Foreign bodies in the tracheobronchial tree are often treated by the otolaryngologist. Rarely, the foreign body is a result of a tracheostomy tube fracture. While several complications have been reported, the most common tracheostomy tube complication resulting in an airway foreign body is fracture of the tube. We report the first case of fracture at the fenestration of a synthetic tracheostomy tube, resulting in a foreign body in the tracheobronchial tree.

Case Report

A 48-year-old morbidly obese Native American man with a tracheostomy tube was seen at his community hospital with a complaint of a foreign body sensation. He reported not having changed the tube for more than a year. During a bout of coughing, he reported a foreign body sensation manifested as recurrent coughing paroxysms and intermittent dyspnea. The tracheostomy tube was removed and was found to be fractured at the fenestration. It was taken to the operating room, where attempts at removal of the tube fragment were unsuccessful. However, a new tracheostomy tube was inserted. Subsequently, the patient was transferred via ambulance to our facility for definitive care.

On arrival in the emergency room, the patient was afebrile, with stable vital signs. A No. 4 Shiley tracheostomy tube was in place, and there was no evidence of respiratory distress, hemoptysis, or refractory coughing. The patient's medical history included hypertension and obstructive sleep apnea complicated by cor pulmonale. Eight years earlier, he had had uvulopalatopharyngoplasty and tracheostomy for sleep apnea. His medications were furosemide, captopril, clonidine HCl, and potassium. Admission laboratory values were normal, except for an elevated white blood cell count of 16,500/mm³. An x-ray film of the neck showed the fractured segment of tube extending from the trachea into the right primary bronchus.

The patient was given local anesthesia with intravenous sedation, and rigid bronchoscopy was done through the tracheal stoma. The foreign body was retrieved from the proximal right primary bronchus (Figure), through an
enlarged stomaplasty. The remainder of the bronchoscopic examination was unremarkable. The patient was transferred back to his community hospital the following day, receiving perioperative intravenous antibiotics. The remainder of his postoperative course was uneventful.

DISCUSSION

The first episode of tracheostomy tube fracture resulting in a tracheobronchial foreign body was reported by Bassoe and Boe in 1960. In a recent review of the literature, Alvi and Zahtz found 11 cases of nonsynthetic tracheostomy tube fractures and 12 reports of synthetic tube fractures. In all but one of the cases with adequate documentation, the fracture occurred at the junction of the tube and the neck plate. They also reported the first case of an incomplete fracture at the fenestration site. The tube, however, did not fragment and separate and therefore did not represent a tracheobronchial foreign body. The only other documented site of tracheostomy tube fracture occurred at the distal end of the cannula, as reported by Bassoe and Boe.

The junction of the tube and neck plate has shown to be the weak point in almost all tracheostomy tubes, both synthetic and nonsynthetic. To date, there are no reports of tracheostomy tube fracture in tubes without joints (such as those manufactured by Portex, Wilmington, Mass). The fenestration site is a potential site of weakness due to the intentional interruption in the wall of the tube. It has been proposed that prolonged wear, poor tracheostomy care, and the formation of granulation tissue may additionally contribute to weakness at the fenestration. In our case, while there was prolonged wear and poor care, there was no evidence of granulation tissue on bronchoscopy.

The Shiley Company (Irvine, Calif) has developed a new type of fenestrated tube consisting of four small slits, rather than one large one. The intent was to prevent the inner cannula from catching, making insertion easier, but it may also provide strength at the fenestration site. The tube in our case was the older type, with a single large fenestra.

Although the tracheostomy tube fracture is the most common tube complication resulting in tracheobronchial foreign body, a variety of other complications have been reported. Lawton and Abadee reported aspiration of a plastic truncated conical tracheostomy plug, which could not be removed by flexible or rigid bronchoscopy or thoracotomy. The patient eventually expectorated it. Kemper and Myers reported migration of the inner cannula during violent coughing, resulting in a metallic foreign body in the trachea and bronchus. It was removed by bronchoscopy and found to be defective, with an absent retaining ring. Bhargava et al reported a case of a broken metal introducer that became lodged in the tracheobronchial tree, necessitating rigid bronchoscopy for removal.

Routine tracheostomy care is often left to patients and their caretakers. As with metal tubes, synthetic tubes require periodic replacement and regular changes of the inner cannula. Considering that there are no universally accepted and published standards of care for tracheostomy tube care, our policy has been to provide patients who require indwelling tracheostomy tubes with the following recommendations for home care:

1. Replace tracheostomy tube every 6 months.
2. Change/clean the inner cannula every 48 hours; clean more frequently as needed.
3. Replace tracheostomy tube ties weekly.
4. Change dressing daily.
5. Use nocturnal bedside humidification.

Patients are also instructed to keep two replacement tubes at home: the size currently used and another, one size smaller than the current tube. In the presented case, if the patient had adhered to this protocol, the complication that occurred after the tube had been in place for more than a year may have been avoided.

CONCLUSION

Tracheobronchial foreign body complications related to tracheostomy tubes are infrequent. The most common is tracheostomy tube fracture. Our case involved fracture and separation of a tracheostomy tube at a site not previously described. The cause is presumed to be weakening at the fenestration site after prolonged use of a single tube. Frequent inspection and cleaning of the tracheostomy tube, in conjunction with scheduled replacement of the tube, may aid in prevention of this complication.

References


Prague, Old Town Square