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Intrathoracic vertical overhanging approach for placement of an endo-stapler during single-port video-assisted thoracoscopic lobectomy†

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Abstract

Single-port video-assisted thoracoscopic lobectomy is still difficult for most thoracic surgeons. Placement of an endo-stapler is one of the key issues when handling the bronchus or pulmonary vessels through one incision, especially if it would interfere with the traction belt. Therefore, we developed a novel method with an intrathoracic vertical overhanging approach to make the placement of the endo-stapler easier during single-port video-assisted thoracoscopic surgery lobectomy, and share our experience in this paper.

Keywords: Single port • Video-assisted thoracoscopic surgery • Lobectomy

INTRODUCTION

Thoracoscopic surgery is currently experiencing an evolution from traditional multiple incisions to a single incision. Single-port video-assisted thoracoscopic surgery (SP-VATS) has been proven to result in reduced duration of hospital stay, postoperative pain and residual paraesthesia and better cosmesis [1, 2]. However, SP-VATS lobectomy is still difficult for most thoracic surgeons, because there are still some unsolved problems associated with SP-VATS lobectomy. One problem is that placement of the endo-stapler is not easy when handling the bronchus or pulmonary vessels, because of collision between surgical instruments in the single port. To reduce the difficulty with placing the endo-stapler, we developed a technique with an intrathoracic vertical overhanging approach.

SURGICAL TECHNIQUE

The patient is placed in a lateral decubitus position and a 4-cm incision is made in the fourth (for cases with target lesions located in the upper, middle lobes) or fifth (for cases with target lesions located in the lower lobes) intercostal space between the anterior axillary line and the mid-axillary line. Both the surgeon and the thoracoscope assistant stand at the anterior side of the patient. A 5-mm 30° thoracoscope and related instruments are used through the incision throughout the surgery. The surgical approach is mostly based on the same principles as in the single-direction thoracoscopic lobectomy, which was published previously by us [3]. The target vessels and bronchi are dissected by alternative use of the electrocoagulation hook and the harmonic scalpel. Then, a traction belt is used to entwine the target pulmonary vessels or bronchus and a right-angle forceps is inserted to clamp the belt to facilitate the overhanging of the targeted pulmonary vessel or bronchus vertically (Fig. 2A and D). Then an endo-stapler is inserted and placed appropriately by changing the traction angle in real time (Figs. 1 and 2B, E). Finally, the traction belt is removed, and the targeted bronchus or pulmonary vessel is divided using the endo-stapler (Fig. 2C and F). For small pulmonary vessels, we ligate them directly with either silk sutures or hem-o-loks. Then the fissures are completed using the endo-stapler. The specimen is retrieved via a self-made protective bag using rubber gloves. At last, systemic mediastinal lymph node dissection is performed for every lung cancer patient.

This novel technique is appropriate for most SP-VATS lobectomies when dealing with the same situation, even though only the left lower lobe was demonstrated here.

DISCUSSION

In 2011, Gonzalez-Rivas *et al.* described their initial experience of SP-VATS lobectomy [4]. Nowadays, SP-VATS covers almost all kinds of mainstream operations for lung disease, from single lobectomy to double sleeve (vascular and bronchial) lobectomy [5].

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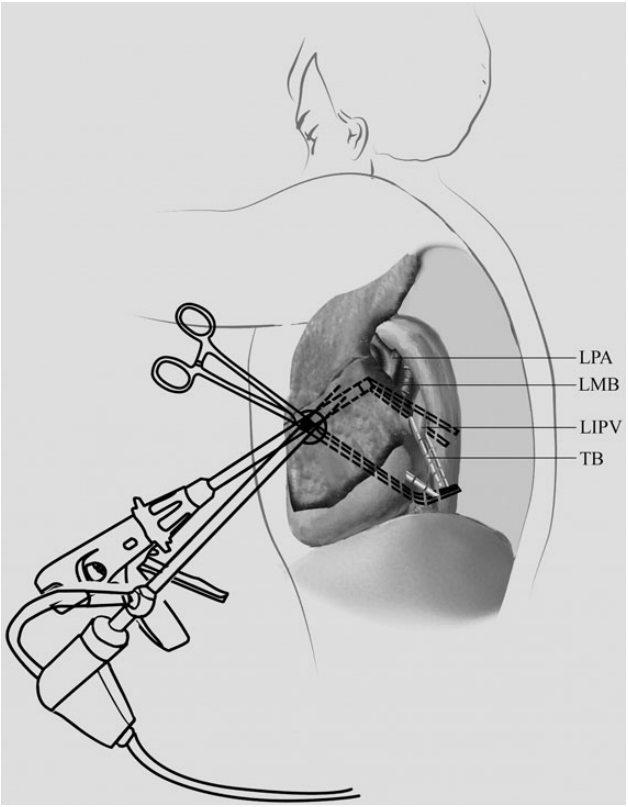

Figure 1: Schematic diagram showing the intrathoracic vertical overhanging approach that was applied to handle the left inferior pulmonary vein. LPA: left pulmonary artery; LMB: left main bronchus; LIPV: left inferior pulmonary vein; TB: traction belt.

Placement of the endo-stapler is relatively difficult in SP-VATS lobectomy compared with the traditional multiportal approach. To solve this problem, some companies have invented specific staplers, such as the articulated stapler and so on. Indeed, these novel instruments can render the procedure easier to perform. Despite practice with many such cases, there are still problems. The articulated stapler is hard to fit every patient's anatomical situation; different surgical procedures and the intraoperative conditions also need different and changeable angles in real time. Our technique could solve the problems in part by achieving better angulation.

We have performed SP-VATS lobectomy since August 2013. In the early stage, the traction belt was pulled out of the thoracic cavity from the incision, but the traction belt and the endo-stapler always interfered with each other because the endo-stapler went into the same plane of the traction belt. Then we moved the traction fulcrum into the thoracic cavity and gradually developed the new method as described here. It facilitated the endo-stapler to go through the target vessels or bronchus by adjusting the overhanging plane, which avoiding the interference from the traction belt and afforded better visualization of vital hilar structures to be dissected.

Yang *et al.* used a Foley catheter to guide the endo-stapler to the right position [6]. Both Yang's and our methods chose to change the surgical approach without employing a novel instrument.

We have used this technique to perform SP-VATS lobectomies in 40 cases. All the patients followed showed good intraoperative and postoperative results. The present technique is convenient and feasible, and eases the operational difficulty of SP-VATS lobectomy by achieving better angulation.

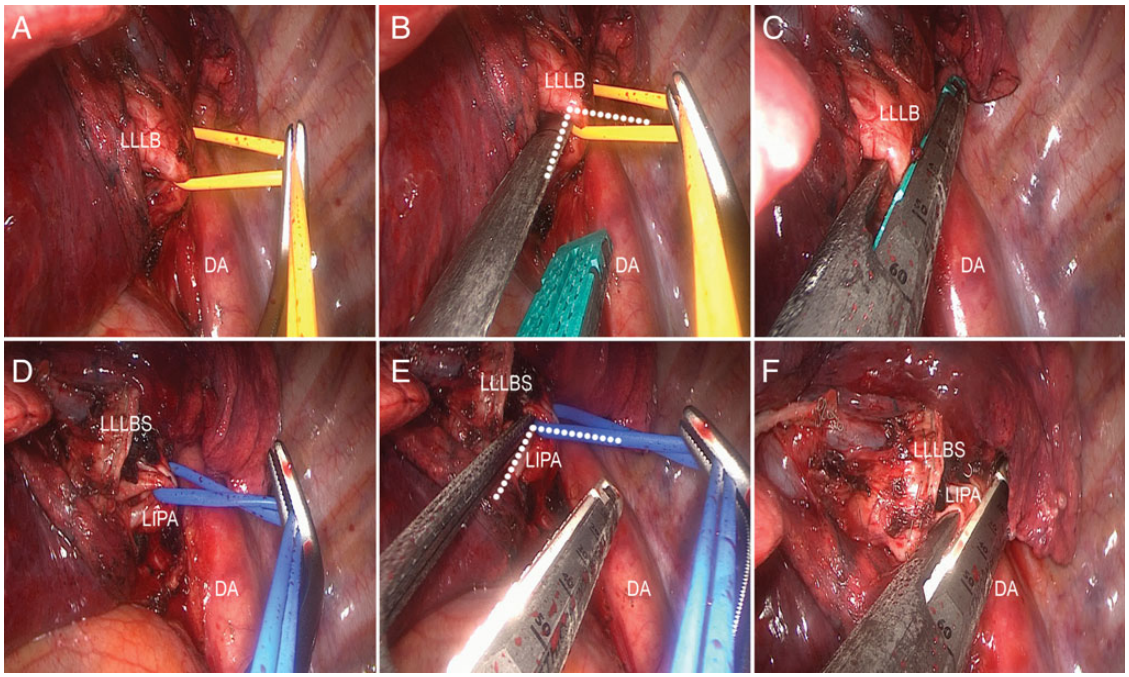

Figure 2: The intraoperative photos showing the technique. (**A** and **D**) Placement of the traction belt and the overhanging of the left lower lobar bronchus or inferior pulmonary artery vertically using a right-angle clamp; (**B** and **E**) placement of the stapler; (**C** and **F**) removing the traction belt and using the stapler. LLLB: left lower lobar bronchus; LLLBS: left lower lobar bronchial stump; DA: descending aorta; LIPA: left inferior pulmonary artery.

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Conflict of interest: none declared.

REFERENCES

[1] Son BS, Park JM, Seok JP, Kim do H. Modified incision and closure techniques for single-incision thoracoscopic lobectomy. Ann Thorac Surg 2015; 99:349–51.

[2] Lee SK, Son BS, Ahn HY, Kim DH. Single-incision thoracoscopic surgery using an anchoring suture of the lung parenchyma for two-directional traction. Ann Thorac Surg 2014;97:E89–91.

[3] Liu L, Che G, Pu Q, Ma L, Wu Y, Kan Q *et al*. A new concept of endoscopic lung cancer resection: single-direction thoracoscopic lobectomy. Surg Oncol 2010;19:E71–7.

[4] Gonzalez D, Paradela M, Garcia J, Dela Torre M. Single-port video-assisted thoracoscopic lobectomy. Interact CardioVasc Thorac Surg 2011; 12:514–5.

[5] Gonzalez-Rivas D, Delgado M, Fieira E, Fernandez R. Double sleeve uniportal video-assisted thoracoscopic lobectomy for non-small cell lung cancer. Ann Cardiothorac Surg 2014;3:E2.

[6] Yang Y, Bao F, He Z, Hu J. Single-port video-assisted thoracoscopic right upper lobectomy using a flexible videoscope. Eur J Cardiothorac Surg 2014; 46:496–7.

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