

Tracheobronchial foreign body in an extremely preterm infant complicated with pulmonary hemorrhage

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Tracheobronchial foreign bodies in preterm neonates are extremely rare. They are usually iatrogenic and associated with dislodgement of medical devices. The narrow airways of neonates pose a challenge in removal of foreign bodies. The obstructing object or attempt of removal in itself may cause significant morbidity or mortality. We report a rare case of pulmonary hemorrhage secondary to a tracheobronchial foreign body in an extremely preterm infant and its successful removal. Literature reviews show atelectasis, pneumonia, and respiratory distress being the most common complications from a tracheobronchial foreign body. Removal of tracheobronchial foreign bodies in the narrow airways of neonates can be a grueling task with multiple risks. A high index of suspicion is needed for early detection of foreign body in the airways to avoid morbid complications.

Keywords:

closed suction catheter, foreign body, neonate, premature infant, pulmonary hemorrhage

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Introduction

Tracheobronchial foreign bodies causing airway obstruction are commonly seen in children younger than 3 years but rarely in neonates [1,2]. Ventilated infants require regular endotracheal suctioning to reduce risk of mucus plugging and bronchopulmonary infections [1]. The closed circuit suctioning system obviates detachment of ventilator [2], reducing risk of desaturation and apnea, but it increases the risk for lower respiratory tract infections [3]. We present a case of a closed suction catheter tip fragment lodged in the bronchus of an extremely preterm infant, causing pulmonary hemorrhage. To the best of the authors' knowledge, only five such cases have been reported so far, and none of them were complicated by pulmonary hemorrhage.

Case history

A 27-week gestation female infant was born through spontaneous vertex delivery, with a birth weight of 920 g. Informed consent was obtained from the parent's of the infant for flexible bronchoscopy and foreign body removal. Despite being given corticosteroids antenatally, she had poor respiratory effort at birth necessitating intubation and surfactant. Informed consent was obtained from the parents of the infant for flexible bronchoscopy and foreign body removal.

She had recurrent episodes of apnea and symptomatic patent ductus arteriosus. A closed circuit suction system (KimVent 6Fr Kimberly-Clark, Registered

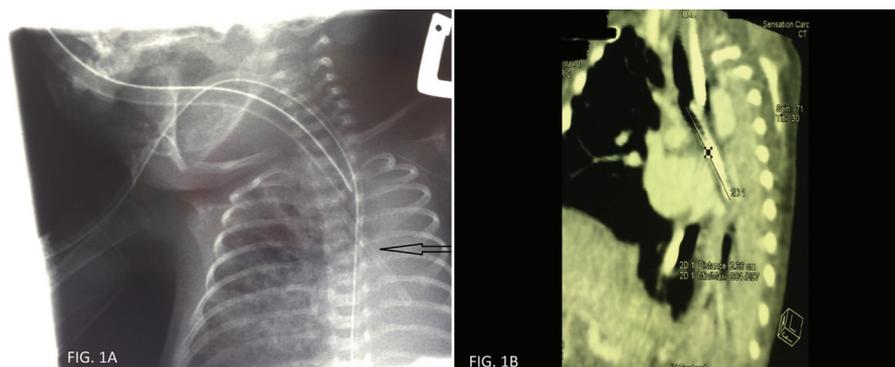
trademark of Kimberly-Clark Worldwide, Inc. 2007 KCWW) was placed to reduce interruption to ventilation and loss of functional residual capacity. She developed pulmonary hemorrhage and left lung collapse on the second week of life, requiring high-frequency oscillatory ventilation.

Serial chest radiographs done showed persistent collapse of the left lung with a tubular structure lying from the left third to eighth posterior ribs (Fig. 1a). Computer tomography (CT) of the thorax revealed fragmented foreign body suspicious of a suction catheter tubing 2.4 cm in length, which was lodged in left main bronchus and caused total collapse-consolidation of left lung (Fig. 1b).

The 1.2-kg infant was given assisted spontaneous ventilation through a T-piece connected to her 3.0 mm endotracheal tube (ETT). A 1.8-mm flexible bronchoscope was introduced through the T-piece connector. The foreign body (fragmented suction catheter tip) was found lying 1 cm from the opening of left bronchus and removed with a urological basket passed through the suction port of the flexible bronchoscope (Fig. 2). She was successfully extubated 5 days later, and discharged home at 35 weeks corrected age with mild bronchopulmonary dysplasia.

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Figure 1



(a) Chest radiograph shows the tubular foreign body lying mediolateral from left third to eighth posterior ribs, as denoted by arrow. (b) Computed tomography of the thorax confirming foreign body in the left tracheobronchial tree measuring 2.36 cm.

Figure 2



Foreign body: suction catheter tip, measuring 3 cm.

Discussion

Advances in ventilatory support in preterm neonates with extremely low birth weight have increased their survival rates [1]. The closed circuit suctioning system reduces complications associated with disconnection of ventilators [2] but increases the risk for lower respiratory tract infections [3].

Tracheobronchial foreign bodies are rarely seen in preterm neonates and are frequently seen owing to medical devices such as sheared stylet sheaths and suction catheters [1,2]. In practice, ETTs are trimmed to reduce dead space for neonatal ventilation. It is postulated that the suction catheter tip of the close circuit suction system had not been completely withdrawn from the ETT during its trimming. Such events have also been reported by Garcia-Aparicio *et al.* [2], Nurkin *et al.* [4], and Leung *et al.* [5]. This draws attention to the importance to regular checking of the integrity of a suction catheter tip, and to only cutting the ETT once the suction catheter has been fully withdrawn. It highlights the flaws of a transparent suction catheter with small markings that are difficult to read [2].

Retrieval of a tracheobronchial foreign body is complicated in a tiny infant and may cause serious morbidity and mortality. One has to be able to maintain saturation while removing the foreign material with minimal complications. Ideally, a neonate weighing 0.9–1 kg and 1–1.8 kg should be intubated with a size 2.5- and 3-mm ETT, respectively [6]. In our patient, assisted spontaneous ventilation was employed, as high-pressure ventilation may further dislodge the foreign body distally, and it also poses a risk of pneumothorax and hyperinflated lungs.

The most common complications reported from a tracheobronchial foreign body are atelectasis, pneumonia, and respiratory distress [7]. Our patient developed pulmonary hemorrhage initially owing to a symptomatic patent ductus arteriosus. It persisted and was complicated with left lung collapse owing to the presence of a foreign body. She was managed with high-frequency ventilation which was successfully weaned off after removal of foreign body. She was allowed home with only mild bronchopulmonary dysplasia.

At 2-year follow-up, she is noted to have slight developmental delay and poor weight gain requiring nutritional support. She is also under the observance of an ophthalmology team for retinopathy of prematurity but is otherwise doing well with no respiratory complications.

Conclusion

The smallest reported premature infant with a tracheobronchial foreign body weighed a mere 650 g [2]. The narrow airways of neonates pose a difficult challenge in removal of foreign bodies. Constant vigilance is needed to detect a foreign body in the

airway, as early detection may avoid further detrimental complications. Cooperation between pediatrics, anesthetics, and otorhinolaryngology team is pertinent to managing such a case.

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Conflicts of interest

There are no conflicts of interest.

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