Surgical Technique

# Uniportal video-assisted thoracoscopic left upper lobectomy under spontaneous ventilation

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**Abstract:** Intubated general anesthesia with one-lung ventilation was traditionally considered necessary for thoracoscopic major pulmonary resections. However, non-intubated thoracoscopic lobectomy can be performed by using conventional and uniportal video-assisted thoracoscopic surgery (VATS). These non-intubated procedures try to minimize the adverse effects of tracheal intubation and general anesthesia but these procedures must only be performed by experienced anesthesiologists and skilled thoracoscopic surgeons. Here we present a video of a uniportal VATS left upper lobectomy in a non-intubated patient, maintaining the spontaneous ventilation.

**Keywords:** Non-intubated patient; single-port video-assisted thoracoscopic surgery (VATS); awake surgery; lobectomy; uniportal; spontaneous ventilation

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Intubated general anesthesia with one-lung ventilation was traditionally considered necessary for thoracoscopic major pulmonary resections. However, non-intubated thoracoscopic lobectomy can be performed by using conventional and uniportal video-assisted thoracoscopic surgery (VATS). Here we present a video of a uniportal VATS left upper lobectomy in a non-intubated patient.

A 73-year-old female, non-smoker, was admitted to our department for surgery. A control CT scan revealed a mass in the left upper lobe. The patient was proposed for non-intubated VATS surgery. A facial mask was used to have control of the airway. Propofol and continued perfusion of remifentanil were administered for sedation. No epidural catheter was placed. The skin and the intercostal space were infiltrated with levobupivacaine. A 3-cm incision was made in the 5$^{th}$ intercostal space. A 3-cm adenocarcinoma was detected in the left upper lobe so a left upper lobectomy and lymph node dissection was performed. The total surgical time was 90 minutes (*Figure 1*).

The patient was sent to a recovery room for 1 hour and then to the ward. The patient was discharged home on the second postoperative day with excellent recovery. The final pathological result revealed a 3.5-cm adenocarcinoma with no lymph node involvement.

## Discussion

The first non-intubated VATS for lobectomy was initially described in 2007 (2). Since then, only three groups have published major pulmonary resections by VATS in non-intubated patients (3-5).

The non-intubated procedures try to minimize the adverse effects of tracheal intubation and general anesthesia such as intubation-related airway trauma (6), ventilation-induced lung injury, residual neuromuscular blockade (7) and postoperative nausea and vomiting. Avoidance of general anesthesia also results in a faster recovery with immediate return to daily life activities.

We consider this procedure feasible for selected patients with no difficulties for intubation, with no obesity and good cardiopulmonary function. In addition, this surgery should only be performed by experienced anesthesiologists and


**Figure 1** Uniportal VATS left upper lobectomy under spontaneous ventilation (1).
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thoracoscopic surgeons (preferably skilled and experienced with complex or advanced cases and bleeding control through VATS).

In this video we show the technique for lobectomy by using a 3 cm single incision approach with no intubation, no vagus blockade, no central vein, no epidural and no urinary catheter. The future of the thoracic surgery is to reduce the surgical and anesthetic trauma. The combination of nonintubated or awake thoracoscopic surgery and the single-port VATS probably represents the least invasive procedure for pulmonary resections. Thanks to avoidance of intubation, mechanical ventilation and muscle relaxants, the anesthetic side effects are minimal allowing to most of the patients to be included in a fast protocol avoiding the stay in an intensive care unit.

The success in performing lobectomies by a single incision approach in non-intubated patients is a result of skills and experience accumulated over time by performing many uniportal VATS surgeries (8,9).

In conclusion, uniportal video-assisted thoracoscopic lobectomy in patients under spontaneous ventilation is a feasible and a safe procedure in expert hands. It represents a good option for high risk patients for intubated general anesthesia such as elderly patients. This procedure should only be performed by experienced anesthesiologists and skilled single-port thoracoscopic surgeons.

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## References

1. Gonzalez-Rivas D, Fernandez R, de la Torre M, et al. Uniportal VATS left upper lobectomy under spontaneous ventilation. Asvide 2015;2:012. Available online: http://www.asvide.com/articles/468
2. Al-Abdullatief M, Wahood A, Al-Shirawi N, et al. Awake anaesthesia for major thoracic surgical procedures: an observational study. Eur J Cardiothorac Surg 2007;32:346-50.
3. Hung MH, Hsu HH, Chan KC, et al. Non-intubated thoracoscopic surgery using internal intercostal nerve block, vagal block and targeted sedation. Eur J Cardiothorac Surg 2014;46:620-5.
4. Dong Q, Liang L, Li Y, et al. Anesthesia with nontracheal intubation in thoracic surgery. J Thorac Dis 2012;4:126-30.
5. Gonzalez-Rivas D, Fernandez R, de la Torre M, et al. Single-port thoracoscopic lobectomy in a nonintubated patient: the least invasive procedure for major lung resection? Interact Cardiovasc Thorac Surg 2014;19:552-5.
6. Fitzmaurice BG, Brodsky JB. Airway rupture from double-lumen tubes. J Cardiothorac Vasc Anesth 1999;13:322-9.
7. Murphy GS, Szokol JW, Marymont JH, et al. Residual neuromuscular blockade and critical respiratory events in the postanesthesia care unit. Anesth Analg 2008;107:130-7.
8. Gonzalez-Rivas D, Paradela M, Fernandez R, et al. Uniportal video-assisted thoracoscopic lobectomy: two years of experience. Ann Thorac Surg 2013;95:426-32.
9. Gonzalez-Rivas D, Fieira E, Delgado M, et al. Uniportal video-assisted thoracoscopic lobectomy. J Thorac Dis 2013;5 Suppl 3:S234-45.

 