Airway Management for a Pediatric Patient With a Tracheal Bronchus

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Tracheal bronchus is an ectopic bronchus almost arising from the right side of the tracheal wall above the carina. The incidence of a tracheal bronchus is reported as 0.1 to 3%. We experienced a patient with tracheal bronchus that was incidentally found at induction of anesthesia. Endotracheal intubation in a patient with tracheal bronchus might cause obstruction of the tracheal bronchus, although in this case, ventilation was not impaired.

Key Words: Tracheal bronchus; Nasotracheal intubation; Children.

Trachea bronchus arising from the lateral wall of the trachea above the carina has been reported to have an incidence of approximately 0.1 to 3%.[1–3] The presence of an anomaly of the central airway might be critical to anesthesiologists. The main clinical implication of endotracheal intubation in a patient with a tracheal bronchus would be hypoxemia and pulmonary atelectasis.[1–4] We experienced a patient with tracheal bronchus that was incidentally found at induction of anesthesia.

CASE REPORT

The patient was a 5-year-old boy, 108.2 cm in height and 19.2 kg in weight. He had no congenital abnormalities and was otherwise healthy. His mother found his multiple caries due to recent decreased food intake. Dental treatment was scheduled under general anesthesia because of his young age and precooperative nature. Auscultation of heart and lungs was within normal limits, although the clinical assessment of his airway was difficult. Oxygen saturation by peripheral capillary oxygen saturation (SpO_2) was 100% in room air. No abnormal findings were observed on preoperative electrocardiogram (ECG) or chest X-ray.

Anesthesia was induced with inhalation of sevoflurane 1–8% in oxygen after the start of noninvasive monitoring for SpO_2 (100%). After loss of consciousness, monitoring of ECG (sinus rhythm), blood pressure (BP) (112/55 mm Hg), and heart rate (HR) (118 bpm) was started. Fentanyl 40 mcg, atropine 100 mcg, and rocuronium 15 mg were administered. Intubation was easily carried out with a 5.0-mm uncuffed nasotracheal tube (Mallinckrodt Nasal RAE Endotracheal Tube; Covidien Japan, Tokyo, Japan) by conventional laryngoscope. After bilateral breath sounds were confirmed, the nasotracheal tube was secured at 20 cm measured at the ala of the nose. The position of tube tip was then confirmed by fiberscope. At that time, a tracheal bronchus arising at the level of the carina was noted (Figure 1). Due to the proximity of the endotracheal tube to the tracheal bronchus and carina, we were concerned with the possibility of endobronchial intubation. The tracheal tube was retracted so that the tip of the tracheal tube was located 2 cm above the carina, and the tracheal tube was fixed at the 18 cm mark at the ala of the nose. Bilateral breath sounds were confirmed. In addition, the end-tidal CO_2 ($EtCO_2$) and airway pressure (15 mm Hg) were normal. During surgery, respiratory (SpO_2: 98–100%, $EtCO_2$: 38–42 mm Hg) and hemodynamic conditions (BP: 80–98/42–66 mm Hg, HR: 80–110 bpm) were maintained stable.

DISCUSSION

Abnormal branching of the tracheaobronchial tree is usually the result of a morphogenetic defect that occurs

Received February 9, 2017; accepted for publication March 31, 2017.

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Anesth Prog 65:50–51 2018 | DOI 10.2344/anpr-64-04-02

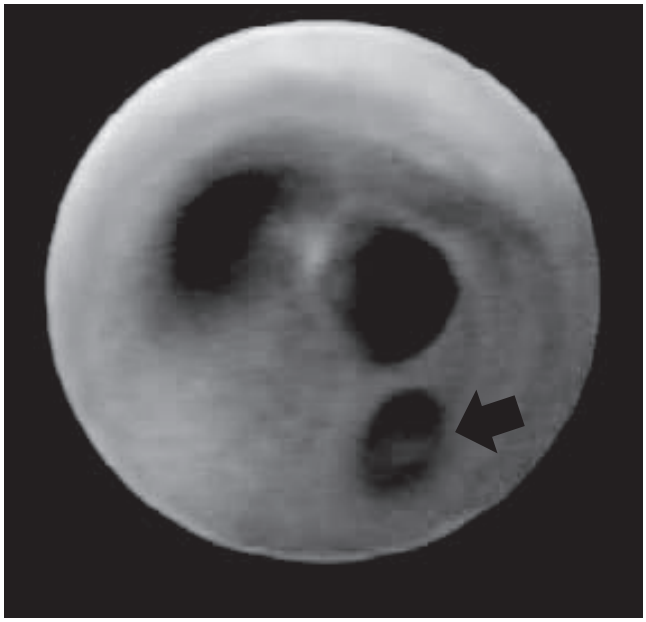

Figure 1. Fiberscope view of a patient with tracheal bronchus at the level of carina (arrow).

at 16 weeks' gestation, and its anomalies originate mainly at the level of the right main bronchus. Tracheal bronchus was first described by Sandifort[1] in 1785, and it was classified into 3 basic types: supernumerary right upper lobe tracheal bronchus, displaced right upper lobe tracheal bronchus, and displaced right upper lobe tracheal bronchus as tracheal trifurcation.[1,3] It can be associated with other congenital anomalies or genetic disorders, but our patient had no other anomalies. Most patients with tracheal bronchi are asymptomatic, but some patients may experience recurrent pneumonia and/or chronic bronchitis.[1,3] Most commonly, the anesthesiologist will be unaware of the presence of tracheal bronchus, which might be important in the differential diagnosis of unexplained intraoperative hypoxemia and pulmonary atelectasis. Tracheal intubation in patients with a tracheal bronchus might cause obstruction of the tracheal bronchus, although in this case, the ventilatory condition was remained stable.

Nasotracheal intubation is one of several techniques of airway management in patients undergoing oral and maxillofacial surgery.[5] Securing the endotracheal tube for children at an appropriate depth of placement is a major concern due to young children's short trachea.[6] In clinical practice, we frequently utilize a fiberscope to confirm proper positioning of the endotracheal tube tip after intubation which, in this case, lead to the incidental finding of tracheal bronchus.

Tracheal bronchus should be considered in the differential diagnosis of hypoxemia and/or pulmonary atelectasis if more common causes have been ruled out.

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