

Confirmation of a Variant Lingular Vein Anatomy during Thoracoscopic Surgery

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Variations in pulmonary veins can have a serious effect on patients undergoing lung surgery. But few clinicians are familiar with patients who have these variations, and few have been reported in the left pulmonary vein. We report the case of a lung cancer patient with a variant anatomy in the inferior segment of the lingular vein (V⁵) that drained into the left inferior pulmonary vein. A preoperative review of the patient's three-dimensional 64-row multidetector computed tomography (3D MDCT) imaging showed that the variant vein (V⁵) was draining from the inferior lingular segment into the upper side of the inferior pulmonary vein, which was also observed on conventional CT films. This variant anatomy was confirmed during a thoracoscopic left upper lobectomy. Furthermore, the superior segment (V⁶) of the inferior pulmonary vein drained into the basal part of the inferior pulmonary vein, but not into the superior side where V⁵ in this patient was drained. The postoperative course was uneventful, and the patient was discharged on postoperative day 10. Preoperative 3D MDCT imaging of the pulmonary vein allowed good visualization of the patient's vascular variant during surgery, and it contributed to safe thoracic surgery, especially in a thoracoscopic operation. (*Ann Thorac Cardiovasc Surg* 2010; 16: 351–353)

Key words: thoracoscopy, lung cancer surgery, anatomy, angiography, computed tomography

Introduction

Various anatomical variants in pulmonary veins can have serious effects on patients undergoing lung surgery. We report the case of a patient with lung cancer who had a variant anatomy of inferior segment of the lingular vein (V⁵) that drained into the superior side of the left inferior pulmonary vein. The patient underwent a thoracoscopic left upper lobectomy. The variant vein was confirmed by three-dimensional 64-row multidetector computed tomography (3D MDCT) imaging before surgery, which

allowed good visualization of the patient's vascular anatomy during thoracoscopic surgery.

Case

An asymptomatic 70-year-old woman was detected with an abnormal chest shadow during a routine annual checkup in October 2008. She was referred to us for further evaluation, and a chest CT scan showed an abnormal shadow with ground glass opacity measuring 1.9 × 1.2 cm in the left upper lobe, which was compatible with lung carcinoma (Fig. 1). A review of the patient's 3D MDCT films showed that the variant vein (V⁵) from the inferior lingular segment was draining into the upper side of the inferior pulmonary vein (Fig. 2), which was also confirmed on conventional CT films (Fig. 3). After the upper lobe arteries were divided, the variant vein was found. A left upper lobectomy with combined resection of the lymph nodes was performed with video-assisted thoracic surgery (VATS). The postoperative course was unevent-

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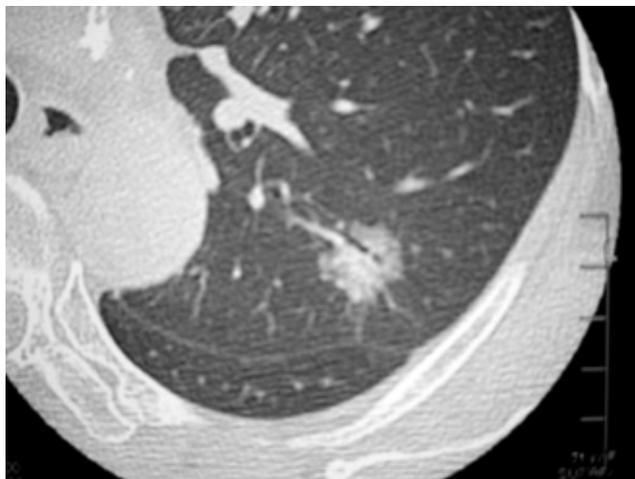


Fig. 1. A chest CT scan showed an abnormal shadow with ground glass opacity measuring 1.9 × 1.2 cm in size in the left upper lobe, which was compatible with lung carcinoma.

ful, and the patient was discharged on postoperative day 10. The pathological diagnosis of the specimen was adenocarcinoma, pT1N0M0, stage IA.

Comment

Few cases of lung cancer with variant pulmonary veins have been reported. One patient with lung cancer was reportedly injured during surgery of a common trunk of the left superior and inferior veins.¹⁾ A thoracoscopic left lower lobectomy in a patient with an aberrant vein (V⁵) that drained into the ventral trunk of the inferior pulmonary vein was also reported.²⁾ Cases of middle lobe veins draining into the right inferior pulmonary vein have also been reported.^{3,4)} Another reported problem in the right side is a variant vein located posterior to the bronchus.⁵⁾ Furthermore, there is a report that the branch of the right upper lobe vein was located posterior to the bronchus intermedius in 5.7% of cases by CT scan and in 3.9% of right thoracotomy cases.⁶⁾

Current CT technology is advanced and allows for easy and rapid viewing of the pulmonary vein structures.⁷⁾ Patients scheduled for thoracic surgery in Jikei Kashiwa Hospital are routinely examined by CT (Aquilion 64; Toshiba, Tokyo, Japan) after intravenous administration of iodinated contrast medium. After each patient's 3D MDCT images of the pulmonary vessels and bronchus have been constructed once the bones were subtracted (tailor-made virtual lung), the data were downloaded to a DVD, and four images were printed onto the film.^{4,8)} This

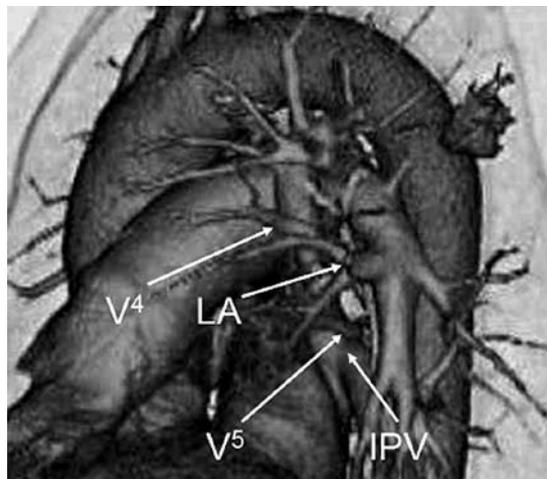


Fig. 2. A three-dimensional multidetector computed tomography image of the variant inferior segment of the lingular vein (V⁵), which drained into the upper side of the left inferior pulmonary vein. LA, lingular artery; V⁴, superior segment of the lingular vein.

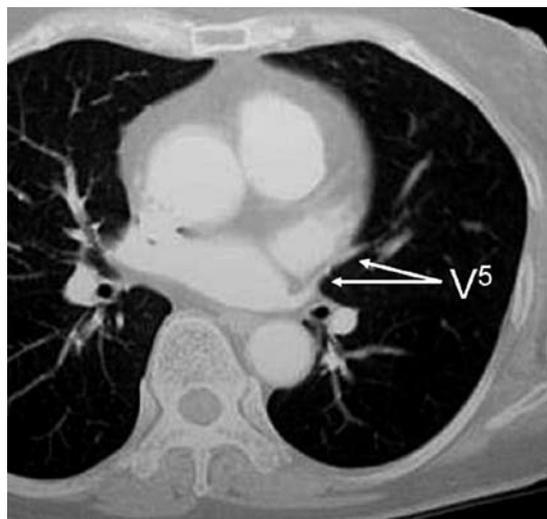


Fig. 3. Preoperative conventional chest computed tomography scan showing the anomalous vein (V⁵).

enabled us to evaluate the vessels of each patient preoperatively.

During VATS on this patient, we found a vessel running between the superior and inferior pulmonary veins. This type of anomalous vein is clearly seen in the space between the inferior and superior pulmonary veins on 3D MDCT. Furthermore, the imaging also showed that the superior segment (V⁶) of the inferior pulmonary vein drained into the basal part of the inferior pulmonary vein and not into the superior side where V⁵ in this patient was drained.

Marom et al. analyzed variations of the pulmonary veins for radiofrequency ablation and reported that 32% had variant anatomy. The most common variation was the independent drainage of the middle lobe veins directly into the left atrium; this was observed in 26% of patients.⁹ However, none of these reported anomalies was the same as the one in our patient. According to Cronin et al., the middle lobe pulmonary vein drained directly into the atrium in 11% of patients and into the inferior pulmonary vein in 5.5%, but there was no variant vein draining to another in the left.¹⁰ We present here a rare variant pulmonary vein in the left. It was not found with conventional CT at first, but 3D MDCT showed us the variant vein that was running between the superior and inferior pulmonary veins. This technology allows rapid and detailed views of the anatomy of pulmonary vessels, and it shortens the evaluation time for surgeons. It also helps to ensure safe thoracic surgery, especially in VATS.

According to radiological and operative findings, an abnormal shadow in the presented case had been diagnosed to be malignant, and we undertook surgery. The diagnosis and treatment of ground glass opacity have become important issues; however, their management has no generally accepted guidelines.¹¹ But in patients with a high malignancy or an intermediate likelihood of malignancy, the early intervention of fine-needle aspiration biopsy or surgery is a good approach.¹² Furthermore, partially solid pulmonary nodules with diameters larger than 11 mm have a high incidence of malignancy.¹³

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