

Uniportal video-assisted thoracic surgery left superior segmentectomy with systematic lymphadenectomy in the semiprone position

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Abstract: A 63-year-old male was referred to our hospital with two existing lesions in bilateral lungs. Computed tomography (CT) showed a 15-mm ground-glass opacity (GGO) in the superior segment of left lower lung (S6) and a 5-mm GGO in the center of the right upper lobe. The preoperative clinical diagnosis was stage I primary lung cancer for the left lesion while the right lesion needed follow-up. Uniportal video-assisted thoracic surgery (VATS) left superior segmentectomy in the semiprone position was performed in this case and the right upper lobe was kept untouched. Frozen section examination confirmed the diagnosis of lung adenocarcinoma, and systematic lymphadenectomy with non-grasping en bloc dissection technique was then performed. A chest tube was placed at the posterior part of the incision through the dorsal thoracic cavity to the apex. The postoperative pathologic diagnosis was minimally invasive adenocarcinoma, staged T1aN0M0.

Keywords: Video-assisted thoracic surgery (VATS); uniportal; segmentectomy; lung cancer; lymphadenectomy

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Introduction

Since when we performed our first uniportal video-assisted thoracic surgery (VATS) lobectomy in semiprone position in May 2014, more than 60 cases were successfully completed in this position. In uniportal VATS lobectomy, semiprone position helps pushing lung and provides more manipulation angles, less workload and better ergonomics for both the surgeon and the assistant. This approach provides more operating space in posterior mediastinum as the lung falls anteriorly with gravity. We also utilized this position in uniportal VATS segmentectomy, especially for superior segmentectomy.

Clinical data

A 63-year-old man was referred to our hospital due to one 5-mm ground-glass opacity (GGO) in the center of the right upper lung and one 15-mm GGO in the superior segment of left lower lung (S6). Two weeks later, the

follow-up computed tomography (CT) revealed change in neither of the lesions. No metastases or contraindications were found in the preoperative evaluation. The clinical diagnosis was stage I primary lung cancer for the left lesion while the right lesion needed follow-up. Uniportal VATS left superior segmentectomy in the semiprone position was performed (*Figure 1*). Intraoperative frozen section examination confirmed lung adenocarcinoma, and systematic lymphadenectomy was then performed.

Operative techniques

The patient was placed in the semiprone position under general anaesthesia, with single-lung ventilation provided by a double-lumen endotracheal tube. A 3.5-cm single incision was employed at the fifth intercostal space between the anterior axillary line and mid-axillary line. A high definition 30-degree 10-mm thoracoscope was placed at the posterior part of the incision after a plastic wound protector was used.



Figure 1 Uniportal video-assisted thoracoscopic surgery left superior segmentectomy with systematic lymphadenectomy in the semiprone position (1).

Available online: <http://www.asvide.com/articles/1106>

A harmonic scalpel, a curved suction device and an endoscopic grasper were the main instruments throughout the operation. Double-joint forceps and an endoscopic linear stapler were also needed. A small gauze grasped with endoscopic grasper was used to push the lung to promote exposure.

The surgeon and the assistant stood at the ventral side of the patient. The surgeon stood caudally, holding the suction with the left hand, and the other operative instrument with the right. The assistant stood cranially, holding the thoracoscope with one hand and the endoscopic grasper with the other.

We commenced the procedure with exploration to find the lesion, locating it in the left superior segment, no metastases in the pleura, and well developed oblique fissure. The oblique fissure was divided with a harmonic scalpel, and the superior pulmonary artery (A6) was exposed. The A6 was closed proximally with two 5-mm vascular clips and then cut with harmonic scalpel. The 13th group lymph nodes were dissected to the distal lung. The posterior mediastinal pleura was opened up in front of the left vagus nerve with harmonic scalpel after the inferior pulmonary ligament was divided with the lung pushed anteriorly. The superior segmental bronchus (B6) was mobilized and then transected with an endoscopic linear stapler. The 13th group lymph nodes was dissected to expose the superior pulmonary vein (V6). The lung was pushed anteriorly to expose the inferior pulmonary vein and confirmed the V6. The V6 was mobilized and then cut with the same way as A6.

The lung was inflated till the S6 was also inflated and

then the left lung was deflated. According to the inflated-deflated line, the intersegmental plane was marked by electrocautery and then divided with multiple endoscopic linear staplers. The resected S6 was retrieved with a specimen bag. The frozen section examination confirmed lung adenocarcinoma and systematic lymphadenectomy was performed.

The lung was pushed anteriorly by the assistant and the 9th group lymph nodes were dissected. The esophagus was separated from the 7th group lymph nodes, which facilitated the exposure of bilateral main bronchus. The 7th group lymph nodes were then dissected en bloc. The 10th and 4th group lymph nodes were dissected sequentially, avoiding inadvertent injury to pulmonary artery, the vagus, or recurrent laryngeal nerves. The lung was pushed posteriorly and the 5th and 6th group lymph nodes were dissected en bloc. A 28-F chest tube was placed at the posterior part of the incision through the posterior thoracic cavity to the apex.

The chest tube was removed on the second day postoperatively, and the patient was discharged uneventfully 2 days later. The postoperative pathologic diagnosis was minimally invasive adenocarcinoma, staged T1aN0M0.

Comments

Since Gonzalez *et al.* reported their first case of uniportal VATS lobectomy (2), this approach has been utilized by many thoracic surgeons worldwide. The patients were all placed in the lateral decubitus position until we began our first case of uniportal VATS lobectomy in the semiprone position (3). Thanks to the better ergonomics in uniportal VATS lobectomy in the semiprone position, we utilized this approach in segmentectomy from June, 2014.

Semiprone position provides more operating space, which facilitates the treatment of the posterior mediastinum. Therefore, for the segments that situate in the posterior part of the lung, such as right S2, right S6, left S1+2, left S1+2+3 and left S6, it is convenient to perform resection in the semiprone position.

In this operation, only four instruments including the endoscope are inserted into the thoracic cavity at the same time, and they rarely interfere with each other because they are all slim. The suction is always working in the thoracic cavity and keeps the clear surgical fields when the dissection is being done.

Avoiding grasping the lung or the lymph nodes

throughout the operation reduces the trauma to the lung, and maintains integrity of the lymph nodes. The lung could be pushed to the appropriate angle by using a curved suction instrument and an endoscopic grasper containing a small gauze.

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None.

Footnote

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

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