



Case report

Iatrogenic tracheal laceration in the setting of chronic steroids[☆]

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ABSTRACT

We report the case of a 71-year-old woman with end-stage chronic obstructive pulmonary disease who presented with a 10-cm tracheal laceration from a presumed traumatic intubation in the setting of respiratory distress and chronic obstructive pulmonary disease exacerbation and subsequently developed significant subcutaneous emphysema along her neck and mediastinum in addition to her peritoneum and mesentery. We were successfully able to treat this patient conservatively up until the time that tracheostomy was warranted. We discuss and review tracheobronchial injuries with respect to etiology, risk factors, and management and hope to benefit health care providers managing airways in patients at risk for tracheal injury.

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1. Introduction

Tracheobronchial injuries are rare, however, have the potential to cause to significant complications including death. Most common causes include emergency intubations, multiple intubation attempts, and overinflation of the tracheal cuff. Several risk factors have been described including female sex (attributed to shorter tracheal length), older age, and corticosteroid use [1]. Diagnosis is a clinical and radiological one, with fiberoptic bronchoscopy as the modality of choice for confirmation. Management options include conservative and surgical approaches, dependent primarily on the on patient's clinical status, and the tracheal injury location and size.

Consent for publication of this case report was obtained from the patient and her family.

2. Case description

A 71-year-old woman (height, 157 cm; weight, 67.1 kg; and body mass index, 25.96 kg/m²) presented as a transfer from an outside hospital after a presumed traumatic intubation in the setting of respiratory distress for chronic obstructive pulmonary disease (COPD) exacerbation (Fig. 1). The details of her intubation, whether there were multiple attempts or not and whether this occurred in the field or outside the

hospital, remain unclear. She was admitted to our medical intensive care unit (MICU) after a chest x-ray (Fig. 2) and computed tomography of her chest (Fig. 3), abdomen, and pelvis, which were obtained in our emergency department and revealed marked subcutaneous air along her neck and chest wall in addition to her peritoneum, mesentery, and posterior mediastinum. Her physical examination was remarkable for significant subcutaneous emphysema from head to groin, with marked crepitus that was tense to palpation present throughout. Of note, her initial arterial blood gas (ABG) showed pH 7.30, Pco₂ 64 mm Hg, Po₂ 77 mm Hg, and 97.8 O₂ saturation. Her blood chemistries were within normal limits.

Our patient had a medical history remarkable for end-stage COPD, asthma, anxiety, and coronary artery disease status post multiple stent placement. It was reported that she had a significant smoking history of 50 pack years, required 3–5 L of oxygen supplementation at home at rest as well as with activities, and experienced dyspnea with any level of exertion. In addition, she was taking inhaled corticosteroids for more than the last 15 years and had frequently been on-and-off systemic steroids for multiple COPD exacerbations. Her pulmonary function tests from 2 years before this admission revealed a very severe obstructive pattern with associated increase in end-expiratory lung volumes and air trapping (Table 1).

Soon after admission, our patient was sent to the operating suite for bronchoscopy and esophagogastroduodenoscopy evaluation of tracheobronchial injury and for possible tracheal stent placement or primary closure. A 10-cm full-thickness laceration of the posterior membranous wall of trachea up to 3 cm above the carina was revealed with no clear evidence of bleeding or esophageal injury (Fig. 4). The size

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Fig. 1. Patient upon arrival to emergency department.

of laceration was deemed to be too large for stent placement and primary closure was felt to be too high risk given her comorbidities. She returned to the MICU, intubated with the tracheal cuff placed distal to the laceration, for medical management with ventilator support and nutrition via total parental nutrition until healing for secondary intention. She remained hemodynamically stable throughout the duration of her MICU stay and was sedated with low dose dexmedetomidine and fentanyl infusions, which were gradually titrated down, without the use of any neuromuscular blocking drugs. She was managed on the ventilator on continuous mandatory ventilation with fraction of inspired oxygen 30%, tidal volume 350 cm³, frequency 14, and positive end-expiratory pressure 3 cm H₂O, and underwent daily continuous positive airway pressure trials on pressure support 8–12 cm H₂O, positive end-expiratory pressure 5 cm H₂O. We adjusted ventilator settings to minimize overall airway pressure. Appropriate therapy with piperacillin-tazobactam and fluconazole was started for COPD exacerbation and concern for mediastinitis.

By day 5, it appeared that our patient's underlying disease process was improving. She demonstrated adequate mentation, followed commands, remained hemodynamically stable, and continued to oxygenate well. Her ABG revealed pH 7.26, Pco₂ 90 mm Hg, Po₂ 101 mm Hg, and an o₂ saturation of 97.9. Her Pco₂ was considered worse from her presumed Pco₂ baseline of at least 60 mm Hg (deduced from the initial ABG available to us after arrived intubated to the ICU) but clinically, she appeared fairly optimized. After a prolonged discussion with the patient and family that with a tracheal extubation trial, reintubation was a possibility, an extubation trial was indeed performed. Our patient appeared to do well initially; however, she became acutely obtunded and unable to protect her airway after approximately 15 minutes. She required tracheal reintubation via an awake fiberoptic bronchoscopy, which she tolerated well and without adverse event. Notably, she maintained o₂ saturation >97% at all times while extubated. Because of the patient's and family's request to avoid a tracheotomy as long as she was improving with her weaning trials, these continued with reduction of pressure support from 15–8 cm H₂O over several

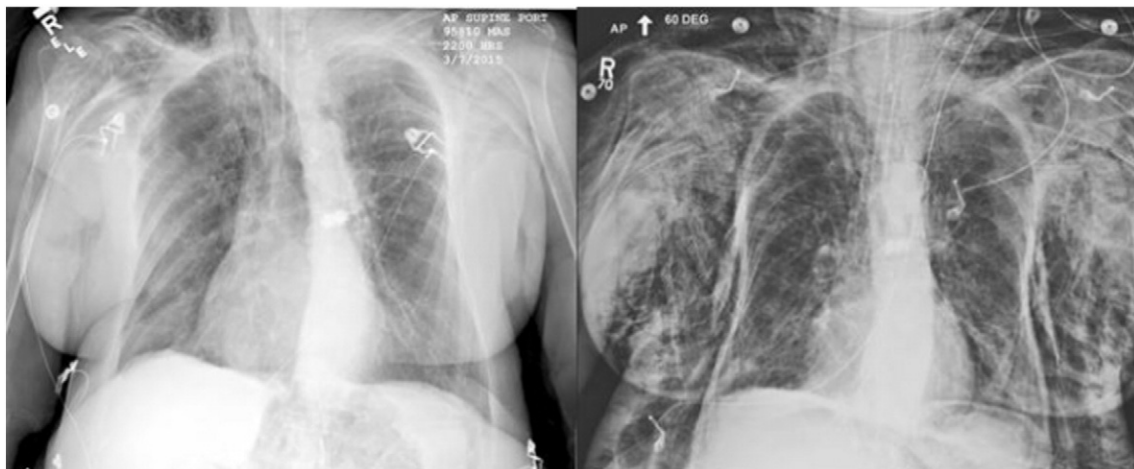


Fig. 2. Chest x-ray obtained in emergency department and a few moments after. Extensive subcutaneous emphysema is noted with evidence of pneumomediastinum in the latter image. Lungs appear hyperinflated with changes consistent with severe chronic obstructive pulmonary disease. No pneumothorax was appreciated.

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