

# Anesthetic management of a patient with an unusual broken tracheostomy tube: a case report

Journal of International Medical Research

2019, Vol. 47(2) 718–721

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DOI: 10.1177/0300060518809251

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## Abstract

**Objective:** This study was performed to investigate the management of general anesthesia in an unusual case involving a patient with a broken tracheostomy tube presenting as an airway foreign body.

**Methods:** We herein describe the anesthetic management of a patient with a broken tracheostomy tube. A 77-year-old Chinese man who had been involved in a car accident underwent a tracheostomy. One year later, he presented with cough and bleeding at the tracheostomy site. Preoperative evaluation revealed that the metal tracheostomy tube was lodged in his left main bronchus. General anesthesia was induced to maintain spontaneous breathing, and adequate topical anesthesia of the airway was administered.

**Results:** The metal tracheostomy tube was successfully removed, and a new tracheal tube was put in place.

**Conclusions:** General anesthesia to maintain spontaneous breathing and adequate topical anesthesia of the airway can be safely used when removing broken tracheostomy tubes.

## Keywords

Tracheostomy tube, airway, general anesthesia, topical anesthesia, spontaneous breathing, foreign body

Date received: 31 May 2018; accepted: 4 October 2018

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## Background

Placement of a tracheal tube is a good method by which to maintain an adequate airway in patients. The occurrence of a broken tracheostomy tube is very rare and has been described in only a few reported cases.<sup>1,2</sup> Broken tracheostomy tubes resulting in airway complications have been reported in some medical cases.<sup>3,4</sup> If the foreign body is large enough to obstruct either the trachea or the right main bronchus, the foreign body must be removed by aspiration. However, a broken tracheostomy tube in the airway is a serious event that may be fatal, and both surgery and anesthesia are challenging in such cases. The management outcomes of general anesthesia in these patients may vary. Furthermore, attention should be given to maintaining the airway and administering adequate analgesia and sedation. This report describes a rare case of a broken tracheostomy tube in the left main bronchus.

## Case presentation

A 77-year-old Chinese man (height: 170 cm, weight: 70 kg) was involved in a car accident and underwent surgical repair of broken ribs. However, the tracheostomy tube was left inside the patient. One year later, he presented to our hospital with cough and bleeding at the tracheostomy site. During preoperative assessment, the original chest radiograph revealed that the end of the metal tracheostomy tube was lodged in his left main bronchus (Figure 1). The patient showed no symptoms of dyspnea.

The patient was prepared for surgical removal of the tracheostomy tube fragment and placement of a new tracheostomy tube under general anesthesia. The anesthetic management of this patient was difficult. A new tracheostomy tube and endotracheal tube for difficult airway was prepared, and



**Figure 1.** Original chest radiograph shows the broken tracheostomy tube in the main left bronchus

it was confirmed that the tube was available. General anesthesia *via* spontaneous breathing was administered after preoxygenation with 100% oxygen. General anesthesia was slowly induced using 1  $\mu$ g/kg of dexmedetomidine, 5  $\mu$ g of sufentanil, and 2 mg of midazolam. However, muscle relaxants were not used. Topical anesthesia of the airway was initiated with 10 mL of 1% tetracaine. When adequate topical anesthesia and oxygenation were maintained, 1.5 mg/kg of propofol was slowly administered to deepen the anesthesia. The patient attained deep anesthesia with spontaneous respiration and without manual bag mask ventilation. During the operation, 2 mg/kg/minute of propofol was injected *via* an intravenous pump. The broken tracheal catheter was removed within 10 minutes (Figure 2), and the pulse saturation of the patient remained above 95%. The new tracheal catheter was inserted, and the patient was awake after 15 minutes.



**Figure 2.** Broken tracheostomy tube

This study was conducted in accordance with the declaration of Helsinki and with approval from the Ethics Committee of the Second Hospital of Hebei Medical University. Written informed consent was obtained from the patient.

## Discussion

In the present case, part of a tracheostomy tube had become lodged in the left main bronchus. The clinical presentation of the patient involved only cough and bleeding at the tracheostomy site. He did not exhibit severe symptoms that could lead to acute respiratory distress. Endotracheal intubation can lead to a risk of distal movement of the broken tracheostomy tube.<sup>5</sup> In addition, the use of a new tracheostomy tube is fastest and safest when the patient presents with acute respiratory difficulties. We planned to maintain spontaneous respiration and administer adequate topical anesthesia of the airway in the present case. Before beginning the operation,

midazolam, propofol, and dexmedetomidine were used to maintain patient sedation. These drugs in combination with topical anesthesia provided good anesthetic maintenance and airway patency, allowing the patient to undergo the surgery.

Cheung and Napolitano<sup>6</sup> described a technique for removal of a tracheostomy fragment in which the best method was direct vision using a bronchoscope and administration of general anesthesia; in another case, conscious sedation was used.<sup>7</sup> In the present case, the metal fragment was found in the left trachea, which is rare. It was removed using a laryngoscope through the tracheostomy stoma.

Many studies have suggested that a broken tracheostomy tube is preventable and that education is key for patients with a tracheostomy tube.<sup>8,9</sup> Many reports have revealed that rapid diagnosis and effective management are keys to the successful treatment of this rare but life-threatening situation.<sup>10</sup> Additionally, good anesthetic management and patient cooperation are necessary for tracheostomy fragment removal.

## Conclusion

General anesthesia to maintain spontaneous breathing and adequate topical anesthesia of the airway can be safely used when removing broken tracheostomy tubes.

## Declaration of conflicting interest

The authors declare that there is no conflict of interest.

## Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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