



Thoracoscopic Mediastinal Lymph Node Dissection for Lung Cancer

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In lung cancer, mediastinum lymphatic spread occurs. We review our technique and experience of thoracoscopic mediastinal lymphnode dissection (MLND). Between 1997 and 2011, 992 patients with primary lung cancer underwent thoracoscopic major pulmonary resection with MLND. Initially we used a combination of electrocautery and clips to divide blood vessels and lymphatic channels; our current technique relies on a vessel sealing system (VSS) which is expeditious and leads to less lymphorrhea. Furthermore, dissection of station 7 nodes is performed after each main bronchus or right intermediate bronchus is taped with a 0 silk suture, which is then brought out of the thorax through the access incision for antero-lateral retraction of the tracheal carina. We dissect between 3 and 4 N2 lymph node stations and a total of approximately 20 N2 lymph nodes. Postoperative complications related to MLND occurred in 35 of 992 patients (3.5%), 15 (1.5%) for recurrent laryngeal nerve injury, 3 (0.3%) for bilateral vagal injury, 14 (1.4%) for chylothorax and 3 (0.3%) for airway injury. However, none were lethal. Thoracoscopic mediastinal dissection is safe and feasible in treating lung cancer. We believe our technique and VSS are very useful for thoracoscopic MLND.

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Mediastinal lymph node staging is an integral component of the assessment and management of patients with non-small cell lung cancer (NSCLC) and is necessary to achieve complete resection. Thoracoscopic mediastinal lymph node dissection (MLND) is not necessarily difficult or inferior to MLND performed through thoracotomy, when nodes are not densely adherent to mediastinal great vessels and organs. Proper thoracoscopic operative technique, coupled with magnified view and easy operability in narrow spaces, makes for easy and safe minimally invasive MLND. Our previous reports on thoracoscopic MLND revealed no difference in the number of dissected nodes between thoracoscopic and open approaches.^{1,2} Initially we used a combination of electrocautery and clips to divide blood ves-

sels and lymphatic channels; our current technique relies on a vessel sealing system (VSS) (LigaSure V, Dolphin chip; Covidien, Mansfield, MA), which is expeditious and leads to less lymphorrhea. We hereby describe our updated techniques and opinions on thoracoscopic MLND for NSCLC.

TECHNIQUE

Port Placement

We routinely use 2 ports and 1 access incision, as described in Table 1 and Fig. 1.

Table 1. Port Placement for Thoracoscopic MLND

Port	Size (mm)	Intercostal Space	Anatomic Line
1. Camera	12.5	6	AAL
2. Dissector/ forceps	12.5	7	PAL
Access incision	30-40	4	AAL

For dissection of lower mediastinal lymph nodes, the camera and dissector can be switched (camera in posterior port [#2]).

AAL, anterior axillary line; PAL, posterior axillary line.

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Figure 1. Two ports and an access incision for right-sided thoracoscopic MLND. (Color version of figure is available online at <http://www.semthorcardiovascsurg.com>.)

2 R and 4 R

The parietal pleura overlying the level 2R/4R area is longitudinally divided between the azygos vein and right brachiocephalic artery by using electrocautery (or VSS). We do not usually divide the azygos

vein. The soft tissue and lymph nodes are dissected en bloc along the anterolateral side of the thoracic trachea just below the caudal edge of the right brachiocephalic artery, while the right vagus nerve is retracted backward with a peanut dissector (inserted through port 2; Fig. 2A). The vagus nerve and azygos vein are sometimes taped and retracted posterolaterally with a silk suture if necessary. For this procedure, an ENDO CLOSE (United States Surgical Corp, Norwalk, CT) is used to easily extract the sutures out of the thorax through a small puncture hole. The nodal block is then dissected along the posterior wall of the superior vena cava, which is retracted anteriorly with a peanut dissector (Fig. 2B). Finally, the nodal packet is passed through under the azygos vein (Fig. 2C) and removed via the utility incision (Fig. 2D).

7 (Right)

Dissection of station 7 nodes is performed after the right main bronchus or right intermediate bronchus is taped with a 0 silk suture, which is then brought out of the thorax through the access incision for retraction. Therefore, the carina is pulled into the operative field, clearly exposing the left main bronchus. It is very important that insertion of curved

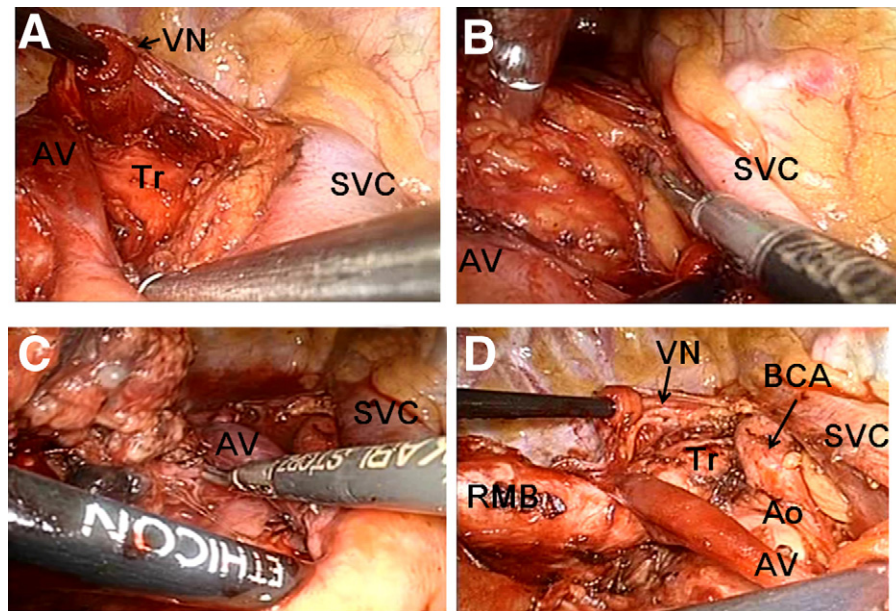


Figure 2. Dissection of stations 2R and 4R. Right vagus nerve is retracted backward with a peanut dissector. Soft tissues with nodes are dissected along the anterolateral side of the thoracic trachea (A). Soft tissues with nodes are dissected along the posterior wall of the superior vena cava (SVC) (B). At this time, the SVC is retracted frontward with peanut dissector (B). The nodal packet is passed through underneath the azygos vein (AV) (C) and removed via the utility incision (D). VN, vagus nerve; Tr, trachea; Ao, ascending aorta; BCA, brachiocephalic artery; RMB, right main bronchus. (Color version of figure is available online at <http://www.semthorcardiovascsurg.com>.)

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