

Video-assisted thoracic surgery left upper lobectomy with systematic lymphadenectomy

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Abstract: A 43-year-old man was referred to our hospital after chest computed tomography revealed a 2.5-cm mixed ground-glass opacity peripherally in the left upper lobe of the lung. No metastasis or contraindication for surgery was found. Video-assisted thoracic surgery (VATS) left upper lobectomy was performed, and analysis of the intraoperative frozen section confirmed the diagnosis of adenocarcinoma. Subsequently, systematic lymphadenectomy was performed. By using this method, suction and harmonic scalpel were the only two major instruments needed throughout the operation. The use of suction ensures a clear view, and the harmonic scalpel functions as a combined dissector, grasper, and cutter, which helps avoid changing instruments during the surgery and saves time. Moreover, the use of this technique for three-port VATS lobectomy facilitates the conversion into single-port VATS if needed.

Keywords: Video-assisted thoracic surgery (VATS); lobectomy; lung cancer; harmonic scalpel

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Introduction

Over the last two decades, the utility of video-assisted thoracic surgery (VATS) has been greatly expanded, and VATS lobectomy with systematic lymphadenectomy has become the first choice of treatment for early-stage non-small-cell lung carcinoma. Three-port VATS lobectomy, which has now evolved into single-port VATS lobectomy, was once the first choice of treatment in our department. Here, we describe our unique technique for three-port VATS lobectomy, in which suction and harmonic scalpel are the only two major instruments needed. The use of this technique for three-port VATS lobectomy facilitates the conversion into single-port VATS if needed.

Clinical data

A 43-year-old man was referred to our hospital after computed tomography revealed a 2.5-cm mixed ground-glass opacity peripherally in the left upper lobe with

spicular formation during his routine medical examination. No metastasis was found by positron emission tomography/computed tomography or brain magnetic resonance imaging preoperatively. His heart and lung functions were normal, and there was no contraindication for surgery. VATS left upper lobectomy was performed (*Figure 1*), and the intraoperative frozen section confirmed the diagnosis of adenocarcinoma. Subsequently, systematic lymphadenectomy was performed.

Operative techniques

The patient was placed in the lateral decubitus position under general anesthesia with single lung ventilation provided by a double-lumen endotracheal tube. Thoracic epidural anesthesia was used. The surgeon and assistant stood on the dorsal and ventral sides of the patient respectively. Three ports were employed. The first port for the thoracoscope was located at the eighth intercostal



Figure 1 Video-assisted thoracic surgery left upper lobectomy with systematic lymphadenectomy (1).

Available online: <http://www.asvide.com/articles/404>

space (ICS) on the midaxillary line, the second port was positioned on the triangle of auscultation regardless of the ICS, and the third port (3.5-cm long) was positioned on the fifth ICS between the anterior axillary line and midclavicular line.

First, the thoracic cavity was explored. There were no adhesions, pleural effusion, or pleural nodules observed. The lesion was located in the left upper lobe peripherally, with obvious pleural indentation. The posterior part of the oblique fissure was well developed, while the anterior part was not completed. The interlobar pulmonary artery could be seen from the oblique fissure.

The inferior pulmonary ligament was dissected, with the group 9 lymph nodes left at the mediastinum. The mediastinal pleura in front of the hilum was opened using a harmonic scalpel until the left pulmonary trunk was exposed, whereas and the mediastinal pleura behind the hilum was opened until the incision of the anterior mediastinal pleura was exposed. The tissue covering the left pulmonary artery trunk and anterior trunk was dissected. The posterior part of the oblique fissure was dissected to expose the interlobar pulmonary artery trunk and lingual pulmonary artery. A tunnel was made on the surface of the intralobar pulmonary artery, after which the uncompleted oblique fissure was divided by an endoscopic stapler.

Subsequently, the superior pulmonary vein and left upper bronchus were dissected and cut by an endoscopic stapler. All of the pulmonary artery branches of the left upper lobe were dissected and cut together using only an endoscopic stapler. Next, the left upper lobe was placed into

a protective bag and removed from the thoracic cavity for subsequent frozen section examination. Based on the frozen specimen, lung adenocarcinoma with pleural involvement was confirmed, with no involvement of the edge of the bronchus observed.

Further, the group 10 lymph nodes were dissected, and the left phrenic nerve, left vagus nerve, and recurrent nerve were exposed to facilitate the dissection of the group 5 and 6 lymph nodes. The left lower lobe was retracted forward and the left vagus nerve and esophagus were dissociated from the group 7 lymph nodes to expose the bilateral main bronchus. These lymph nodes were dissected from the junction of the inferior pulmonary vein and the right main bronchus to the carina, after which they were dissociated from the left main bronchus and removed. Moreover, the recurrent laryngeal nerve was exposed to facilitate dissection of the group 4 lymph nodes; and, finally, the group 9 lymph nodes were also dissected.

Comments

Suction and harmonic scalpel were the only two major instruments used during the operation, while a cautery was conversely not used. The use of suction ensures a clear view, and the harmonic scalpel functions as a dissector, grasper, as well as a cutter, which helps avoid changing instruments during the surgery and saves time.

If the interlobar pulmonary artery can be easily seen from the fissure, the fissure is cut first; otherwise, the fissure is cut last. The key structures can be exposed more easily after the fissure is cut, and the procedure is subsequently performed in a single direction (anterior to posterior).

In most cases, one of the bronchial arteries is located between the left upper bronchus and the pulmonary artery trunk, and this bronchial artery should be dealt with before the left upper bronchus is cut to avoid bleeding. In this case, the bronchial artery could not be exposed until the left upper bronchus was cut, although the use of a harmonic scalpel with suction could easily treat this kind of bleeding.

Finally, when the fissure is completed and the lingual artery is adjacent to the anterior trunk, the branches of the left upper pulmonary artery can be cut together using an endoscopic stapler. If the branches are located far away from the same line, they can be treated separately. When dissecting the mediastinal lymph nodes, care should be taken to avoid clamping the lymph nodes as much as

possible in order to avoid crushing them.

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