

# Delayed Endotracheal Tube Obstruction by Chewing Gum Aspiration in a Cervical Spine-Injured Patient

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## Citation

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## Abstract

We are presenting a case of delayed onset of obstruction of an endotracheal tube by aspirated chewing gum. The only physical manifestation of this obstruction was difficulty in passing a suction catheter through the endotracheal tube. There was no compromise of ventilation but removal of the tube was required. Alternatives in management of this unusual problem are discussed.

Implications: Endotracheal tube obstruction by foreign bodies can occur in emergency settings and the best management strategy depends upon patient characteristics and the nature of the obstruction.

## INTRODUCTION

Endotracheal tube (ET) obstruction can occur by numerous mechanisms including kinking, tracheobronchial secretions, blood and foreign bodies. Occlusion by foreign body is uncommon but when it occurs is usually associated with an isolated point of narrowing. We report ET obstruction at many sites after fragmentation of retained and partially dissolved endobronchial chewing gum, requiring ET removal.

## CASE

A 19 year old white male was the unhelmeted driver of a motorcycle that left the roadway. He presented to the University of Kentucky Trauma Center after being intubated with a 7.5mm ET at the scene by EMS personnel for decreased Glasgow Coma Score. His trauma evaluation revealed left pneumothorax, an open left clavicle fracture, right tibia/fibula fracture, LeForte III facial fractures, an unstable C1 fracture and stable C7 and T1 fractures. There was no intracranial hemorrhage or contusion.

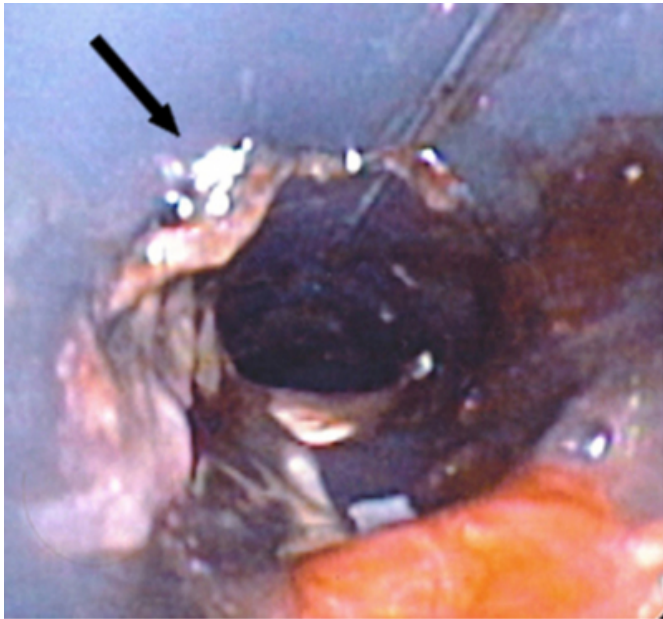
Thirty-six hours after admission, the nursing and respiratory staff reported difficulty passing a suction catheter through the endotracheal tube. Examination of the suctioned aspirate revealed small foreign objects approximately 2-3mm in diameter. Visual, manual and olfactory inspection of the

aspirate confirmed the foreign bodies as chewing gum. The ET was inspected and thin deposits of the gum were noted to be scattered in the lumen. An attempt was made to change the ET over a Cook Airway Exchange Catheter (Cook Critical Care, Bloomington, IN) at the bedside but this was unsuccessful because of inability to pass the catheter. A Metro Mizus Endotracheal Tube Replacement Obturator (Cook Critical Care, Bloomington, IN) was also tried without success. Bronchoscopy was performed with a pediatric bronchoscope and again mural coating was noted (Figure 1), as well as rare aspirated fragments of gum in the bronchial tree. The patient was ventilated the entire time without difficulty, and there were no increases in airway pressures or ventilatory requirements during this time.

Because of inability to perform adequate pulmonary toilet due to the gum, and due to the patient's multiple facial fractures and unstable cervical spine, the patient was taken to the operating room for an uncomplicated open tracheostomy. The ET was removed (Figure 2). Bronchoscopy was then repeated and remaining fragments of chewing gum were removed. His postoperative recovery was uneventful with no further evidence of airway obstruction.

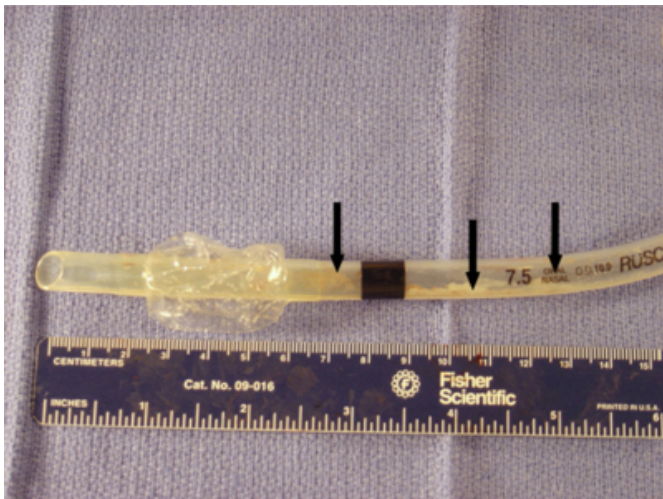
**Figure 1**

Figure 1: Videoscopy of Endotracheal Tube Lumen. The lumen of the endotracheal tube is shown. Fragments of chewing gum are adherent to the walls of the tube (arrow).



**Figure 2**

Figure 2: Ex-vivo Endotracheal Tube. Fragments of chewing gum are adherent to the wall of the tube at multiple sites (arrows).



## DISCUSSION

Causes of ET obstruction include kinking, tracheobronchial secretions, blood, and foreign bodies<sup>1,2</sup>. Usually the foreign body is introduced on instrumentation and intubation of the airway. It is not known in this patient whether the gum was aspirated during the collision or during the intubation at the scene. Obstructions by foreign bodies often appear early after intubation, whereas this obstruction appeared 36 hours

after injury<sup>3</sup>. In this case, the problem confronting the critical care team was how to replace the ET.

Changing an ET over a tube changer can be difficult, even under the best circumstances. The possible complications include the tube catching on the arytenoids, barotrauma or airway puncture from the changer, and loss of the airway if the changer is not deep enough when the tube is removed or if the changer is pulled out with the tube.

Adequate lubrication of the tube changer is important in initial placement, and subsequent placement of the new ET. In this case, the tube changer could not be passed deeply enough into the existing ET tube for the distal end of the changer to exit the distal end of the tube, even with copious amount of lubrication. Fragmentation of the gum led to scattered mural deposits on the luminal wall. Another concern was the risk of decannulating the trachea when removing the old tube, since the lumen of the tube was so sticky.

Because of the facial fractures, unstable cervical spine, and inability to pass the changer through the sticky lumen of the existing ET, it was decided by both the anesthesia and surgical teams that the safest route to take was elective tracheostomy in the operating room.

We also chose not to attempt the change with a tube changer of smaller diameter because we believed that this would increase the risk of the beveled end of the new ET catching on the arytenoids.

One option would have been to attempt the tube change in the operation room with the surgical team scrubbed and on standby for an emergent surgical airway placement if the change was unsuccessful. But we, however felt the safest way to proceed would be to perform a tracheostomy under the elective, controlled conditions. The authors recommend removal of chewing gum from the airway as soon as possible after diagnosis because fragmentation may occur from heat, moisture and mucosal enzymes in the airway, making removal difficult.

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