



A Rare Glottic Foreign Body with Unusual Presentation

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Abstract

Aspirated foreign bodies in the airway cause immediate obstruction and may be fatal especially in children and infants. In most cases, whether pediatric or adult, a history suggestive of foreign body aspiration is elicitable. Even if radiological confirmation is unavailable, patients with such a history, must undergo diagnostic endoscopy. Early diagnosis and immediate removal of the foreign body is the key for the successful management and avoidance of complications in patients with airway foreign bodies. In adults, especially in edentulous patients, a swallowed denture (foreign body) usually gets lodged in the esophagus, entrance into the airway is uncommon. This report presents a rare case of a denture fragment foreign body lodged between the two vocal cords. This kind of impaction of a denture fragment in the larynx is rare and lodging at the level of the glottis is even rarer.

Introduction

Foreign body airway is a potentially life-threatening condition and proper education can help in preventing this. Physiologically, the sphincteric function of the larynx efficiently protects the lower respiratory tract, therefore, the chance of accidental inhalation of a foreign body is rarer than the chance of swallowing. Foreign bodies in the glottis are uncommon. Most airway foreign bodies become lodged more peripherally after passing through the larynx and trachea. Foreign bodies that are large and those with sharp and irregular edges can get stuck at the laryngeal inlet. Right bronchus followed by left bronchus and trachea are the commonest sites of lodgment once the foreign body has passed the glottis. A glottis impaction usually

presents with wheezing and dyspnoea. Presentation without any airway symptoms is seen but rare. Patients with foreign body inhalation may have an associated complaint of severe coughing or frank stridor.¹ Foreign bodies of the larynx and trachea may present with complete obstruction leading to sudden death. This makes the timely diagnosis more critical. Hoarseness is seen with laryngeal foreign bodies but not with tracheal foreign bodies. Efforts to clear the throat, coughing and gagging are all reflexes that protect the airway and suggest incomplete obstruction.

Various types of foreign bodies are seen in the airway. The most common offenders include: Nuts, candies and grapes, while latex balloons and other toys are the most frequent nonfood objects.² In Indian settings, custard apple seed inhalation is also frequently seen. Foreign bodies like dentures are extremely rare in the airway. As the proportion of the elderly population continues to grow and poor oral health has been particularly evident in the developing country,³ foreign body denture is a growing concern. Many elderly people wear dentures and therefore they need to be properly educated about the care of these dentures to avoid getting it ingested or inhaled. In all patients with a broken or swallowed denture, there is always a chance of inhalation of the denture in part or as a whole.

Once suspected, timely intervention to reach a diagnosis followed by urgent removal of the aspirated foreign body is the basis for best results. Associated with a history, physical examination, radiographic studies, and direct laryngoscopy or a bronchoscopy helps in accurate and early diagnosis. At times a long delay in diagnosis can result in respiratory complications varying from a simple chronic wheeze or recurrent pneumonias to a lung abscess or life-threatening airway obstruction. This can be an important cause of death, especially in the pediatric population, or it can lead to significant morbidity in the long term.

Case Report: This is an unusual case of a fragment of denture getting lodged in the larynx of an otherwise healthy asthmatic and conscious female patient. This case is interesting as the type of foreign body, its mode of entry and site of impaction are all unusual. A 45-year-old adult dyspnoeic female was seen with a history of sudden onset of difficulty in breathing. She discovered that a fragment of the denture was missing. She then realized that she had accidentally inhaled the broken fragment of the denture while she was drinking water. The patient had pain in the throat and difficulty in speaking associated with discomfort in the throat. Bilaterally, on auscultation, ronchi were present. A diagnostic laryngoscopy had already been done at another hospital and it revealed the position of the foreign body in the larynx so, the diagnosis was already confirmed. Indirect laryngoscopy was not done and a radiograph of the soft tissue of the neck (lateral view) was also not essential. Swallowing was painful. There was no hemoptysis or chest pain, but there was definite hoarseness of voice and dysphonia.

Endoscopic examination of the larynx confirmed the findings of a triangular piece of fragmented denture hanging between the two vocal cords at the laryngeal inlet just behind the anterior commissure area. The base of this piece of denture was lying antero-posteriorly in between the vocal cords which were mobile. The glottic chink had enough space to allow for breathing (See Picture 1 on the right). But due to laryngeal spasm and resultant narrowing of airway, patient had difficulty in breathing. She also had a history of asthma which worsened her condition. Foreign body induced laryngeal spasm increased the wheezing. A direct laryngoscopy was planned and consent for rigid bronchoscopy and



tracheostomy was taken. General anesthesia was induced with O₂ and Sevoflurane. Standard cardiopulmonary monitoring, and pulse-oximetry were used.

After induction, the patient was positioned and the laryngoscope was introduced. Intubation was not possible with such a presentation. The triangular fragment of the denture was clearly seen impacted at the level of the glottic region of the larynx. It was hanging between the two vocal cords with all the possibility of slipping down to the carina which could have resulted in sudden respiratory arrest. Under general anesthesia, the triangular-shaped fragmented piece of denture was carefully removed and the need for tracheostomy was alleviated.



When this piece of removed denture fragment was examined and compared, it fitted perfectly into the residual denture of the patient just like a jigsaw puzzle (See Picture 2 on the right). This ruled out the possibility of anymore foreign body fragments in the distal airway and therefore a rigid bronchoscopy was not performed. The phase of recovery from anesthesia was difficult as the patient went into severe bronchospasm. This was managed without incident using Inj. Deriphylline. The foreign body was removed successfully by rigid laryngoscopy within 2 hours of the patient first being seen. Spontaneous ventilation

was maintained throughout the procedure.

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Discussion

The smaller lumen of the airway makes it more susceptible to severe obstruction. Any triggering factor that induces laryngeal spasm can cause complete respiratory obstruction resulting in rapidly fatal outcome. Accidental inhalation and ingestion of a foreign body has been reported in the literature,⁴ but a fragment of denture hanging between the two cords is quite unusual.

The signs and symptoms due to foreign body aspiration can be described in three stages. The patient presents with a history of a choking episode, along with paroxysms of gagging and coughing. There may be no difficulty in breathing or there may be an acute respiratory obstruction demanding immediate attention. Once the patient gets over with this phase, the second stage continues as an asymptomatic interval. If still not managed, then the third stage characterized by symptoms of complications sets in which is due to long-standing foreign body retention. These are related to either delayed diagnosis or missed foreign bodies which initiate granulations. On many occasions, patients suffer from initial coughing paroxysms and only a

mild respiratory distress. A history of having symptoms like coughing and/or choking or wheezing and on examination unilateral reduced breath sounds is almost a sure indicator of an inhaled foreign body. It is usually the pediatric population who present with an accidental airway foreign body and in adults it is usually the swallowing of a food bolus or a denture that is commoner. Although many elder people wear dentures, it's accidental inhalation is rare and then it's impaction at the level of the glottis is rarer. Dentures are more often swallowed rather than inhaled⁵ as the esophagus is a distensible structure and does not have a sphincteric protection like the larynx. When a denture is inhaled, it can be a broken fragment from the denture that can get stuck in the glottis like in the present case.

There is a general tendency to probe the hypopharynx with a finger, this may become a dangerous maneuver as (i) a loose foreign body may get tightly impacted into the larynx (which may result in a complete obstruction) or (ii) the foreign body may be pushed into the esophagus (which may compress the trachea against the upper sternum leading to airway compromise). There is a study where use of a Fogarty catheter has been suggested for effective dislodgment of impacted foreign bodies.⁶ Complications also result from operative intervention leading to prolonged morbidity⁷ and are secondary to either FB aspiration or procedures for FB removal (laryngeal edema).

Adolescent behaviors as described by Jackson and Jackson in 1932⁸ explains the cause for aspiration of sharp, metallic foreign bodies in these patients. Therefore, this group needs to be educated about hazards of choking. A study of choking due to pins, needles or a blowdart and aspiration of sharp, metallic foreign bodies secondary to careless behavior in seven adolescents has also been reported.⁹ The main reason behind the pins entering the tracheobronchial tree is "carelessness on the part of adults in putting pins in the mouth, and, in children, imitation of the bad example of their elders" as stated in 1923 by Chevalier Jackson.⁸ As adults, especially females, are often seen to hold pins between their lips, (usually with the point out) the point is almost always oriented superiorly within the airway. 113 patients were treated by Jackson and Jackson (1932) and out of these, 42 patients had the pins in the distal bronchi. This paper gives a comprehensive review for the treatment and prevention of sharp, metallic foreign bodies in the bronchus. But the aspiration of a denture fragment without any provoking factor is surprising.

In 1999, a report on the removal of aspirated turban pins (also known as headscarf needles) in 63 girls was made by Kaptanoglu, et al.¹⁰ Turban pin aspiration occurs almost exclusively in young Islamic females.^{10,11} Once retrieved, the fragments of the foreign body should be reassembled to be sure of complete removal.

Rigid bronchoscopy is the best procedure to treat aspiration of a sharp, metallic foreign body which is a serious condition. To remove airway foreign bodies, rigid bronchoscopy should be preferred over flexible bronchoscopy. Ventilation and foreign body visualization or manipulation is better with rigid bronchoscopy. A rigid bronchoscope allows better examination of the airway in patients with a longstanding retained foreign body. Complications can include chronic purulent bronchitis, formation of granulation tissue and cicatricial scarring. During bronchoscopy, jet-ventilation should be used for oxygenation as a tubeless ventilation is desired. At times, a tracheostomy may be needed for removal of the foreign body. Zhang and Zhang's¹² reported that methyl methacrylate resin has a tendency to fracture under cyclic loading.¹³ The average lifespan of complete dentures is about 5–7 years and the wearing out is a result of poor fitting rather than a mechanical failure. The force required to bend the shaft of the femoral bone (205 MPa) is three times the flexure stress (65 MPa) that a standard denture can bear.¹⁴ An average standing force ranging from 581 to 1866 N can be withstood by dentures as per various studies.¹⁴⁻¹⁷

The cause of denture fragmentation in this case can be explained by the fact that there was mechanical stress working with or without other factors, as the accidental inhalation occurred while the patient was drinking water. Fractures in dentures can be due to flexural fatigue and impact. Due to repeated flexing of a material, microscopic cracks develop in areas of stress concentration, these cracks fuse to form fissures and weaken the denture. When this weakened portion is subjected to any stress that exceeds the mechanical capacity of the remaining sound portion of the material¹⁸ a fracture results. Denture factors that affect the life of the denture are material used, base thickness, stability of denture base and form and position of teeth. The patient factors that are important are stress due to muscular power, nature of the underlying soft tissues and functional and parafunctional activities (chewing, biting, swallowing and clenching). Typically, the denture's fracture or crack initiates along the midline as this is the most stressed area. In the anterior area, no teeth are in contact¹⁸ and the fracture often begins from here. Fatigue stress is a significant factor in causation of fracture of the dentures. Therefore, it is important to ensure that the mechanical properties of manufactured dentures conform to the ISO standards. This will alleviate the possibility of unforeseen traumatic stress and resultant fragmentation as in this case.

Conclusion

In summary, a foreign body in the airway should always be suspected if there is a history of foreign body inhalation even if the patient does not have symptoms of respiratory obstruction. It can be a pin, needle, nuts (beetle-nuts or almonds), candies, seeds (tamarind or custard apple), latex balloons, other toy fragments or a broken denture fragment. Whatever the foreign body, there is an urgent need to retrieve the foreign body and secure the airway. Cases where retrieval may be difficult should be anticipated and properly planned to avoid airway compromise, complications and long-term morbidity.

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