The Journal of Emergency Medicine, Vol. ■, No. ■, pp. 1–4, 2018

0736-4679/$ - see front matter

https://doi.org/10.1016/j.jemermed.2018.02.014

Clinical Communications: Adult

IATROGENIC TRACHEAL RUPTURE CAUSED BY EMERGENCY INTUBATION: A CASE REPORT

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☐ **Abstract—Background: Iatrogenic tracheal rupture is a rare but life-threatening complication. If suspected by clinical examination or chest radiograph, a computed tomography scan can confirm the diagnosis, but the criterion standard is a bronchoscopy. There is no consensus on its management. Case Report: A 52-year-old woman was intubated in a prehospital setting after cardiac arrest. A gradual appearance of subcutaneous emphysema was observed after intubation. A computed tomography scan revealed a complicated tracheal rupture, pneumomediastinum, and pneumothorax. The management was surgical. Why Should An Emergency Physician Be Aware of This?: Intubation in emergency conditions increases the risk of tracheal rupture and a delay in management is an important prognostic factor.** © 2018 Elsevier Inc. All rights reserved.

☐ **Keywords—prehospital; tracheal intubation; tracheal rupture; subcutaneous emphysema**

INTRODUCTION

Iatrogenic tracheal rupture after intubation is rare but potentially fatal. The prevalence is estimated between 0.05 and 0.37% and is more common in women (1). It should be suspected in patients with subcutaneous emphysema, pneumomediastinum, or pneumothorax as a result of intubation. There is no consensus on management, which is only guided by the experience of case series.

CASE REPORT

A 52-year-old woman with a history of ischemic heart disease and a left anterior descending artery stent placed in 2007 had a cardiac arrest at home. Cardiopulmonary resuscitation was initiated by her relatives before the arrival of the medical team. Low-flow duration is estimated at 30 min. During resuscitation, the patient had an episode of gastric content aspiration. The first recorded electrocardiogram showed a ventricular fibrillation that required 5 external electrical shocks. The patient then recovered a sinus rhythm, with an ST segment elevation from V3 to V6, with inverted T-waves. A laryngoscopy was performed in this prehospital setting by a senior emergency physician with a Macintosh metallic blade no. 4. Vocal cords were not seen, which reflects a Cormack–Lehane classification grade IV view. An Eschmann tracheal tube introducer (i.e., soft gum bougie [Bougie Boussignac, Vygon, Ecouen, France]; Figure 1) was used at the first attempt. The distal hold-up sign (occurrence of a resistance to the progression of the introducer) confirmed the correct

Reprints are not available from the authors.

Received: 7 November 2017; Final submission received: 29 January 2018;
Accepted: 8 February 2018

Figure 1. Bougie Boussignac (Vygon, Ecouen, France), which is 70 cm in length, 5 mm wide, and has a 40° angle tip. This device is suitable for a 6- to 11-mm tracheal tube. A double duct allows oxygenation during intubation.

placement (2). No resistance was noted when the endotracheal tube was placed. The patient was therefore sedated and treated with acetylsalicylic acid and enoxaparin during transfer to the angiography room.

The coronary angiography showed an intrastent chronic occlusion of the left anterior descending artery, supplied by the circumflex artery, with failure of the passage of a guidewire. It also revealed occlusion of the posterior coronary artery supplied by the left network, with failure to dilate. Hemodynamic dysfunction was treated with norepinephrine and dobutamine.

At the intensive care unit, the patient (with a body mass index of 29.9 kg/m^2), had a blood pressure of 94/68 mm Hg, a heart rate of 116 beats/min, and oxygen saturation of 97% under mechanical ventilation. Pulmonary auscultation showed absent breath sounds in the left lung base and the presence of bilateral rhonchus. There was a gradual onset of significant subcutaneous emphysema localized in the thorax, neck, and face.

Arterial gasometry showed an acidosis with a pH of 7.18, pCO_2 of 49 mm Hg, pO_2 of 220 mm Hg, total CO_2 of 20 mmoL/L, and a base excess of –10 mmol/L. Arterial lactate was at 2.6 mmol/L and troponin was at 366 ng/L.

A chest radiography did not show a pneumothorax, but there was subcutaneous emphysema and the endotracheal tube was in place, close to the carina (Figure 2).

A chest computed tomodensitometry scan was performed (Figure 3), which revealed a significant pneumomediastinum with dissection of the peritracheal and periaortic soft tissues. In addition, an important dilation of the trachea in the right lateral wall led to a tracheal rupture diagnosis. There was extensive subcutaneous emphysema of the anterior, posterior, and cervical thoracic walls, a right pneumothorax, and diffuse pulmonary atelectasis.

After a medicosurgical meeting, surgical management was decided based on the extension of the tracheal defect and the progression of subcutaneous emphysema (active leakage).

A right axillary thoracotomy was performed and a longitudinal rupture of 7 cm extending to the first centimeter of the right mainstem bronchus was noted. In response to perioperative occurrence of refractory hypoxemia, venovenous extra corporeal membranous oxygenation (ECMO)

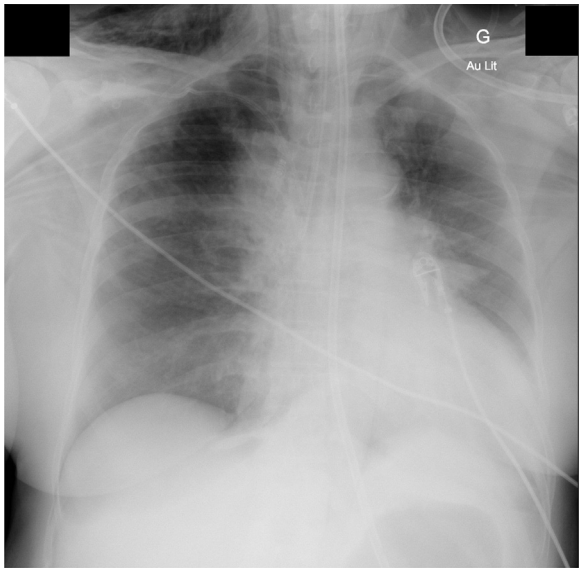

Figure 2. Initial chext radiography. Note the presence of cervical subcutaneous emphysema and bilateral muscular emphysema in the pectoralis major.

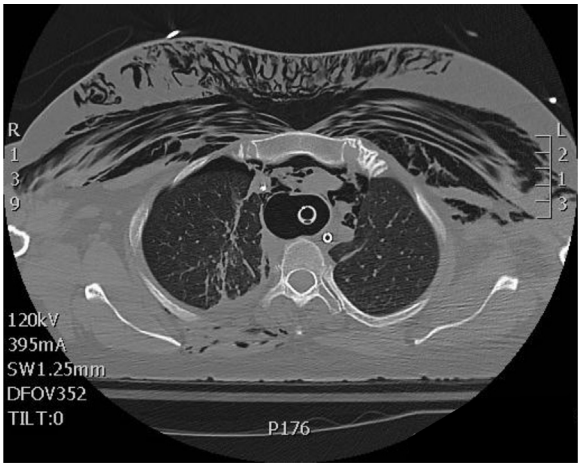

Figure 3. Tracheal rupture of the right lateral wall with balloon herniation. Note the presence of pneumomediastinum and subcutaneous emphysema of the anterior chest wall. The right anterior pneumothorax is insignificant.