



Non-grasping *en bloc* mediastinal lymphadenectomy in video-assisted thoracoscopic lobectomy for lung cancer

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Video-assisted thoracoscopic surgery (VATS) lobectomy has been developed as a minimally invasive surgery since it was first reported in 1992 (1). The feasibility, safety, efficacy, and oncologic equivalence of VATS lobectomy have been investigated in numerous studies including randomized controlled trials. Although there remain some controversies in VATS lobectomy with mediastinal lymphadenectomy (2-4), it is widely performed, and National Comprehensive Cancer Network (NCCN) guidelines for non-small cell lung cancer (NSCLC) and the American College of Chest Physicians (ACCP) guidelines recommend VATS lobectomy for the treatment of early stage lung cancers (5,6).

Many surgical techniques for VATS lobectomy with mediastinal lymphadenectomy have been developed with different energy devices that included cautery hook, ultrasonic scalpel (US), and bipolar sealing devices. In 2015, Liu *et al.* proposed an optimized method named “non-grasping *en bloc* mediastinal node dissection” for VATS lung cancer surgery (7). They first introduced this surgical technique into tri-portal VATS lung cancer surgery. During mediastinal lymphadenectomy, target lymph nodes were exposed following non-grasping strategy with simple combination of a metal endoscopic suction and an electrocoagulation hook or an US. Their surgical outcomes seemed equivalent to a comparable dissection through a thoracotomy in the hands of an experienced thoracoscopic surgeon (8) as postoperative morbidity and mortality were 17.4% and 0.5%, respectively, and the total number of lymph nodes (N1 + N2) was 16.0 ± 5.9 (range of 5–52), while the number of N2 LNs was 9.5 ± 4.0 (range of 3–23) (7).

In 2016, Liu *et al.* applied their “non-grasping *en bloc* mediastinal node dissection” technique to uniportal VATS lung cancer surgery (9). In this study, two main instruments (suction and energy devices) were developed with diversified use, and only the two instruments were used during mediastinal lymphadenectomy following the strategy of “non-grasping” (9).

In the July 2017 issue of the *Journal of Thoracic Disease*, Ma Lin, Liu C, *et al.* showed a video of their “non-grasping *en bloc* mediastinal node dissection” technique for the right side in a three incisions approach (10). In their technique, the process of mediastinal lymphadenectomy is stylized and the boundary of *en bloc* is clearly defined. As the authors commented, following the standardized steps and skeletonizing the surrounding landmarks are the key points to safely perform *en bloc* mediastinal lymphadenectomy. They also proposed that “hollow out” and “flip over” the block are the important maneuver of *en bloc* dissection (10). In addition, proper use of surgical instruments appears to be important to safely and adequately perform mediastinal lymphadenectomy. In their techniques, an endoscopic suction plays an important role in making proper surgical field as a multifunctional retractor. On the other hand, lateral thermal damage may be the potential risk to using US in *en bloc* dissection. A previous study using the tongue tissue of rabbits compared the increase in tissue temperature and the thermal histological effects of US, bipolar and unipolar electrosurgery incisions, and reported that bipolar cautery causes the least temperature rise and thermal tissue damage in the peripheral tissues, whereas the US method

gives way to the highest temperature rise and the largest tissue damage (11). Because the non-grasping technique does not grasp fat tissues containing lymph nodes to be dissected, it would be sometimes difficult to make sufficient counter traction to avoid thermal injury by the US to lymph nodes or surrounding tissues. However, this concern may be redundant. Kondo, *et al.* investigated the relationship between tissue tension and thermal diffusion to peripheral tissues caused by the use of an electric scalpel, US, or a bipolar sealing system, using a pig mesentery model. They reported that the tissue tension was inversely correlated with the thermal diffusion area with the electric scalpel and bipolar sealing system, whereas thermal diffusion with a US is less likely to affect tissue tension (12). Future studies are needed to investigate whether the thermal tissue damage in lymph nodes caused by a US may affect oncological outcomes of lung cancer patients undergoing VATS lobectomy.

Although the “non-grasping *en bloc* mediastinal node dissection” technique seems feasible in the three reports by Liu C *et al*, whether this surgical technique can be easily performed by other surgical teams is unclear, and the oncological feasibility with long-term outcomes needs to be investigated in multicenter studies. In addition, it is important to improve our surgical techniques with the proper use of surgical instruments that will be improved and newly developed in the future.

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Footnote

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

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