest X-ray and a lateral neck X-ray

Figure 1 Normal appearing anteroposterior chest X-ray.

(figure 3) and these were once again interpreted as normal. During this visit, CT of the neck was proposed to the mother as an imaging modality that may reveal the cause of the intermittent swallowing difficulty, but she refused. The patient was discharged home the second time. She was brought yet again to the ED 2 days later (6 days postinitial presentation), this time no longer able to swallow solids, even intermittently. Her mother noted that she was persistently drooling but she had no other symptoms such as dyspnoea, fever, cough or wheezing. She had no significant medical or surgical history. On examination, vital signs were normal. Her oropharynx had no lesions or signs of trauma. Her breath sounds were equal bilaterally without wheezes, rhonchi or rales. The remainder of her physical examination was normal, including her abdominal examination. The initial two sets of lateral neck X-rays were re-examined. A gastroenterologist was consulted and included as one of the X-ray examiners this time, and a thin linear object was recognised in the cervical oesophagus on both X-rays (figures 2 and 3). Even with further focused review, the object was not identifiable on the either of the AP chest X-rays. Oesophageal FB was suspected and the patient was referred for endoscopy.

TREATMENT

Under general anaesthesia with endotracheal intubation, upper endoscopy was performed and a foreign object was visualised in the cervical oesophagus just below the cricopharyngeal constrictor at the thoracic inlet. The object was extracted without difficulty. No abrasions or ulcers

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Figure 2 Lateral neck X-ray at the first visit shows a linear density at the cervical oesophagus suggesting oesophageal foreign body (arrow).

were identified at the site of the FB or elsewhere in the oesophagus or stomach. The object was noted to be a plastic star-shaped toy (figure 4). None of the family members recognised it and no one knew how she had come into contact with it.

OUTCOME AND FOLLOW-UP

Postprocedure, the patient had immediate resolution of symptoms and was discharged home.

Figure 3 Lateral neck X-ray at the second visit shows a persistent linear density at the cervical oesophagus suggesting oesophageal foreign body (arrow).

Figure 4 The plastic star-shaped toy that was removed from the patient's oesophagus.

DISCUSSION

Ingestion of FBs by small children is a common problem worldwide. The age range most at risk is from 5 months to 8 years, with a peak between the first and third year.¹ This age is notable for excessive hand-to-mouth behaviour, increasing mobility and exploration and decreased likelihood of direct supervision by caretakers. While most ingested FBs cause little trouble and pass through the gut uneventfully in 4–7 days, problems may occur in approximately 20–30% of children.^{2–3} Clinical sequelae of retained foreign bodies depend on the location and duration of impaction and the characteristics of the FBs.⁴ Baran *et al* evaluated 161 children who had undergone endoscopic or surgical removal of ingested gastrointestinal tract foreign bodies. The relative risk of a complication was 6.83 for objects lodged greater than 72 h.⁵ With this relative risk in mind, delayed diagnosis of oesophageal FB should be avoided.

Delay in diagnosis can be the result of several factors. One is that the patient presents primarily with respiratory infection symptoms and the evaluating clinician does not think of oesophageal FB ingestion as part of the differential diagnosis. The common signs and symptoms in patients with an FB that has been retained for less than 24 h tend to be gastrointestinal and include dysphagia, drooling, vomiting, gagging and anorexia. Patients may also develop acute respiratory distress with choking and cyanosis.⁶ Respiratory symptoms such as cough, stridor, fever, chest pain, wheezing, chronic upper respiratory tract infections, pneumonia and haemoptysis are more common weeks or months after ingestion. In such cases, X-rays may not seem indicated. A review of the literature of patients with oesophageal FBs presenting with chronic respiratory symptoms showed that 31 of 32 patients had radiopaque FBs and required only chest or lateral soft tissue neck radiographs for diagnosis.⁷

Clinicians should consider oesophageal FB ingestion and obtain X-rays when evaluating children with chronic respiratory symptoms.

Another factor in delayed diagnosis is radiolucent objects. Although between 63% and 85% of oesophageal FBs are visible on chest X-ray,^{8,9} radiolucent objects can be ingested. Common radiolucent FBs seen in children are made of wood, plastic or glass.¹⁰ Radiolucent FBs will frequently cause secondary soft tissue changes or distension of the proximal upper airway. If plain X-rays do not reveal the FB, contrast studies of the oesophagus may be needed, but carry a risk for aspiration. In addition, contrast coating of the FB and oesophageal mucosa can compromise subsequent endoscopy. CT scan, ultrasonography and MRI are helpful in the diagnosis of radiolucent oesophageal FBs.¹¹

A third factor in delayed diagnosis is that ingestions may be unwitnessed or initially asymptomatic. In the majority of children with FB ingestions, a precise history is not known.^{12,13} A witnessed episode of choking is the most important piece of history in making a diagnosis of oesophageal FB. An estimated 40% of FB ingestions in children are unwitnessed, and up to 50% of children with confirmed FB ingestion are initially asymptomatic.^{11,14} Oesophageal injury was more common and more severe in children with unsuspected FB ingestions than in children with witnessed ingestions.^{15,16} This factor alone or in combination could lead to diagnostic delay.

Our case was an unwitnessed ingestion but had typical gastrointestinal symptoms. The American Society for Gastrointestinal Endoscopy (ASGE) advocates the use of biplane radiographs (AP and lateral) as the initial diagnostic test for patients with suspected FB ingestion.¹⁷ In a study of 325 children, only 64% of ingested objects were radio-opaque.¹⁴ In our case, the object was invisible on AP chest X-ray but was recognisable on lateral neck X-ray. What we learned from our case is the importance of detailed interpretation of the X-ray, especially at the region of the oesophagus. It should be noted that flat objects tend to rotate to the greatest diameter of the oesophageal lumen and become oriented in the coronal position. On AP imaging, plastic materials weakly absorb the X-ray beam, allowing it to pass through the FB, creating an invisible image. However, on the lateral view, the FB is positioned in such a way that greater attenuation of the X-ray beam occurs, resulting in a more radio-opaque image.¹⁸ Although the object in our case was not recognised on the initial X-ray readings, in retrospect, we should have focused greater attention on the lateral views in the region of the oesophagus.

When plain radiographs do not reveal any foreign bodies or other abnormalities, further management depends on the characteristics of the patient and the clinical presentation. If the patient remains symptomatic, the ASGE suggests CT scan with three-dimensional reconstruction as the next diagnostic procedure.¹⁷ In our case, this was recommended, but the patient's mother turned it down. With suspected FB ingestion, persistent oesophageal symptoms should be evaluated by endoscopy, even in the setting of a negative radiographic evaluation.¹⁹

Several physicians did not see the FB in our case. Physicians tend to be influenced by a former physician's diagnosis. A multi-institutional review of 1269 FB aspiration or ingestion events revealed that 85% of patients were correctly diagnosed following a single physician encounter. In the majority (81%) of these children, the correct diagnosis was carried out if the patient presented within 48 h of the initial choking episode. If the correct diagnosis was not made during the first encounter, the patients

were often under treatment for another diagnosis for an additional prolonged period after the choking event.⁹ In our case of FB ingestion, the missed diagnosis by the first touch physician led to a delay in diagnosis and the risk of severe complication.

Learning points

- ▶ When foreign body (FB) ingestion is suspected, both anteroposterior and lateral X-rays of the neck and chest should be obtained.
- ▶ When FB ingestion is suspected, special attention should be paid to the lateral view since objects may be more radio-opaque on this view.
- ▶ The decision made by the first touch physician is crucial in making an accurate and timely diagnosis in cases of suspected FB ingestion.

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