Upper airway obstruction by a fragmented tracheostomy tube: Case report and review of the literature

Hashem M. Al-Momani a,⁎, Khaled R. Alzaben b, Ayman Mismar c

a Department of General Surgery, Division of Pediatric Surgery, University of Jordan, Faculty of Medicine, Amman, Jordan
b Department of Anaesthesiology, University of Jordan, Faculty of Medicine, Amman, Jordan
c Department of General Surgery, Division of Endocrine Surgery, University of Jordan, Faculty of Medicine, Amman, Jordan

ABSTRACT

INTRODUCTION: Many objects were described in the literature as causes of upper airway obstruction including seeds, nuts and household particles but fragmented tracheostomy tube is a rarely reported cause of airway obstruction. We report a case of foreign body aspiration in the tracheobronchial tree due to a fragmented and migrated tracheostomy tube.

PRESENTATION OF CASE: We report a 4.5 year old female patient who had upper airway obstruction due to a fragmented and migrated tracheostomy tube. She was diagnosed by chest X-ray and the tube was removed by rigid bronchoscopy.

DISCUSSION: Several factors contribute to fragmentation of the tracheostomy tube including repeated removal and reinsertion, cleaning, boiling or chemicals. Early breakage is most often due to manufacturing defects. The occurrence of a fractured tracheostomy tube in children is rare. Nevertheless, tracheobronchial foreign bodies in children can be life threatening and pose a dire emergency.

CONCLUSION: Based on our experience, the doctors and other staff should check for any manufacturing defects before the first use of a tracheostomy tube, which should reduce the occurrence of this rare, but life threatening.

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1. Introduction

Upper airway obstruction (UAO) is common in children under 3 years [1–3]. Many objects were described in Literature including seeds, nuts and household particles. There are a few reports describing fractured tracheostomy as a cause of airway obstruction. We report a case of foreign body aspiration in the tracheobronchial tree due to a fragmented and migrated tracheostomy tube.

2. Case report

A four-year old female patient with a body weight of 12 kg was diagnosed to have Leigh's disease at the age of 6 months. She had global developmental delay which resulted in hypotonia and delayed walking. With progression of the disease she started to have weakness in respiratory muscles that led to recurrent chest infection. She developed intractable myoclonic seizures controlled only with a high dose of midazolam, then after she developed respiratory failure and was kept on ventilator.

A tracheostomy opening was created for her due to prolonged intubation; four weeks later while she was in the pediatric ward she suddenly developed coughing, cyanosis and oxygen desaturation. Chest X-ray showed that the tracheostomy tube was fragmented from its base, slipped into the trachea and lodged in the left main bronchus. On arrival to the operating room, the patient was in respiratory distress and oxygen saturation was about 85% while she was on oxygen 10 l/min. After application of the essential monitors (ECG, BP, capnography and pulse oximetry) and securing the intravenous access, the patient was induced with incremental doses of sevofurane in 100% oxygen through the face mask and kept spontaneously breathing, lignocaine 2% 3 ml was used for topicalisation of the trachea and the upper airway. A trial of rigid bronchoscopy was done through the tracheostomy but it was not successful, then a second trial through the oral cavity was done and the patient kept ventilated through the side port of the bronchoscope, bronchoscopy was done successfully and the broken tracheostomy tube was removed. The tracheostomy was replaced and the patient respiratory situation settled to its basal condition. The patient was awakened from anaesthesia and sent to the pediatric intensive care unit for close observation and monitoring.

⁎ Corresponding author at: Department of General Surgery, Faculty of Medicine, University of Jordan, Jordan.
E-mail address: hashemmomani@yahoo.com (H.M. Al-Momani).

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3. Discussion

Although many complications of tracheostomy have been described, fracture of the tracheostomy tube is rarely reported [4]. The first case was described by Bassoe and Boe. In 1960, breakage and aspiration of a part of the fractured tube has been documented in a few cases in adults [5,6]. To our knowledge, our patient is the youngest case of a fragmented PVC tracheostomy tube migrating into the tracheobronchus.

Several factors contribute to fragmentation of the tracheostomy tube including repeated removal and reinserion, cleaning, boiling or chemical (corrosive cleaning fluids, alkaline bronchial secretions) which are used for tracheostomy care [6,7]. Therefore, tracheostomy tubes should be checked regularly for signs of wear and tear and periodic replacement is necessary (Figs. 1 and 2). In our case, however, the tracheostomy tube was broken 8 weeks after it was first used. Early breakage is most often due to manufacturing defects, thus all tracheostomy tubes should be checked for before use [7].

According to literature, most patients do not have serious problems unless the tracheostomy tube becomes blocked. X-rays of the chest are always helpful in ascertaining the position of the broken fragment. If the fragment is located just below the tracheostomy opening, it may be removed under direct vision with or without local anesthesia. However, if the fragment migrates away from the tracheostomy opening, the safest way to remove it is through trans-tracheostomy bronchoscopy under general anaesthesia [8].

The occurrence of a fractured tracheostomy tube in children is rare. Nevertheless, tracheobronchial foreign bodies in children can be life threatening and pose a dire emergency. Based on our experience, the doctors and other staff should check for any manufacturing defects before the first use of a tracheostomy tube, which should reduce the occurrence of this rare, but life threatening, complication of pediatric tracheostomy.

Conflicts of interest

None.

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None.

Ethical approval

Not applicable.

Consent

Written informed consent was obtained from the patient’s guardian for publication of this case report and accompanying images.

Author contribution

Not applicable.

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