

Case Report

A rare cause of ventilatory failure in a patient with post-traumatic intracranial hemorrhage

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ABSTRACT

High minute ventilation is required to lower intracranial pressures in patients with intracranial bleed. Respiratory acidemia consequent to ventilatory difficulty is dangerous in such patients as it further raises intracranial tension. We describe such a case. A 24-year-old man had to be intubated and mechanically ventilated after he met with a road traffic accident and sustained extensive maxillofacial injuries and intracranial bleed. A tooth was accidentally aspirated in this injury and progressively resulted in left lower lobe collapse, pneumomediastinum, and consequent difficult ventilation. Under video bronchoscope guidance, the tooth was removed with grasping forceps. Pneumomediastinum temporarily increased after the tooth removal, but by 12 h postextraction, resolution of both the pneumomediastinum and left lower lobe collapse was observed. There was a 17 h delay postadmission before the cause of ventilatory failure was realized. Aspiration of foreign bodies, in general, and teeth, in particular, should be actively looked for in patients with ventilatory difficulties in the post-trauma setting.

KEY WORDS: Aspirated tooth, bronchial foreign body, maxillofacial injury, pneumomediastinum, respiratory acidemia

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INTRODUCTION

Respiratory acidemia in patients with intracranial injuries is a dangerous scenario as the need to lower intracranial pressures is of paramount importance. An aspirated foreign body (FB) in such a situation, although uncommon,^[1] can lead to ventilatory impairment.

CASE REPORT

Following a road traffic accident, an inebriated 24-year-old man sustained extensive bilateral maxillofacial fractures and intracranial bleed with midline shift. At initial evaluation in the emergency room (ER), he was

tachycardic and tachypneic, but normoxemic with saturation of 96% and a Glasgow Coma Score of eight. After shifting to neurointensive care unit for further management, he was found to have hypoxemia. He underwent endotracheal intubation and ventilation. Postintubation, he developed hypotension requiring vasopressor support, combined respiratory and metabolic acidosis, and evidence of low-partial pressure of oxygen by fraction of inspired oxygen (P:F) ratio. Despite adequate minute ventilation and positive end-expiratory pressure (PEEP), there was no satisfactory resolution of respiratory acidosis.

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How to cite this article: Thangakunam B, Bal SK, Venkatapathy AV, Irodi A, Christopher DJ. A rare cause of ventilatory failure in a patient with post-traumatic intracranial hemorrhage. *Lung India* 2017;34:390-2.

Access this article online	
Quick Response Code: 	Website: www.lungindia.com
	DOI: 10.4103/0970-2113.209246

Postintubation, chest X-ray (CXR) revealed a retrocardiac triangular opacity causing silhouette of the medial portion of the left dome of diaphragm [Figure 1], suggesting a left lower lobe collapse, pneumomediastinum (which was absent in the CXR at admission), and a radiopacity resembling a tooth in the left retrocardiac region just inferior to the level of the hilum. It measured 7.8 mm at its widest diameter. It had been overlooked until then.

Under intravenous midazolam sedation, an Olympus model 6 mm (outer channel) flexible video bronchoscope was introduced. The right-sided bronchial tree was normal. A tooth was seen in the left lower lobe bronchus [Figure 2]. The slough around the tooth was removed with a biopsy forceps, and the tooth was freed. The bleeding associated with the slough removal subsided with aspiration and cold saline instillation. With the help of an alligator grasping forceps, the tooth was dislodged. However, the tooth was larger than expected and could not be pulled through the 8.5 mm endotracheal tube (ETT). The tooth was partially pulled, and the ETT, grasping forceps, and FB were removed *en masse*. The patient was re-intubated immediately under bronchoscopic guidance. Postextraction, a check bronchoscopy revealed normal bilateral bronchial tree.

After removal of the tooth, the patient continued to require high PEEP. The minute ventilation was maintained at higher levels to reduce the partial pressure of carbon dioxide in the blood. Postprocedure, the P:F ratio improved marginally, but there was a marked improvement in the respiratory and metabolic acidosis.

A CXR done 4 h postprocedure still showed linear radiolucencies (more apparent in postextraction CXR compared to preextraction CXR) along the left heart border suggestive of pneumomediastinum [Figure 3].

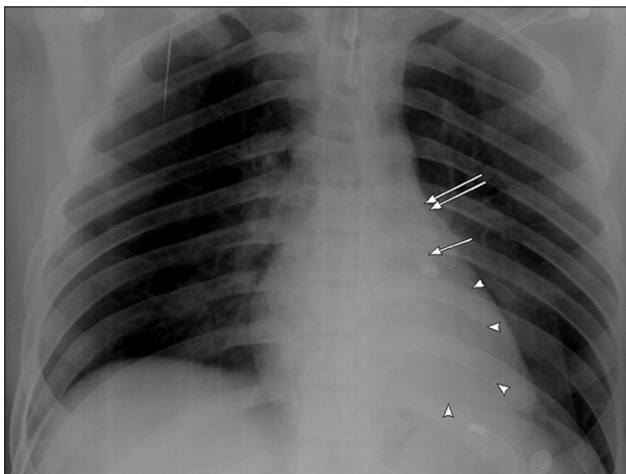


Figure 1: Portable anteroposterior view chest radiograph postintubation showing a retrocardiac opacity (arrowheads) with loss of silhouette of the left dome of diaphragm, tooth in the left lower lobe bronchus (single arrow), and small pneumomediastinum (double arrows)

Complete resolution of the left lower lobe collapse and pneumomediastinum was observed 12 h postprocedure [Figure 4]. The FB removal was done 17 h after admission to the ER (19 h postinjury). The patient improved subsequently and was extubated 7 days later.

DISCUSSION

Tooth aspiration is rare and most commonly described in the setting of maxillofacial injuries^[1] and postendotracheal intubation of elderly patients.^[2] In these scenarios, this can be an occult cause of ventilatory impairment. Fatal outcomes have been described both when such cases go undetected or when removal of the tooth is associated with bronchial tree perforation.^[3] We report a case of craniofacial injury associated with aspiration of tooth into the lung, leading to the left lower lobe collapse and pneumomediastinum. The situation of the patient was complicated by the fact that he was being ventilated invasively with high PEEP, pressure support, and minute ventilation. Time was an important factor in this patient as every minute of hypoventilation was deleterious to the brain by raising the intracranial pressure. In such situations, even removal of the tooth *en masse* with the ETT may temporarily lead to dangerous hypoventilation. This limitation has been overcome by removing the FB via a tracheostomy tube while continuing ventilation through an ETT.^[4]

Tracheo-bronchial foreign bodies contribute up to 12% of the cases of secondary spontaneous pneumomediastinum^[5] in children. Removal of the FB results in its resolution.^[5] The elevated airway pressures associated with high minute ventilation and concurrent endobronchial obstruction along with primary bronchial wall damage caused by the tooth could have contributed to the development of pneumomediastinum. Pneumomediastinum further contributes to ventilatory impairment.

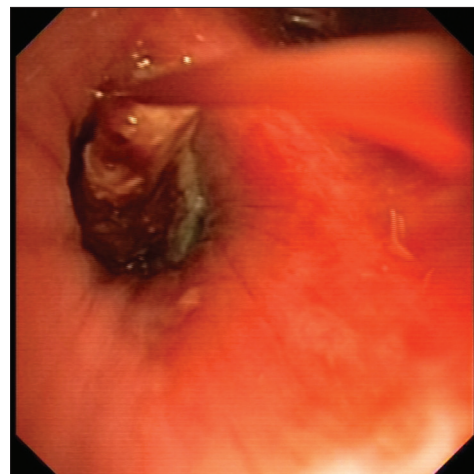


Figure 2: Video bronchoscopic image showing a tooth occluding the left lower lobe bronchus

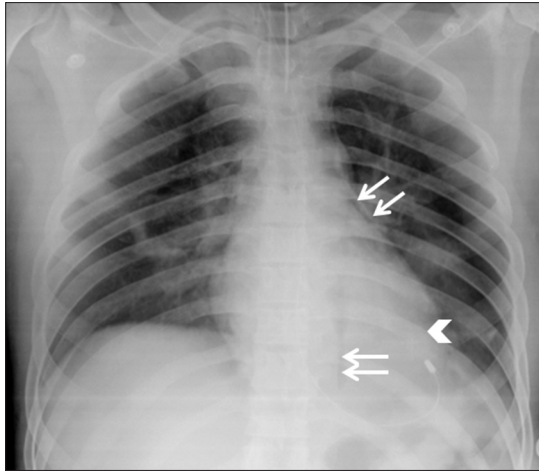


Figure 3: Portable anteroposterior view chest radiograph 4 h after removal of the tooth from the left lower lobe bronchus, showing persistent left lower lobe collapse (arrowhead) with loss of silhouette of the left dome of diaphragm and increasing pneumomediastinum (double arrows)

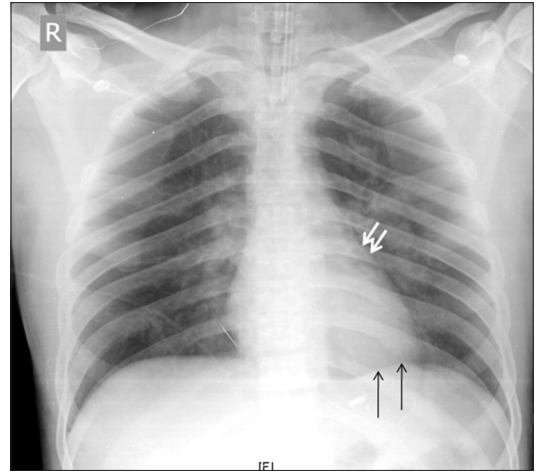


Figure 4: Portable anteroposterior view chest radiograph 12 h after removal of the tooth from the left lower lobe bronchus, showing resolution of the left lower lobe collapse with clear visualization of the left hemidiaphragm (black arrows) and reduction in the pneumomediastinum (white arrows)

CONCLUSION

An aspirated FB, such as tooth, should be considered in differentials while evaluating ventilatory impairment in patients with craniofacial injuries with or without obvious chest injury. Both delayed detection and subsequent attempts at its removal can have fatal outcomes. Pneumomediastinum is a common association with tooth aspiration but with a benign outcome after its extraction.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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