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Case Report

Aspiration of the dental crown in an elderly patient^{☆,☆☆}

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ABSTRACT

The aspiration of objects and foreign bodies requires quick and systematic care. During emergent orotracheal intubation, accidental dental crown release can cause a threat to the patient's life. This paper aimed to report a case of foreign body (dental prosthetic crown) aspiration and its management and discuss alternative approaches. An 81-year-old male patient, who was admitted to the hospital's intensive care unit (ICU) for meningitis, presented with altered consciousness, and decreased oxygen saturation. He underwent emergent orotracheal intubation. After intubation, chest radiography was performed to check for proper orotracheal tube positioning and lung expansion. The resultant images revealed the presence of a foreign body within the right lower lobe bronchus in the shape of a dental crown. The foreign body, intubation cannula and basket clamp were successfully removed, followed by reintubation of the patient. The foreign body was a prosthetic upper premolar dental crown (24). While care should be taken to avoid complications, if a foreign body is aspirated during emergent orotracheal intubation, endoscopic removal appears safe and effective. Careful creation, placement, maintenance, and preservation of prosthetic crowns are critically important in elderly patients.

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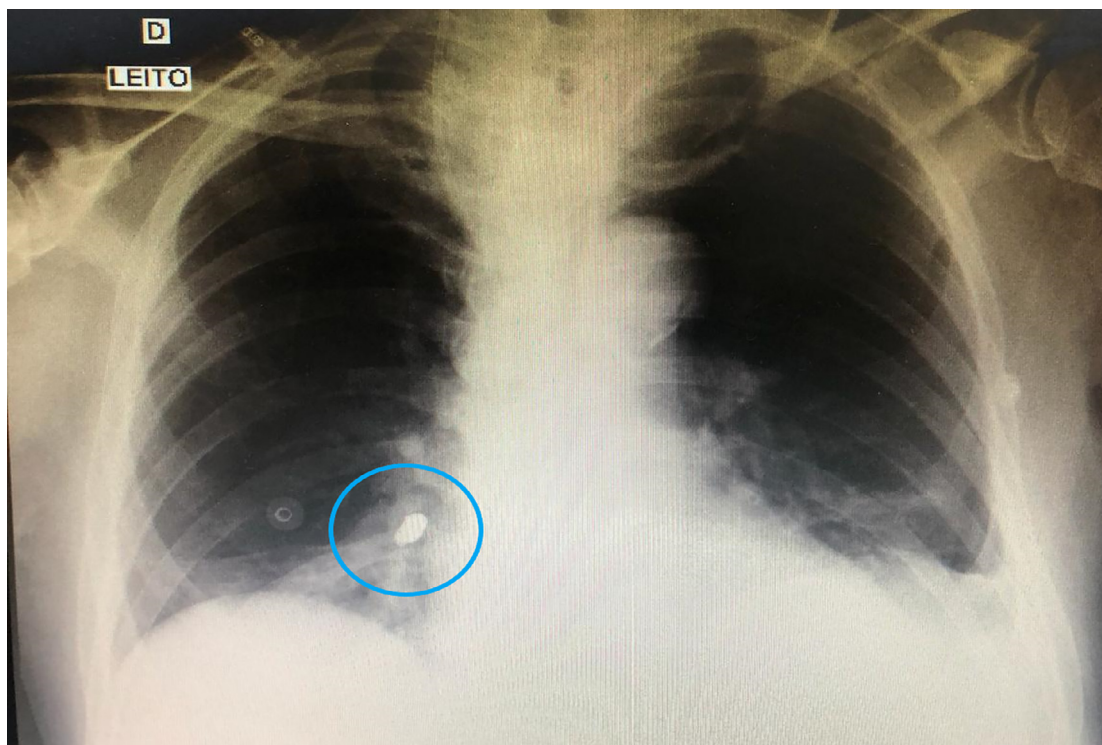


Fig. 1 – Chest radiography showing a foreign body (tooth) (blue circle) in the right lower lobe bronchus.

Introduction

An increase in life expectancy has led to the search for better rehabilitative treatments; creation, placement, maintenance, and preservation of prosthetic crowns are critically important to promote long-lasting treatment results [1–5]. Older patients may experience deterioration in oral hygiene, and teeth decay can adversely affect rehabilitation efforts in this population, resulting in fractures or loosening of the crowns [6,7].

Foreign body aspiration is considered a major, emergent complication [8–12]. While the fate of loosely cemented dental prosthetic crowns may seem trivial, aspiration of the crown into the lower airways represents a medical emergency [9]. When a foreign body remains lodged in the trachea, the risk of suffocation is high, especially when the trachea is partially or totally obstructed. Patients may rapidly develop cyanosis, requiring emergency orotracheal intubation [4,13].

Diagnosis can be made based on the signs and symptoms such as coughing, choking, wheezing, acute dyspnea, and muffled respiratory sounds [14]. Radiographic examination is essential to detect the presence of airway foreign bodies and determine their location [15–19] because most aspirated dental foreign bodies are radiopaque [20]. However, nonvisualization of a foreign body on radiography does not exclude aspiration, and further investigation is necessary [19]. Although other airways could be affected, the intermediate bronchus is the most commonly affected site in adults [21]. In general, foreign body aspiration requires specific handling and the immediate transportation of the patient to a hospital, especially when maneuvers aimed at expelling the object fail [13,22].

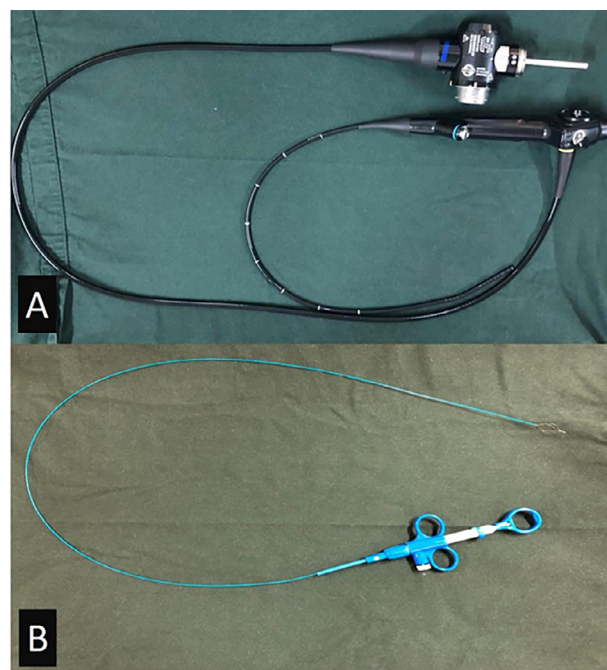


Fig. 2 – (A) Flexible bronchoscope (Olympus, BF-P10, Tokyo, Japan); (B) Basket clamp.

Thus, we aimed to report the aspiration of a foreign body (upper premolar dental prosthetic crown) during emergent orotracheal intubation and the management of such cases. We also discuss alternative approaches.

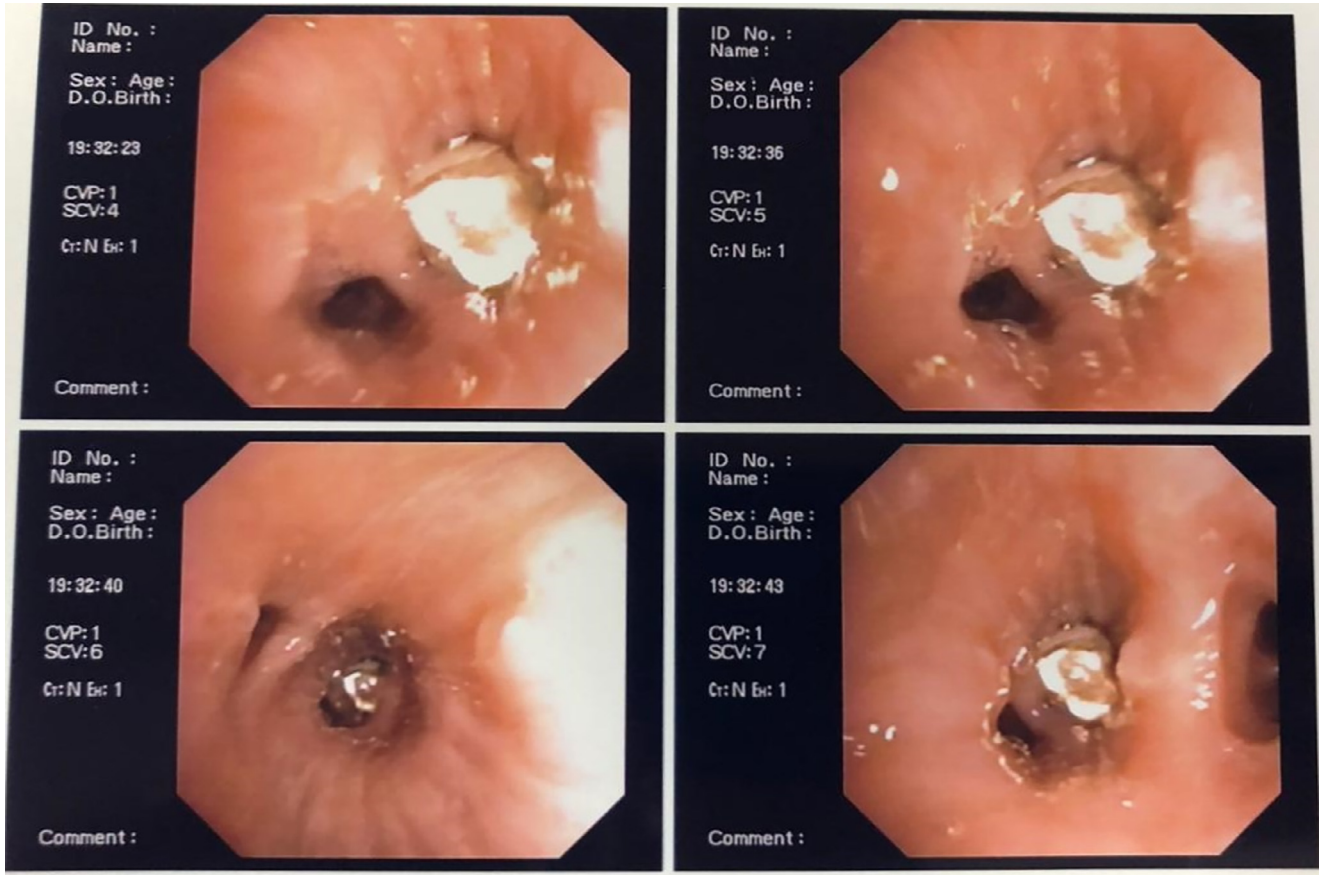


Fig. 3 – Access to the foreign body aided by a flexible bronchoscope and clamp to capture the foreign body.

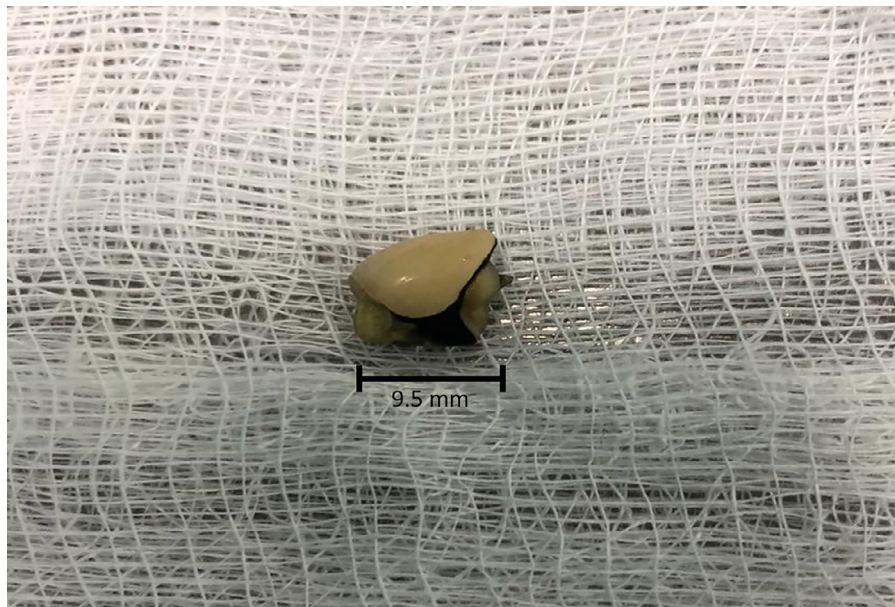


Fig. 4 – Foreign body (single crown) removed using a flexible bronchoscope (crown size 9.5 mm).

Clinical report

An 81-year-old man was admitted to a hospital's intensive care unit (ICU) for meningitis. He presented with altered consciousness and decreased oxygen saturation, necessitating emergency orotracheal intubation. After intubation, chest radiography was performed to check the orotracheal tube placement and confirm proper lung expansion. Radiography revealed a foreign body shaped like a dental crown located in the right lower lobe bronchus (Fig. 1).

Our plan to remove the foreign body involved accessing the bronchus using an orotracheal intubation cannula coupled with a flexible bronchoscope (Fig. 2A) and basket clamp (Fig. 2B). The scope passed freely through the trachea without altering its caliber and without causing any mucosal lesions. The trachea demonstrated conserved distensibility, indicating a small amount of mucous. A foreign body shaped like a dental prosthetic crown was observed, obliterating the lower lobe bronchus of the right lung (Fig. 3).

The foreign body was grasped using a basket clamp and removed with the orotracheal intubation cannula. The procedure was successful and without complications. The foreign body was identified as an upper premolar dental prosthetic crown (24) (Fig. 4). After removing the orotracheal intubation cannula, basket clamp, and dental prosthetic crown, the patient was reintubated.

The total duration of this intervention, from the identification of the foreign body by the ICU team to foreign body removal and repeat orotracheal intubation, was approximately 1 hour.

Discussion

In this study, we report a case of foreign body aspiration (dental prosthetic crown) during emergency orotracheal intubation. Foreign body aspiration is common in pediatric patients but rare in adults [23,24]. Its main causes among the elderly are trauma, emergency orotracheal intubation, and dental procedures [22,23,25]. Predisposing conditions such as a decrease in (or loss of) consciousness and airway involvement may occur [11,22]. Affected patients may present with chronic cough, fever, hemoptysis, chest pain, and wheezing that could evolve to postobstructive pneumonia and atelectasis [26].

Even though crown aspiration is relatively uncommon, it constitutes a true medical emergency [27], and some successful cases have been reported in the literature [12,14,28,29]. To avoid more severe complications—up to and including even death—individuals may attempt digital seizure when the foreign body is present in the oral cavity or the Heimlich maneuver in cases of aspiration and airway obstruction [1].

Increases in life expectancy have led to the search for better rehabilitative treatments [1,2]. Several factors may be associated with fractures or loosening of the dental prosthetic crowns and include material, occlusal patterns, masticatory load distributions, cement types, oral health and hygiene, presence of carious lesions, tooth preparations and root sizes,

old prosthetic crowns, maladjusted pins, endodontic lesions, periodontal disease, and poor prosthetic planning [3,4,6,7].

Procedures like these must be carefully performed, particularly in elderly patients with systemic impairments who are more prone to respiratory problems and intubation due to infections, cardiac and respiratory arrest, pulmonary diseases, or degenerative diseases involving the central nervous system [30].

Prevention remains the best means of avoiding accidental aspiration and ingestion, and some articles have explained how to prevent these adverse outcomes [31–36]. However, sometimes it is not possible to follow all these recommendations while executing traumatic or emergent procedures. Airway protection mechanisms like cough or laryngeal adductor reflex of the lower airways from foreign body aspiration. Patients undergoing emergent orotracheal intubation may have loose or unaccounted traumatically misplaced teeth or dental crowns. Surgeons should suspect foreign body (in this case, a tooth) aspiration [1,11].

Chest examination and radiography should be performed in patients with dental avulsion, loosening, or prosthetic crown release, especially in those with respiratory alterations or missing dental elements during the accident.

CT scans are more effective than chest radiographs as the thorax shows radiopaque structures and overlays in two-dimensional images [36]. However, a radiopaque foreign body is easily diagnosed based on both CT scans and chest radiographs. In this case report, the patient was diagnosed after chest radiography.

Early diagnosis can help guide treatment and reduce future complications [37,38]. After confirmation of aspiration, the foreign body should be removed using a rigid or flexible bronchoscope [24] to avoid the development of aspiration pneumonia, obstructive pulmonary abscesses, or other complications [10]. A flexible bronchoscope should be the first choice for managing cases of foreign body aspiration because of the low morbidity and high efficacy [36,39,40].

Conclusion

Effective diagnosis is important to prevent further complications in patients who aspirate prosthetic dental crowns. Chest radiography and CT are useful in the diagnosis of this condition, and flexible bronchoscopy should be the first choice for the management of foreign body aspiration.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2021.05.041.

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