Thoracoscopic Right Posterior Segmentectomy of a Patient With Anomalous Bronchus and Pulmonary Vein

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A 39-year-old woman was admitted to our hospital for a pure ground-glass opacity that had been detected in the right lung during a regular examination. A computed tomography scan showed a pure ground-glass opacity beneath the pleura of the right upper lobe of the lung that had enlarged over time. As a consequence, a lung adenocarcinoma was suspected. Meanwhile, three-dimensional computed tomography scans revealed a tracheal bronchus originating directly from the lateral wall of the trachea. The patient consequently underwent posterior segmental resection and mediastinal lymph node sampling by video-assisted thoracic surgery. During surgery, in addition to the tracheal bronchus, a variable central vein was found entering the left atrium dorsal to the right pulmonary artery trunk. We submit that, to the best of our knowledge, this is the first case of its kind ever reported.

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Tracheal bronchus is a rare variation that refers to an abnormal bronchus that comes directly off the lateral wall of the trachea and supplies ventilation to the upper lobe. Here, we report an uneventful thoracoscopic right posterior segmentectomy with the tracheal bronchus and the abnormal vein.

A 39-year-old woman with no history of smoking was admitted to our hospital because of a pure ground-glass nodule that was detected in the right lung during a routine physical examination. Computed tomography (CT) scan suggested a 7 × 8 mm pure ground-glass nodule beneath the pleura of the right upper lobe, with no significant enlargement of the hilar, and mediastinal lymph nodes found bilaterally. Three-dimensional CT demonstrated that the apical and anterior segmental bronchus directly originated from the main trachea, and the posterior segmental bronchus originated from the right main bronchus (Figs 1, 2). The patient was found to be asymptomatic with normal physical examination results and blood test analysis. No distant metastases were observed by bone radioisotopic scanning.

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Then the anomalous central vein [1], which was our second targeted anomaly, was accidently encountered and identified intraoperatively. The central vein, generally known as one of the branches of the superior pulmonary vein, was conventionally located ventral to the pulmonary artery trunk. In this case, the central vein was running dorsal to the pulmonary artery trunk, being away from the superior pulmonary vein (Figs 3A, 3C). From the anterior aspect of the hilum, the routine course of the central vein was absent (Fig 3B), which alternatively validated our previous identification of the anomalous central vein. The branches of the central vein were then cautiously isolated, with the subsegmental veins kept intact. Further procedures included the dissection and isolation of the recurrent artery and the posterior segmental lung, and finally, the lymph node sampling.

The procedure was successfully completed within 130 minutes, with blood loss of 10 mL. Postoperatively, the ground-glass opacity was pathologically confirmed as adenocarcinoma in situ with negative margins and no evidence of metastasis in the lymph nodes (pT1aN0M0), including stations 2, 4, 7, 9, 10, 11, 12 and 13.

Comment
Tracheal bronchus refers to an abnormal bronchus that derived directly from the lateral wall of the trachea (ie, above the main carina) and supplies ventilation to the upper lobe [2]. The incidence is presumably 0.1% to 2% [3]. Based on previously reported morphologic patterns, it can be classified into four groups: displaced, rudimentary, supernumerary, and anomalous right upper lobe bronchus [4]. This anomaly is commonly associated with recurrent pneumonia, as well as stridor [5]. However, most patients with this abnormality have no symptoms, and it is usually found during a regular examination or at autopsy. The variable bronchus that we report belongs to the displayed bronchus. Typically, a displaced bronchus ventilates through the apical segment of the right upper lobe of the bronchus [6, 7]. However, this one supplies ventilation to the apical and anterior segmental bronchus and the posterior segmental bronchus that originates from the right main bronchus. Only Inada [8] and Okubo and colleagues [9] have reported this type of variation.

Variant pulmonary vein is rare. Yurugi and colleagues [10] reported a superior pulmonary vein that ran dorsal to the trunk of the pulmonary artery in a patient undergoing thoracoscopic right upper lobectomy. Matsubara [11] reported that a branch of the superior right pulmonary vein crossed just behind the intermediate bronchus and drained into the left atrium in the subcranial area. The central vein of this case directly drains into the left atrium, instead of pooling into the superior right pulmonary veins. We did not see this kind of variation in the pulmonary vein previously reported in the literature. Moreover, our patient who presented with tracheal bronchus who underwent thoracoscopic segmentectomy was the first case of its kind reported.

As anomalies of bronchus and pulmonary vein can increase the risk of complications during surgery, surgeons should pay attention to this situation quite extensively.

References