

How to deal with benign hilar or interlobar lymphadenopathy during video-assisted thoracoscopic surgery lobectomy

Shi Yan, Chao Lv, Xing Wang, Nan Wu

Key Laboratory of Carcinogenesis and Translational Research (Ministry of Education/Beijing), Department of Thoracic Surgery II, Peking University Cancer Hospital and Institute, Beijing 100142, China

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Correspondence to: Nan Wu, MD. Department of Thoracic Surgery II, Peking University Cancer Hospital and Institute, No. 52, Fucheng Avenue, Haidian District, Beijing 100142, China. Email: nanwu@bjmu.edu.cn.

Background: Video-assisted thoracoscopic surgery (VATS) surgery has changed the way lobectomy procedure was performed over the past few decades. However, some difficulties impede the accomplishment of VATS lobectomy, which of them, benign lymphadenopathy may pose a threat to safety of surgery.

Methods: We reported a case with enlarged hilar and interlobar lymph nodes. The video showed the instrumentation and techniques that we had adopted to deal with the complicated dilemma during the operation. Critical experience was also suggested in some hypothetical scenarios.

Results: AS techniques were further refined, successful VATS segmentectomy or lobectomy with challenging hilar or interlobar lymphadenopathy could be performed without uncontrolled bleeding or unexpected conversion.

Conclusions: A VATS approach is acceptable in the management of benign hilar or interlobar lymphadenopathy. However, facile technique is necessary to deal with intraoperative dilemma. To those who are not sure about the practicability of the VATS procedure, planned conversion is still an effective method to ensure safety of the operation.

Keywords: Hilar; interlobar; lymphadenopathy; video-assisted thoracoscopic surgery lobectomy (VATS lobectomy)

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Introduction

Since first launch of video-assisted thoracoscopic surgery (VATS) lobectomy 20 years ago, VATS surgery has changed the way lobectomy procedure was performed over the past few decades. However, some difficulties impede the accomplishment of VATS lobectomy, which of them, benign lymphadenopathy may pose a threat to safety of surgery. Fortunately, expertise has also been growing mature accompany with rapid development of techniques and instruments so that successful VATS lobectomy with challenging hilar or interlobar lymphadenopathy could be performed without uncontrolled bleeding or unexpected conversion.

Case presentation

A 52-year-old male complained of a 6-year history of hemoptysis, which had worsened during the last 8 months. He had a 30-pack-year history of tobacco use. Flexible bronchoscopy showed a very limited mucosal lesion on the orifice of right superior segment of lower lobe 2 months ago. Squamous cell carcinoma was confirmed after biopsy. After 2 months follow-up, flexible bronchoscopy suggested that the lesion had healed with scar. However, CT scan suggested an irregular small nodule located in lingular segment of the left upper lobe. PET/CT scan revealed a 1.6 cm × 0.9 cm lesion with an increased rates of glucose



Figure 1 Two-port VATS left upper lobectomy with challenging hilar or interlobar lymphadenopathy (1). VATS, video-assisted thoracoscopic surgery.

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metabolism on the orifice of the lingular segment. Transbronchus lung biopsy was performed through endobronchial ultrasonography with a guide sheath (EBUS-GS), which confirmed the lingular lesion as the second primary squamous cell carcinoma.

For the concern of possible operation on the right side in the future, we preferred to resect lingular lesion first due to the absence of visible disease on the right side after latest bronchoscopic examination. We decided to perform a lingular segmentectomy first for preserving more function for the potential right-side surgery, but quality standard of segmentectomy must be secured, such as safety margin and negative node involvement.

We inspected the left thorax to rule out unexpected pleural seeding by thoracoscopy and palpated the tumor at the lingular segment. Next, circumferential blunt dissection of the lingular vein was carried out using a dissector, suction tip and hook electrode. Care was taken to avoid injury to neighbor structures of the vein, such as the bronchus and pulmonary artery (PA). We exposed the upper edge of inferior vein and hilar nodes were taken and confirmed negative by frozen pathology. Since the fissure was incomplete, we further exposed the angle between the lingular bronchus and the lower lobe bronchus. No. 11 nodes were removed and negative as well. The segmental vein was divided. Then we pulled the lung posteriorly and mobilized the lingular bronchus. The lingular artery located posterior to the bronchus. No. 12 and 13 lingular nodes were also removed and free from tumor. Then we created a plane between pulmonary parenchyma and the artery and dissected the fissure and ligated the artery.

After vascular division, the segmental bronchus was identified. After clamping the bronchus and inflating the lung, we marked the margin of the segment. Then the lingular bronchus was divided using a scissor. Segmentectomy was performed according to the margin. We placed interrupted sutures to close the stump. Bronchus margin was negative. Nodes from level 5 were removed and negative from cancer. The specimen was examined but the pulmonary parenchyma margin was too close to the lesion. Therefore, we decided to continue the procedure of upper lobectomy. Mediastinal lymph node dissection was performed as well. A 24-F chest tube was placed and the wounds were closed (*Figure 1*).

Discussion

Benign lymphadenopathy, such as fibrocalcified lymph nodes attached to the major pulmonary vessels and bronchus, may pose a threat to safety of surgery. Calcified lymph node was showed to be the major cause of conversion during VATS lobectomy (2), which was quite often encountered among patients from rural area or patients with previous history of lung infection diseases, such as tuberculosis or fungi infection.

A thorough evaluation of lymphadenopathy around hilar and interlobar area is effective to prevent uncontrolled bleeding or unexpected conversion during VATS surgery. In our experience, the initial process started from gentle exposure or mobilizing the branches of PA and vein. In most cases, calcified lymph nodes are not fixed with the vein. Only in rare situation, the posterior side of the superior pulmonary vein and the cranial side of the inferior pulmonary vein may densely adhere to adjacent bronchus. However, benign lymphadenopathy quite commonly affects the main stem or the branches of the PA, which may cause conversion or even more complicated surgery, such as partial resection of the artery (3).

For concern of patients' safety, planned conversion may be effective in hilar node anthracofibrosis. About 25% to 41% of conversions were due to hilar nodal anthracofibrosis and hilar adhesions, and were associated with increased operative time and length of stay (4). It was reported that calcification score was the only predictor of conversion to open thoracotomy (5).

In this case, most enlarged nodes were located around the branches of the PA and fissure was not well developed. We planned to develop a plane between PA and lung parenchyma and transecting lung parenchyma could

facilitate exposure. We conducted dissection from hilar nodes (No. 10) and interlobar nodes (No. 11). Combination of blunt and sharp dissection may help to free the node from artery wall and therefore exposure of artery would be easier.

In some cases, lymphadenopathy is quite severe between the truncus anterior of the PA and the bronchus, we preferred to ligate the truncus anterior of the left PA after all other structures are transected, because mobilization along the upper border of the bronchus may be safer.

In rare situation, calcified node infiltrates to vascular wall, which may increase the risk of massive bleeding. Another way to prevent bleeding is to clamp the main trunk of the left PA before dissection. Above two procedures depends on the surgeon's preference and expertise.

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None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Informed Consent: Written informed consent was obtained

from the patient. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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