



Detection of Incidental Tracheal Bronchus in Minimally Invasive Cardiac Surgery Planned for Single Lung Ventilation

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ABSTRACT

The tracheal bronchus is a rare congenital anomaly resulting from an additional tracheal outgrowth in the early stages of embryonic life. It typically arises from the right wall of the trachea above the carina. Generally asymptomatic, it may sometimes lead to lung disease. We present the case of a 70-year-old male scheduled for minimally invasive valve surgery, where an accessory bronchus was incidentally detected during single-lung ventilation.

Keywords: Bronchoscopy, minimally invasive cardiac surgery, one-lung ventilation, tracheal bronchus

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Introduction

The tracheal bronchus is a rare congenital anomaly that occurs as a result of an additional tracheal protrusion in early embryonic life. It usually originates from the right wall of the trachea, above the carina. It is often asymptomatic but may cause recurrent pneumonia, chronic bronchitis, or bronchiectasis.^[1] The incidence of tracheal bronchus on the right side is 0.1%–2% and on the left it is around 0.3%–1%.^[2]

With the increasing use of minimally invasive techniques in cardiac surgery, one-lung ventilation is frequently used. Double-lumen tubes can be used for one-lung ventilation, while the use of bronchial blockers can also be an alternative. In order to ensure adequate oxygenation and ventilation during one-lung ventilation, it is routinely recommended to verify the optimal position of the tube with a fiberoptic bronchoscope. Good knowledge of the anatomy of the respiratory tract and bronchoscopic assessment skills are important for successful one-lung ventilation.

In our case, we aimed to present the congenital tracheal bronchus and anesthesia management detected incidentally

with fiberoptic bronchoscopy (FOB) in a patient who was scheduled to undergo valve surgery with thoracotomy and to provide one-lung ventilation by closing the right lung with a bronchial blocker.

Case Report

A 70-year-old male patient, 165 cm in height and 65 kg in weight, with a known diagnosis of chronic cholecystitis, who was admitted to our hospital with chest pain, was scheduled for minimally invasive valve surgery. In the preoperative examination, Mallampati score was II, neck movements were normal, and sternomental distance was >12 cm. Echocardiography showed LVEF=60% and SPAB within normal limits. Respiratory function tests performed on the patient were within normal limits.

In the patient who was planned to have one-lung ventilation, it was planned to insert a bronchial blocker to ensure closure of the right lung. Number 7 and 9 bronchial blockers (TAPPA medical equipment) and a flexible bronchoscope were prepared. The patient was taken to the operating room, and ECG and SpO₂ monitoring, BIS and NIRS monitoring, radial artery catheterization, and

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invasive blood pressure measurement were performed. Heart rate was measured as 60 beats/min, blood pressure as 123/65 mmHg, and SpO₂ as 97%.

After induction with midazolam 2 mg, fentanyl 100 mcg, lidocaine 80 mg, and propofol 150 mg, rocuronium 65 mg was applied, and effective muscle relaxation was waited. Successful intubation was achieved with direct laryngoscopy and a number 8.5 endotracheal tube.

During the airway evaluation with fiberoptic bronchoscopy, it was observed that the patient had a type III congenital tracheal bronchus, where the right upper lobe bronchus separated at the level of the trachea (Fig. 1). When the right bronchial blocker was placed, the tracheal bronchus could not be closed, which was confirmed by listening to the breath sounds and FOB. When the blocker cuff was inflated a little more, it was observed that the blocker shifted from the carina to the trachea.

Afterwards, it was decided to insert a left double-lumen tube into the patient. However, at this time, the surgical team decided to intervene in the patient's suspected coronary lesion and announced that the minimally

invasive surgery plan was abandoned and the surgery would continue with median sternotomy.

After the uneventful surgery, the patient was taken to the postoperative intensive care unit intubated and sedated. The patient, who stayed in the intensive care unit for 1 day, was discharged in good health 6 days later.

Discussion

The tracheal bronchus, first described by Sandifort in 1785, is an anomalous, accessory, or ectopic bronchus branch originating from the right lateral wall of the trachea, more common in males.^[3] It can develop from any point above the main carina but is usually seen within 2 cm. Its diameter varies from 0.5 cm to 1.0 cm and its length from 0.6 cm to 2.0 cm. It may be displaced or redundant, depending on the number of segmental bronchi of the anatomical right upper lobe bronchus.^[4]

When a left-sided double-lumen tube (DLT) is used in a patient with a tracheal bronchus, the tracheal cuff may occlude the tracheal bronchus. If the left lung is isolated and only the right lung is to be ventilated, this

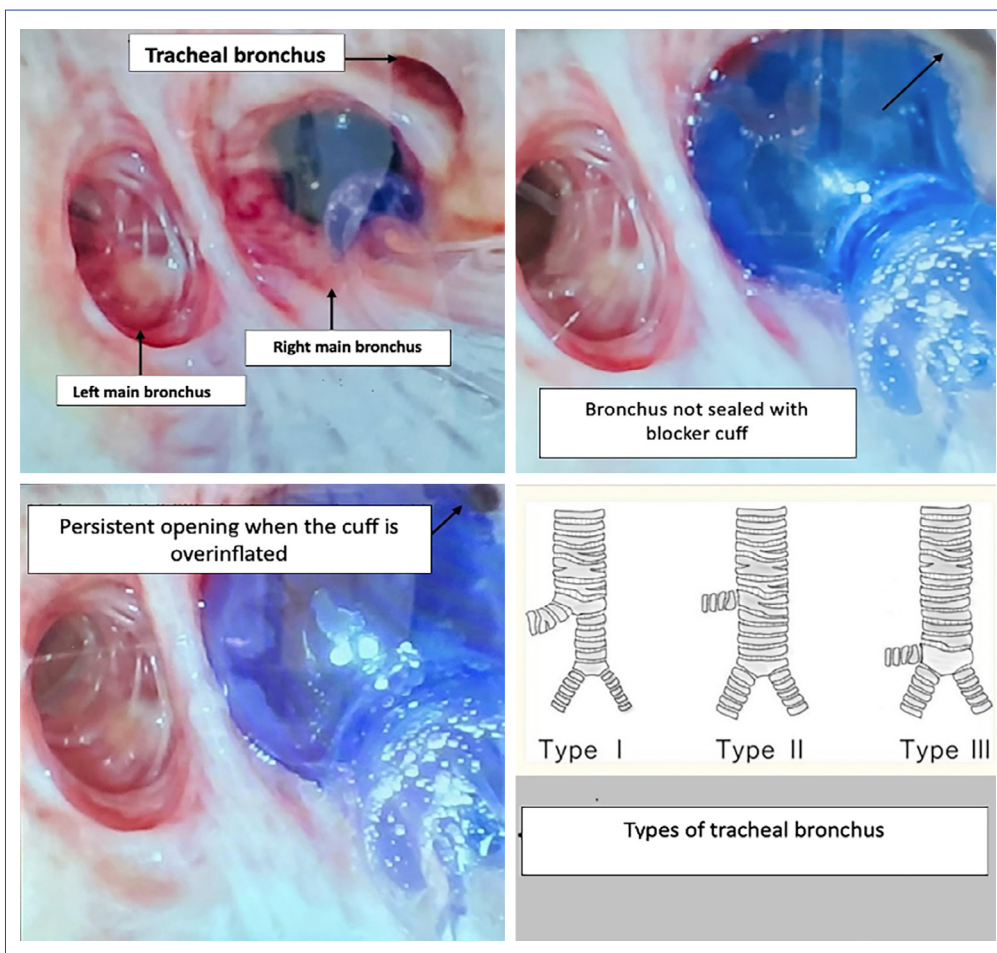


Figure 1. Bronchoscopy image of tracheal bronchus.

may cause significant hypoxemia because an additional lobe of the lung cannot be used for gas exchange. If the right DLT is used and the tracheal cuff is proximal to the tracheal bronchus opening, the right lung may not be isolated because the right upper lobe can be used for gas exchange via the tracheal lumen.

Similarly, when a bronchial blocker is placed in the right main bronchus to isolate the right lung, the right upper will not be isolated. This can probably only be achieved by placing an additional blocker or a Fogarty catheter. Similarly, in our case, due to the right-sided tracheal bronchus, the right lung continued to be ventilated when the blocker was placed, and the attempt to isolate the right was unsuccessful.

The presence of a tracheal bronchus during airway management of a patient in the operating room may be a clinical surprise. The absence of unexplained air entry into any lung region after intubation and/or lung isolation should raise clinical suspicion of this anatomic entity.^[5] The importance of FOB evaluation should not be forgotten for successful oxygenation and ventilation during one-lung ventilation.

In patients diagnosed with tracheal bronchus, it should be kept in mind that the right lung cannot be completely closed with bronchial blockers, and surgical planning should be made accordingly. It should be considered that failure may occur due to anatomic differences such as tracheal bronchus, and double-lumen tube preparation should be made just in case.

Disclosures

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

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