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Airway management for patients with a tracheal bronchus

S. IKENO, H. MITSUHATA, K. SAITO, Y. HIRABAYASHI, S. AKAZAWA, H. KASUDA AND R. SHIMIZU

Summary

A tracheal bronchus is an aberrant, accessory or ectopic bronchus arising almost invariably from the right lateral wall of the trachea, causing hypoxaemia, atelectasis, or both, during anaesthesia. We describe two patients with a tracheal bronchus found before anaesthesia. One tracheal bronchus was found by tracheobronchoscopy and the other by chest x-ray. Because of recognition of the anomaly before operation, anaesthesia was uneventful in each patient. (*Br. J. Anaesth*. 1996; **76**: 573–575)

Keywords

Complications, tracheal bronchus. Intubation tracheal.

Tracheal bronchus is an aberrant or accessory bronchus arising almost invariably from the right lateral wall of the trachea [1]. The incidence is reported to be approximately 0.1–3% [1–3] and is usually asymptomatic [4]. A tracheal tube can obstruct [5–7, 14] or migrate into a tracheal bronchus [7, 8], causing pulmonary atelectasis, hypoxaemia, or both. We report two patients with an ectopic tracheal bronchus that was found before operation by tracheobronchoscopy or chest x-ray.

Case reports

PATIENT NO. 1

A 55-yr-old woman was referred to our hospital for surgical treatment of carcinoma of the right middle lobe. She had undergone appendicectomy and abdominal total hysterectomy under spinal anaesthesia, but had never received general anaesthesia. Routine laboratory tests, arterial blood-gas analysis and ECG were normal. Spirometry suggested minor airway obstruction.

Bronchoscopy was performed and revealed an ectopic tracheal bronchus arising 3 cm above the carina. Chest x-ray was normal except for the tumour capacity. Tracheobronchography confirmed that the ectopic tracheal bronchus arose directly from the trachea and supplied the apical and anterior segment of the right upper lobe. The bronchus arising 4.6 cm below the carina supplied the posterior segment of the right upper lobe (fig. 1).

Lobectomy of the right middle lobe was scheduled under one-lung anesthesia with a left-sided, double-lumen endobronchial tube (BronchoCath 35Fr. Mallinckrodt Medical, St Louis, USA). Because the tracheal cuff of the tube could obstruct the tracheal bronchus when the bronchial cuff was in the left main bronchus, we examined accurately the relationship between the position of the tracheal bronchus and the tracheal cuff. The length from the peripheral edge of the tracheal cuff to the proximal edge of the bronchial cuff was 4.5 cm. The distance from the carina to the orifice of the tracheal bronchus was 3.5 cm. Therefore, when the bronchial cuff was positioned correctly, the orifice of the tracheal bronchus was located 1 cm below the tracheal cuff ensuring the patency of the tracheal bronchus.

Before induction of anaesthesia, an extradural catheter was inserted at T6–T7. After induction with thiopentone and suxamethonium, the tracheobronchus was intubated. The position of the bronchial cuff was confirmed by bronchoscopy. Anaesthesia was maintained with nitrous oxide–oxygen–sevoflurane and continuous extradural block. The operation was uneventful. The tracheobronchus was extubated after atelectasis in all lobes was excluded by chest x-ray. Her postoperative course was uneventful.

PATIENT NO. 2

A 2-yr-old girl was referred for anaesthetic assessment before burr hole irrigation for subdural empyema. She had been suffering from recurrent subdural haemorrhages from the age of 9 months, and had undergone burr hole irrigation on five occasions in another hospital.

Preoperative laboratory tests and ECG were unremarkable. Chest x-ray showed an ectopic tracheal bronchus arising about 1 cm above the carina (fig. 2). This had not been diagnosed previously. Burr hole irrigation was scheduled under general anaesthesia. Because the tracheal bronchus was identified clearly on chest x-ray, bronchoscopy was not performed before induction of anaesthesia with

SHIGEO IKENO, MD, HIROMASA MITSUHATA, MD, KAZUHIKO SAITO, MD, YOSHIHIRO HIRABAYASHI, MD, SATOSHI AKAZAWA, MD, HARUYUKI KASUDA, MD, REIJU SHIMIZU, MD, Department of Anesthesiology, Jichi Medical School, 3311-1 Yakushiji, Minamikawachi, Kawachi-gun, Tochigi 329-04, Japan. Accepted for publication: October 28, 1995.

Correspondence to S.I.

Figure 1 Tracheobronchography (patient No. 1) showing a tracheal bronchus supplying the apical and anterior segment of the right upper lobe.

nitrous oxide–oxygen–sevoflurane. After administration of suxamethonium, a tracheal tube was advanced 14 cm from the right corner of the mouth. After bilateral respiratory sounds were confirmed, tracheobronchoscopy was performed, showing that the ectopic tracheal bronchus was not obstructed. Respiratory sounds were monitored throughout and surgery was uneventfully. After chest x-ray excluded atelectasis in all lobes, the trachea was extubated. Her postoperative course was uneventful.

Discussion

In patient No. 1, we were able to perform one-lung anaesthesia safely, because we had confirmed before operation that the orifice of the tracheal bronchus was not obstructed by the double-lumen tube. In patient No. 2, the orifice of the tracheal bronchus was not obstructed with the tracheal tube, because the orifice was located near the carina.

Tracheal bronchi are associated occasionally with other congenital anomalies, including cyanotic heart disease [1], but our patients had no other anomalies. Bronchial anomalies may be reported as an incidental finding on bronchoscopy, as in patient No. 1 [1].

There are two types of tracheal bronchi: supernumerary and displaced [9]. The former, which is comparatively rare, is an accessory bronchus. A displaced bronchus arises from an abnormal position and supplies one or more segments of the upper lobe, most commonly the apical segment [4]. Although tracheal bronchi are usually reported to be asymptomatic, they may cause stridor in children. They may also be related to inflammatory conditions affecting the lung on that side, including recurrent pneumonia [4, 10], non-obstructive bronchiectasis [4, 11] and postobstructive pneumonia distal to an adenoma arising in the tracheal bronchus [4, 12]. A tracheal bronchus has been reported as high as 6 cm above the carina [4, 13]. In such patients, a tracheal tube could obstruct an ectopic tracheal bronchus [5–7, 14] or an ectopic tracheal bronchus could be intubated [7, 8], causing atelectasis, hypoxaemia, or both. Recognition of a tracheal bronchus before anaesthesia can guide airway management. In three patients reported previously, however, tracheal bronchi were found during general anaesthesia [6, 7, 14, 15], and some were identified on chest x-ray retrospectively [6]. In patient No. 2, we diagnosed a tracheal bronchus before anaesthesia on chest x-ray alone, because we were alert to the possibility.

One-lung anaesthesia in these patients may be difficult [5, 15]. In patient No. 1, we were able to perform one-lung anaesthesia safely because we had confirmed the relationship between the tracheal

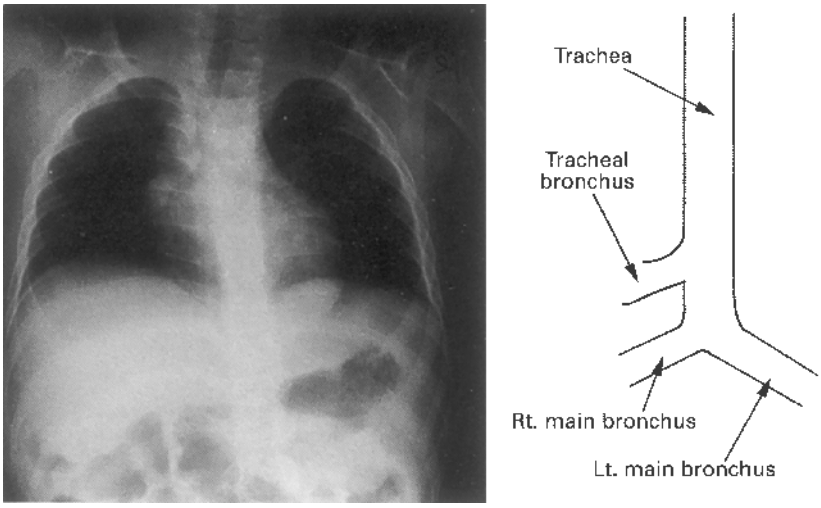

Figure 2 Chest x-ray (patient No. 2) showing an ectopic tracheal bronchus arising approximately 1 cm above the carina.

bronchus and the bronchial cuff. Bronchial blockers may be useful in some situations. In particular, for left lung surgery, a blocker in the left main bronchus enables the right lung to be ventilated effectively with a short tracheal tube.

In conclusion, chest x-ray should be observed carefully to exclude ectopic tracheal bronchus. Tracheal bronchi should be included in the differential diagnoses of airway problems, including hypoxaemia, atelectasis, or both, during anaesthesia.

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