

Video-assisted thoracoscopic surgery (VATS) lower lobe bisegmentectomy (S7/8) for a central pulmonary metastasis

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Abstract: Surgery for pulmonary metastasis is performed heterogeneously with regard to surgical approach [open *vs.* video-assisted thoracoscopic surgery (VATS)] and resection techniques (e.g., laser enucleation, electro-cautery resection, stapling). Complete tumor resection and preservation of lung parenchyma are of utmost importance. This is technically challenging, especially for central lesions close to vascular and bronchial segmental structures. Thus, simple thoracoscopic wedge resections are often not feasible. A VATS lower lobe bisegmentectomy (S7/8) was performed on a 62-year-old patient with a suspicious pulmonary nodule and a history of hemicolectomy for colorectal carcinoma. Different VATS techniques of vessel dissection and parenchymal control were applied. VATS anatomic segmental resections represent a helpful tool in surgical therapy of central pulmonary metastasis.

Keywords: Segmentectomy; bisegmentectomy; sublobar resection; pulmonary metastasis

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Introduction

Video-assisted thoracoscopic surgery (VATS) has become a standard procedure for diagnosis and therapy of peripheral pulmonary nodules including pulmonary metastasectomy. In surgery for pulmonary metastases complete resection of all lesions and preservation of lung parenchyma are of utmost importance. Pulmonary metastasectomy is performed heterogeneously not only with regard to the surgical approach (open *vs.* VATS) but also to resection techniques (e.g., laser enucleation, electro-cautery resection, stapling). The minimally invasive surgical approach has been proven to offer advantages with regard to postoperative pain and complications.

Until recently, however, an open approach to pulmonary metastasectomy was favored and regarded as the gold standard by many thoracic surgeons especially for oncologic reasons: allowing for direct, bimanual and thus meticulous palpation of the parenchyma, the chances to detect additional, radiologically not identified nodules were appraised to be significantly higher compared to VATS. Due to constantly improving preoperative imaging

techniques with high resolution computed tomography (CT) combined with an increasing experience in palpating the complete lung via the small thoracocentesis, these concerns have diminished constantly within the last years. Recent studies even show a better long term survival after VATS (1).

Nevertheless, a VATS approach may be combined with technical challenges and limitations, especially in central lesions located close to vascular and bronchial segmental structures. In such cases, “simple” wedge resection bears a high risk of either incomplete tumor resection or bleeding complication due to injury of pulmonary artery (PA) segmental branches. Thus, control of the respective segmental structures may be indicated.

A VATS lower lobe bisegmentectomy (S7/8) was performed on a 62-year-old patient with a suspicious pulmonary nodule and a history of hemicolectomy for colorectal carcinoma (*Figure 1*).

Operative technique

The patient was positioned in the lateral decubitus position.



Figure 1 Video-assisted thoracoscopic surgery (VATS) lower lobe bisegmentectomy (S7/8) for a central pulmonary metastasis (2).

Available online: <http://www.asvide.com/articles/1734>

The operation was conducted under general anesthesia with double-lumen endotracheal intubation. The camera port (10 mm) was placed in the 7th intercostal space of the anterior-axillary line. The utility port (15 mm) was placed in the 4th intercostal space on the left anterior axillary line. The auxiliary port (10 mm) was placed in the 7th intercostal space on the left mid scapular line. A retraction ring was placed in the utility port in order to atraumatically open up the soft tissue and muscle layers to tumor cell spread as well as bleeding by instrument insertion. An anterior approach was applied with the surgeon and the assistant both standing on the patient's ventral side.

Initial exploration of all lobes was performed to rule out anatomic abnormalities and potential additional, radiologically not identified nodules. After takedown of the pulmonary ligament and dissection of the inferior pulmonary vein, the PA was approached in the fissure. Next, the anterior part of the fissure between lingual and anterior lower lobe was completed using a tissular endostapler.

Interlobar PA was dissected more peripherally, thus identifying segmental branch A7/8, which was transected with a vascular long endostapler. This allowed approach to and dissection of the lower lobe bronchus until B7 was identified and transected using a tissular endostapler.

Dissection was then continued along the inferior pulmonary vein to identify its segmental branch V7/8, which was transected with a vascular endostapler.

It was realized that transection of B8 was mandatory to insure clear resection margins of the specimen. After

diathermic release of some peripheral lung parenchyma, segmental-orientated resection was completed using the endostapler. After removal of the specimen a fibrin patch was used for buttressing the dissected parenchyma of the lower lobe in order to prevent air leaks. Ventilation of the left lung proved the remaining lower lobe segments to expand completely.

One 24F chest tube was placed. Total surgery time was 125 min and blood loss was 50 mL. The chest tube was removed on postoperative (PO) day 1. Pathological examination confirmed complete (R0) resection. The patient was discharged on PO day 3.

Discussion

Control of the respective segmental structures is mandatory to achieve complete but nevertheless parenchyma-sparing resection in centrally located metastases. The techniques of VATS anatomic segmentectomy may be suitable also in pulmonary metastasectomy, which—for oncologic reasons—does not require resection of the entire anatomical segment. It thus is not mandatory to control all segmental structures (artery, vein, bronchus) but only those, which prevent safe and complete resection of the respective nodule.

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None.

Footnote

Conflicts of Interest: Dr. Hiebinger was awarded “The Master of Thoracic Surgery” and was granted the Award of Great Potential in the 2016 Masters of Thoracic Surgery—Uniportal VATS Lobectomy & VATS Segmentectomy Video Contest.

Informed Consent: Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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