

Case report

Upper airway obstruction in an adolescent: Can airway foreign bodies be missed without self-reporting?

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ABSTRACT

Upper airway obstruction due to foreign body aspiration is rare in adolescents. Diagnosis of the same is difficult, and incorrect, delay of treatment is common in patients with no aspiration history. Herein, we describe the case of a 15-year-old boy who presented with upper airway obstruction because of swallowing chewing gum 4 days before presentation. The patient was initially misdiagnosed and was scheduled for an emergency tracheotomy. However, this unnecessary surgical procedure was narrowly avoided because his symptoms resolved after he expelled the chewing gum from his airway. Despite being questioned several times about aspiration of any foreign bodies, he did not self-report the incident because he did not suspect that his symptoms were due to swallowing of the chewing gum.

1. Introduction

Airway foreign body is a common and notable cause of accidental deaths among children [1–4]. Although airway foreign bodies have been reported in adolescents and young adults, their occurrence is less frequent in them than in children [5,6]. A Laryngeal foreign body is rare as aspirated foreign body most often lodges in the lower respiratory tract. In most of the cases, upper airway obstruction may develop suddenly; however, witnesses or self-reports on accidental swallowing of foreign objects will be available [7]. Therefore, upper airway obstruction due to a foreign body tends to be overlooked and delayed diagnosis in their population following an atypical clinical course without any witness and self-reporting.

We present the case of delayed diagnosis and inappropriate treatment for a previously healthy 15-year-old boy with upper airway obstruction because of chewing gum lodged in the subglottic region.

2. Case presentation

A 15-year-old boy who was previously healthy presented with fever, sore throat, and mild dyspnea a day before admittance to the emergency department (ED) of a referral hospital. The attending physician

diagnosed him with an upper respiratory infection and subsequently discharged him. On the same day, the patient presented the same hospital because he was unable to lie down to sleep. Lateral soft-tissue X-ray revealed no signs of an enlarged epiglottis; therefore, the patient was administered inhaled epinephrine and intravenous dexamethasone and was discharged after his symptoms improved. However, dyspnea worsened and the patient was presented to the referral hospital again on the same day. He was hospitalized for a symptom of upper airway stenosis. The second lateral soft-tissue X-ray confirmed the absence of an enlarged epiglottis and abnormal shadow (Fig. 1). Although his symptoms persisted, dyspnea and inspiratory stridor, which did not require supplemental oxygen, transiently improved after the administration of inhaled epinephrine and intravenous dexamethasone. On the second day of hospitalization, an otolaryngologist performed laryngeal fiberoscopy that revealed the presence of a laryngeal mass under the glottis. Because further examination and therapy were needed, the patient was referred to the tertiary care university hospital.

Upon arrival at the tertiary care university hospital, the patient denied having a history of accidental ingestion of foreign bodies on being questioned by some pediatricians. One of the pediatricians re-confirmed with the patient several times if he had ingested a foreign body accidentally, but the patient self-reported that he had no memory of such

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incidents. The contrast-enhanced computed tomography (CT) of the neck to the chest revealed a mass in the subglottic region and mediastinal emphysema (Fig. 2). It was judged that the patient required a surgical procedure; therefore, he was transferred to our pediatric intensive care unit (PICU) at the National Center for Child Health and Development. However, dyspnea with inspiratory stridor continued worsening during this transfer. After admission to our PICU, he was placed on non-invasive ventilation, which did not reduce his breathing distress or respiratory effort. Contrast-enhanced CT at the referral hospital had suggested that the mass in the larynx appeared similar to a pedunculated tumor with surface contrast enhancement. After discussing the therapeutic options with an anesthesiologist and otolaryngologist, we decided to perform an emergency tracheotomy for the upper airway obstruction without additional interview him for foreign body aspiration.

During preparation for surgery, the patient expelled the chewing gum from his airway, after which his symptoms disappeared completely and he no longer complained of respiratory discomfort. Accordingly, he was discharged from our hospital after 2 days. After detailed inquiry, the patient provided the following explanation. Four days prior to his first visit to the ED of the referral hospital, he was chewing a gum, the hard-shelled gum common in Japan, while walking to his school. When a teacher suddenly called his name, he immediately swallowed the gum to avoid being scolded; however, he did not experience any difficulty at that time. Four days prior to the onset of the symptoms, he experienced discomfort in the throat without dyspnea. However, he maintained his normal routine and attended his football practice. He did not suspect that his respiratory distress was because he swallowed the chewing gum; therefore, he did not mention this during any subsequent medical examinations.

3. Discussion

Although an airway foreign body missed and incorrect treatment was administered, the patient could avoid unnecessary tracheotomy because he expelled the swallowed chewing gum from his airway. Airway foreign bodies are known as one of the major causes of upper airway obstruction in children and can lead to life-threatening emergency situations [8,9]. Although foreign body aspiration may occur at any age, it

is less frequent in adolescents and young adults than in children. A study has reported that foreign bodies were aspirated in approximately 90% of patients were aged <4 years and only 5% of children aged 4–14 years [4]. Asif et al. [2] have reported that approximately 80% of patients with foreign body aspiration were aged <5 years, whereas 6% were aged >15 years.

There are few reports of airway foreign bodies due to chewing gum in children [1,10]. In adults, there have been several reports on upper airway obstruction by aspirated chewing gum. These patients are unconscious due to some factors, such as sleeping, sudden cardiac arrest, general anesthesia while keeping the chewing gum in the mouth [11–14].

The most foreign body passes through the larynx and lodged in the more peripheral trachea. Laryngeal foreign body, especially the subglottic foreign body like this case, is very rare. The frequency of a laryngeal foreign body is reported about 10% for airway foreign body [15], a subglottic foreign body is reported about 1% [1,16]. Large foreign bodies, sharp objects, and foreign bodies with irregular margins can be lodged in the laryngeal inlet. Such objects can get stuck in the subglottic region. In this case, it is unclear why his symptoms developed after several days from the day he swallowed chewing gum. It may have stayed at the larynx inlet at first because chewed well gum, which has irregular edges, was swallowed him intentionally under consciousness. A few days later, as a result of passing through the vocal cord and lodged in the subglottic region, his symptoms developed.

Foreign body aspiration in children can be diagnosed by caregivers who identify foreign bodies in the mouths of children as well as through self-reporting by older children and adolescents. A witness to an aspiration episode is a significant independent predictor of foreign body aspiration [7]. The diagnosis of foreign body aspiration is more difficult, and treatment delay is common in patients with no aspiration history [17,18]. In this case, although several doctors interviewed the patient regarding the aspiration of a foreign body, he had no memory of any such an event. After the patient was admitted to our PICU, his symptoms of dyspnea with upper airway obstruction progressively worsened, prompting an emergency tracheotomy. Therefore, the patient was no longer interviewed for aspiration. No aspiration history was found from the initial examination to the decision to perform tracheotomy. This lack of self-reporting is factor that made the diagnosis difficult.

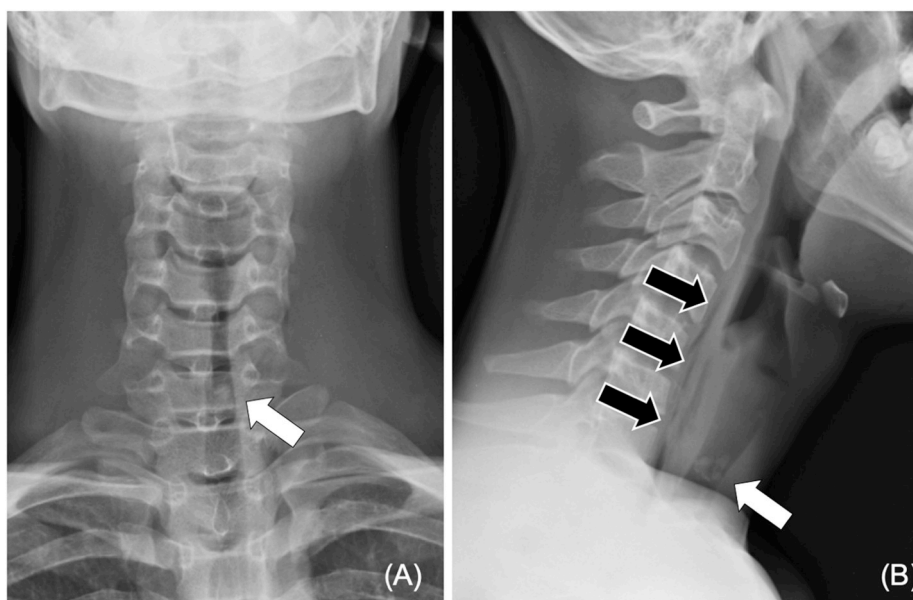


Fig. 1. Soft-tissue neck X-ray.

(A) Front view and (B) lateral view. Both images show that the foreign body in the trachea (white arrow). Lateral neck X-ray showing emphysema within the retropharyngeal soft tissue (black arrow).

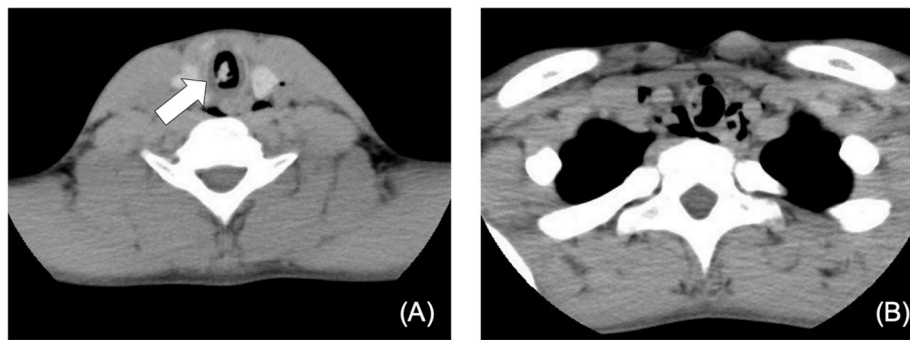


Fig. 2. Contrast-enhanced computed tomography of the neck. (A) Axial CT scan showing the foreign body in the trachea (white arrow). (B) Axial CT scan showing emphysema around the trachea at the level of clavicle.

Delays in the diagnosis of foreign body aspiration are caused by physicians and parents as well as due to absence of a history of foreign body aspiration [3]. Approximately half of physicians reported incorrect treatment for bronchial asthma and respiratory tract infection in subjects with or without a history of foreign body aspiration [1]. In particular, in adolescents and young adults, foreign body aspiration is rare, and thus, the tendency for incorrect diagnosis and treatment may be even stronger without witnesses or self-reports. Therefore, the diagnosis of foreign body aspiration starts with suspicion of this event. It is important to obtain information from either a witness or the patient through self-reporting. For that purpose, some ingenuity may be necessary during an interview. When interviewing the caregivers of infants, they may feel comfortable disclosing foreign body aspiration if the “foreign body” is food because they know that anything that enters the child’s mouth, food or otherwise, can be a foreign body in the respiratory tract. However, food such as chewing gum, as in this case, is not generally associated with foreign body aspiration in adolescents. In fact, the patient did not suspect that his respiratory distress was caused by chewing gum that he swallowed intentionally. Thus, education to improve knowledge about indicators of foreign body aspiration and appropriate judgment skills are needed for pediatricians as well as internal physicians, otolaryngologists, and emergency physicians who examine adolescents and young adults.

4. Conclusion

Although rare, airway foreign body should always be considered as a differential diagnosis in adolescents with upper airway obstruction, following an atypical clinical course and no self-reporting. It is necessary not only for pediatricians but also for all physicians, who have the opportunity to examine adolescents, that clinical acumen and appropriate management abilities for upper airway obstruction with a foreign body.

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Contributors

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Declaration of competing interest

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