Surgical Technique

# Left upper lobectomy and pulmonary angioplasty by uniportal video-assisted thoracic surgery

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**Abstract:** Diego Gonzalez-Rivas and his colleagues performed the first case for pulmonary major resection by the uniportal approach in 2010. In the following years, more and more expert surgeons developed the uniportal approach and even applied it to very complex cases. Many centers have showed that uniportal video-assisted thoracic surgery (VATS) lobectomy is a safe and feasible technique. The patient presented here is a complex case: The lingular segmental artery was invaded seriously by the tumor and it was difficult to divide it freely, and the pulmonary artery plasty was needed. Although this condition made the procedure some technically challenging, the case was performed successfully without any operative complications.

**Keywords:** Uniportal video-assisted thoracic surgery (VATS); lobectomy; pulmonary angioplasty

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## Introduction

Since the uniportal video-assisted thoracic surgery (VATS) lobectomy was reported firstly by Diego Gonzalez-Rivas in 2011, the technique has been spreading over the world. Many hospitals have successfully adopted the technique (1). The Shanghai Pulmonary hospital has taken the technique as a standard approach of VATS for lobectomy and performs uniportal VATS lobectomy more than 2,000 cases (2). The single-port approach has the same prognostic outcomes as conventional VATS has, but less trauma and shorter stay time in hospital than multiple-port approach. Up to date, many complex thoracic surgery, such as segmentectomy, pneumonectomy, sleeve lobectomy, were reported performed by this technique (3-7). Uniportal VATS lobectomy and pulmonary angioplasty was described rarely in literature. We performed smoothly this operation for a patient with central lung carcinoma by the technique last month and describe the technique (*Figure 1*).

## Surgical technique

A 78 years old man was admitted for uniportal VATS. Computed tomography (CT) scan revealed two masses in the left upper lobe (LUL), one central tumor of 2.5 cm diameter close to the pulmonary artery and one peripheral nodule of 1 cm diameter with spicule sign. Bronchoscope showed a neoplasm locating in the start of lingular segmental bronchus and the pathology showed a high differentiated squamous carcinoma.

The patient was placed in a right lateral decubitus position. A single 3.4 cm incision was made in the fifth intercostal space with no rib spreading. The camera was placed in the posterior portion of the incision at most time and the instruments inserted parallel to the camera. Firstly, the left upper pulmonary vein was divided and stapled. Secondly, the dissection continued with the anterior and apical artery which was stapled by a vascular endostapler. Thirdly, the LUL bronchus was divided carefully and stapled. Fourthly, the pulmonary artery trunk was blocked up with a tie for the sake of safety. After that, pulmonary angioplasty was fulfilled by a vascular stapler carefully, which was technically challenging because of the tumor invasion. The LUL was removed through the port. The LUL bronchus margin was cut out for frozen section. No. 5, 6, 9, 7, 10, 4 station lymph nodes were dissected out in turn. At last, Air leak was ruled


**Figure 1** Left upper lobectomy and pulmonary angioplasty by uniportal VATS (8).
Available online: http://www.asvide.com/articles/1725

out with a water test upon insufflation. The whole procedure took 135 mins with 90 mL bleeding.

## Comments

Pulmonary angioplasty is a troublesome and challenging job. In the past, pulmonary angioplasty was performed usually through open thoracotomy. Nowadays the technique can be performed through minimally invasive technology (9,10). Xu *et al.* (9) reported their technique about pulmonary angioplasty through multiportal VATS.

Here we introduce a case with the lingular segmental artery invaded by tumor, and pulmonary angioplasty was performed by a stapler through uniportal VATS. The key point of the operation are following: (I) as the lingular segmental artery was invaded by tumor, the artery should be dealt with finally; (II) the pulmonary trunk need be blocked off by thoracoscopic blocking clamp or thread; (III) the tiny vessel might be ligated by sutures and cut by ultrasound knife; (IV) the vessels or bronchus should be dissected and exposed fully in order to insert a stapler easily; (V) the left lobectomy , incision should be located little to back in fifth intercostal space so as to manipulate easily both in hilar and subcarinal part; (VI) the camera is placed in the posterior portion of incision at most time, but not invariable; (VII) lymphadenectomy, it is difficult to dissect the subcarinal lymph nodes for very deep location. We suggest that the posterior mediastinum space should be opened as far as possible; (VIII) retracting the lower lobe bronchus by little spin, to dissect the space between the subcarinal nodes and esophagus until seeing the right main bronchus; (IX) electrocautery and Harmonic might be used to dissect in turn, and the subcarinal lymph nodes would be dissected out in en bloc; (X) the recurrent laryngeal nerve should be protected carefully in the dissection of No.4 station nodes.

Most of the articles published about complex reconstruction by uniportal VATS belong to the team from the Coruña University Hospital (3-7), and more experiences from multiple medical centers are needed in the future.

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## Footnote

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

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

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