Left bronchial isomerism is a rare condition characterized by a bronchial structure on the right side that is a mirror image of the left side. In this report, we record our experience with a 62-year-old female lung cancer patient in whom left bronchial isomerism was discovered during surgery using a thoracoscope. A right upper pulmonary lobectomy was successfully completed, the key to which was successful separation of the right upper and middle lobes. As there is a risk of excising the wrong bronchi in such cases, thoracic surgeons need to identify bronchus variations. The optimal method to do this is to use a bronchoscope and computed tomography images of the bronchial tree reconstruction prior to surgery.

Introduction

Left bronchial isomerism is a rare anatomic bronchial abnormality, which is defined simply as a condition in which a person has two bilobed lungs with two long main bronchi. Adult patients with this abnormality have rarely been reported. Only one case has been reported in the literature in which a bronchus variation was discovered during surgery; however, no photographic records of this case are available. In this report, we describe the details of a patient who was found to have left bronchial isomerism during lung tumor surgery. In patients with this condition, there is a risk of excising the wrong bronchi by mistake.

Case report

A 62-year-old, non-smoking, female patient presented with a solitary pulmonary nodule of the right upper lung, which was discovered by chest computed tomography (CT). The patient had no history of cough, weight loss, fever, or intercurrent illness. Additionally, no abnormalities were found during physical and auxiliary examinations. As the lesion was in the periphery of the lung, a bronchoscopic examination was not conducted.

The patient underwent thoracoscopic surgery on 19 June 2014. Initially, a wedge excision of the lesion on the right upper lung was performed. As intraoperative pathology indicated adenocarcinoma, a right upper pulmonary lobectomy was scheduled. During thoracoscopy, we found that the patient did not have a horizontal fissure in the right lung, so we elected to conduct a single-direction operation with a posterior approach. However, we found no right upper lobe (RUL) bronchus connected to the right main bronchus (RMB) in the rear pulmonary hilum. After separating the posterior of the oblique fissure, we still found no RUL bronchus located at the posterior of the right pulmonary artery (RPA; Fig 1a). As the anatomical structure was not clear, we decided firstly to separate the RUL and the middle lobe (ML). This was accomplished using a surgical stapling device; the stapling lines (SL) can be seen in Figure 1. We then observed that the right lower lobe bronchus (RLB) and the common right upper and middle lobe bronchi were directly connected to the RMB (Fig 1b,c). In addition, the RPA passed superiorly to the top of the
common bronchi, as is normally the case with the arrangement of left pulmonary hilum structure (Fig 1). After successfully conducting a single pulmonary lobectomy, we completed lymph node dissection.

After surgery, we constructed images of the bronchial tree in the preoperative CT, which revealed that the RUL and ML bronchi had a common stem, and no normal intermediate bronchus was found (Fig 2). This also confirmed the presence of left bronchial isomerism. No other visceral heterotaxy was found.

Note, we use phrases such as “right up lobe,” “right upper pulmonary,” and “middle lobe” habitually; however, a middle lobe or a normal right up lobe would not be present once left bronchial isomerism is diagnosed.

**Discussion**

There are several known anatomic variations in the tracheobronchial system, including tracheal and accessory cardiac bronchi, diverticula of the trachea, bridging bronchus, and bronchial isomerism. While sources estimate incidence between 1% and 12%, these variations are a rare clinical entity because of their asymptomatic nature.

Left bronchial isomerism is characterized by a bronchial structure on the right side that is a mirror image of the left side of the body. Until now, there has only been one case reported in the literature that has mentioned this rare variation being encountered during surgery, and the patient in that case had a right upper and middle lobe bilobectomy because of the location of the tumor. No other documented case has described the surgical experience for this variation.

In our case, it was suspected during thoracoscopy that the RMB was the RUL bronchus, and if the RMB had been cut by mistake, the whole right lung would have to have been removed. Subsequently, we confirmed that there was no RUL bronchus in the upper side of the right main pulmonary artery, and we recognized the existence of a bronchus variation. Therefore, the “horizontal fissure”

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**Figure 1** Intraoperative findings: (a) dorsal view, (b,c) ventral view. CB, common right upper and middle lobe bronchi; ML, middle lobe; RLB, right lower bronchus; RMB, right main bronchus; RPA, right pulmonary artery; RUL, right upper lobe; SL, stapling lines.
(assuming that it exists) was dealt with first by going through the tunnel at the base of the “horizontal fissure.”

For surgical safety, thoracic surgeons need to identify bronchus variations. The optimal method is to use a bronchoscope and CT images of the bronchial tree reconstruction prior to surgery. In addition, clues, such as the absence of an interlobar fissure, malposition of the bronchus, and malposition of the blood vessels, should also receive special attention. When the anatomical structure of the pulmonary hilum is not clear, interlobar fissures should be dealt with first.

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**Disclosure**

No authors report any conflict of interest.

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