

The consequence of endotracheal intubation in a 95-years old man for 839 days

A case report

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Abstract

Rationale: The benefits of prolonged endotracheal intubation (ETI) in comparison to early tracheotomy is still over the controversy. Little information is available in concern to prolonged ETI more than years. We report the consequence of oral ETI in a 95-year old man for 839 days.

Patient concerns: This patient was transferred to the intensive care unit due to sputum asphyxia and respiratory arrest. Timely ETI was performed. However, as a neurological insult, extubation had a high risk of failure due to the insufficient ability of sputum clearance. In addition, his family members refused further surgical interventions including tracheotomy.

Diagnoses: Prolonged ETI occurred in this patient. On day 240 and 329 after ETI, 3D airway image did not reveal laryngeal stenosis or laryngeal lesions. On day 459 and 662, ET tube (ETT) exchanged was performed and the balloon became stiff and inelasticity.

Interventions: Although a possible tracheoesophageal fistula was suspected by imaging findings on day 547, the gastroscopy did not reveal the fistula on the esophagus. Enteral nutrition was delivered through the gastric tube, while the mediastinal infection was not observed during subsequent follow-up of computed tomography.

Outcomes: He received tracheostomy due to acute sputum obstruction within ETT and abrupt oxygen desaturation on day 839.

Lessons: During prolonged ETI, more attention should focus on airway humidification, proper cuff pressure and optimal time for tube exchange in order to avoid severe complications.

Abbreviations: ETI = endotracheal intubation, ETT = endotracheal tube.

Keywords: 839 days, consequence, prolonged endotracheal intubation

1. Introduction

Endotracheal intubation (ETI) is essential for primary airway management in critically ill patients with acute respiratory failure or for airway issues.^[1,2] However, weaning should be considered

as early as possible if the etiologies of ETI are removed.^[3] Because several large trials indicate that prolonged ETI is associated with laryngeal injury, more sedative administration and less comfort, the current guidelines suggest that critically ill patients with expected duration of ETI more than 10 to 14 days need to change to a tracheostomy tube for further airway management in case of severe complications.^[4] Therefore, prolonged ETI over months or even years are rare in clinical practice and little information is available in relation to the prognosis on this condition. Herein, we report the consequence of ETI in a 95-years old man for 839 days.

This study adhered to the tenets of the Declaration of Helsinki, and the ethics committee of the First Affiliated Hospital of Chongqing Medical University approved the study. Written consent was obtained from the patient for publication of this report and its related images.

2. Case report

A 95-year-old man was admitted to the geriatrics department with a complaint of blood in the sputum for 20 days. Nasopharyngoscopy and gastric ultrasound did not find the evidence of bleeding from the upper airway and stomach. Combined with chest computed tomography (CT) results, hemoptysis was highly suspected due to bronchiectasis with infection. After conservative treatment, the hemoptysis gradually resolved. However, progressive dyspnea occurred in course of the disease. On 10th October 2016, ETI was performed due to

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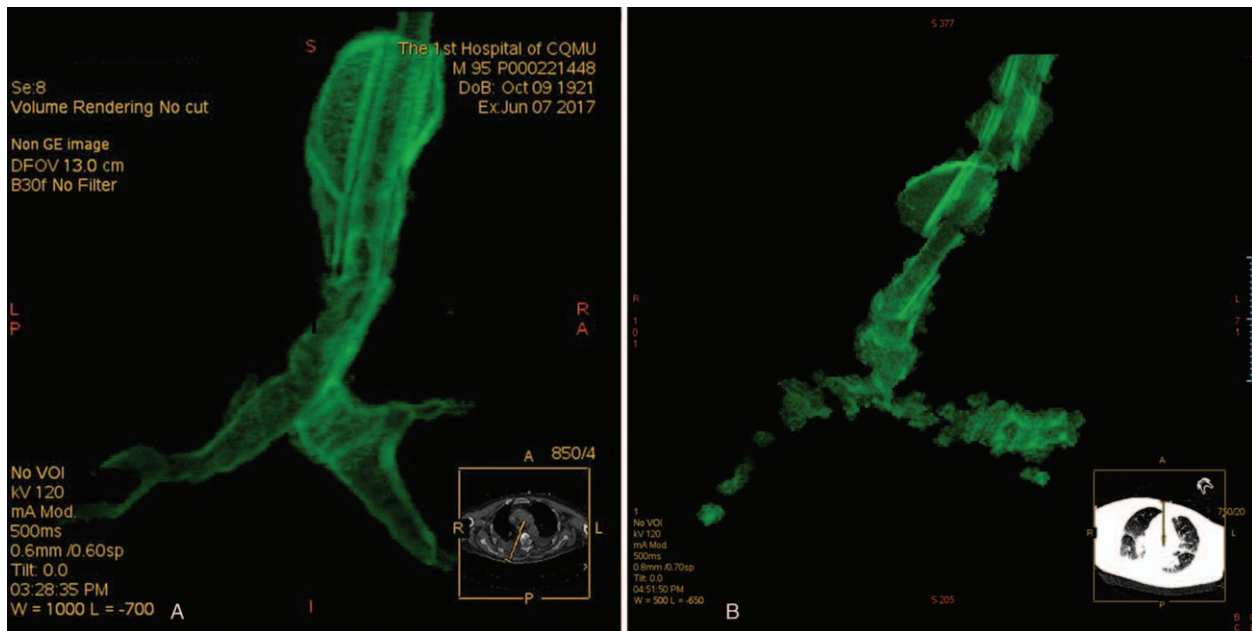


Figure 1. Three dimensional computed tomography reconstruction of the airway on day 240 (A) and day 329 (B) after ETI.

asphyxia and respiration arrest. Spontaneous breath was rapidly restored with bag-mask ventilation and sufficient bloody sputum suction (100ml). He was then transferred to the intensive care unit for further treatment.

Mechanical ventilation was removed 28 days after ETI, and oxygen was administered through the endotracheal tube (ETT). Due to neurological insult, his airway clearance ability was still poor, and the standard for removal of the ETT cannot be achieved. However, his family members refused to perform tracheostomy as special considerations.

During the following day 240 and day 329 after ETI, three dimensional (3D) CT reconstruction of the airway was performed and laryngeal damages, such as tracheal esophageal fistula and significant airway stenosis around the balloon were not found (Fig. 1). On day 459 after ETI, ETT exchanged was performed. In gross observation, the ETT was changed to yellow in color. Meanwhile, the balloon was stiff and inelasticity (Fig. 2). Although on day 547 after initial ETI, 3D CT of the airway indicated that there was a possible fistula between the anterior wall of the upper esophagus and the posterior wall of the trachea (Fig. 3). However, the gastroscopy did not reveal the fistula on the esophagus and the chest CT follow-up also did not indicate mediastinal infection after enteral nutrition through a gastric tube.

On day 662 after initial ETI, ETT exchanged was performed again due to the leakage of the balloon. Laryngoscope showed that a large amount of granulation tissue surrounded the glottis, and the glottis was barely visible. Finally, on day 839, he received tracheostomy due to acute sputum occlusion within ETT and abrupt oxygen desaturation.

Ventilator-associated pneumonia was reported on day 11. *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae* were identified in the following sputum culture. On day 58 after initial ETT, pressure ulcer occurred on the lip and recovered subsequently.

3. Discussion

The benefits of prolonged ETI in comparison to early tracheotomy is still over the controversy. The most concerned complication of intubation is tracheoesophageal fistula due to



Figure 2. Endotracheal tube retained in the airway for 459 days.



Figure 3. The computed tomography examination on day 547 after ETI. The arrow head indicated that there was a possible fistula between the anterior wall of the upper esophagus and the posterior wall of the trachea.

laryngeal injury. Nobre et al^[5] reported a case of post-intubation tracheal laceration after 18 days of ventilation. However, Fekete^[6] also described another interesting case of oral ETT for 145 days and there was no evidence of laryngeal ulcer. In our case, the duration of ETT is much longer. On day 240 and 329 after ETI, 3D airway image did not reveal laryngeal stenosis or laryngeal lesions.

Although tracheoesophageal fistula was highly suspected on image findings during ETI on day 547, gastroscopically did not discover the fistula through the esophagus. During the procedure of tube exchange, we found that the tracheal balloon that retained in the airway for 459 days and 203 days was aged and stiffness without elasticity. As the cornerstone of laryngeal damage arrived from tissue ischemia due to overinflation of the cuff, we speculate that the major events of laryngeal injury may occur within the initial 1 to 3 month of ETI and the incidence is slim with increasing duration due to aged balloon. Another consideration of prolonged ETI is the possible tearing risk of the tracheal wall when removal of the tube. However, this phenomenon did not occur in this case which may be explained by the relative loose space between the tracheal wall and aged cuff.

Meanwhile, humidification is also an important issue for airway management in patients with prolonged ETI. Although routine humidification was performed, acute sputum occlusion within tracheal tube still occurred which suggests that more attention should be paid on airway management during

prolonged ETI and regular fiber bronchoscope are necessary to guarantee the patency of ETT.

Finally, with the increasingly serious aging problems, more patients may need to develop ETI for airway issues. However, “there are a thousand Hamlets in a thousand people’s eyes,” the family members may pay more attention to the quality of life instead of survival time. Thus, the phenomenon of prolonged ETI may have a trend of increase in the future. But nevertheless, the last attempt to remove respiratory secretions using cough augmentation is necessary in order to avert ETI.^[7]

4. Conclusions

As the increase of aged populations and different opinions to the quality of life, for airway issues, the sporadic cases of prolonged ETI may increase in future. Cautions are needed to focus on airway humidification, monitor cuff pressure, and design optimal time for tube exchange in order to avoid severe complications. In addition to routine sputum clearance, cough augmentation may provide an alternative strategy to avoid ETI.

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