

# Mediastinal Staging Endosonographic Ultrasound Lymph Node Biopsy or Mediastinoscopy



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## KEYWORDS

- Mediastinoscopy • Endoscopic lung cancer staging • Combined EBUS-EUS • Lung cancer staging
- Endobronchial ultrasound (EBUS) • Endoscopic ultrasound (EUS)
- Endosonographic lung cancer staging

## KEY POINTS

- Staging is indicated in all central tumors, peripheral tumors larger than 3 cm, computed tomography (CT) scan showing lymph nodes larger than 1 cm, N1 lymph node involvement on PET, and PET positivity (standardized uptake value [SUV] >2) even if lymph node size less than 1 cm.
- Certain situations mandate nodal staging in the setting of normal PET and CT scans in the mediastinum. These situations include; central tumors, positive N1 nodes on CT and if there is low fludeoxyglucose uptake (SUV <2) in the primary tumor.
- The negative predictive value of combined endobronchial ultrasound (EBUS)–endoscopic ultrasound (EUS) is higher compared with standard mediastinoscopy. In comparison with conventional mediastinoscopy, endosonographic staging is less invasive and is carried out as an outpatient day case under conscious sedation, with considerable cost savings and also well tolerated by patients.
- Conventional mediastinoscopy is no longer the gold standard, and it is the end of the era of a traditional gold standard test.
- When compared with traditional mediastinoscopy, the ability of the combined EBUS-EUS technique to sample multiple stations and distant metastases, including structures below the diaphragm, with higher sensitivity and negative predictive value makes it a new gold standard in staging non–small cell lung cancer when performed by an experienced operator.

## INTRODUCTION

Precise staging of the mediastinum is vital in determining the appropriate treatment plan in patients with potentially operable non–small cell lung cancer. Testing with invasive, minimally invasive, or noninvasive tests can prevent surgery and pulmonary resection in patients with advanced, benign,

or medically treated diseases. Computed tomography (CT) and PET-CT scans have improved radiological staging of lung cancer; however, these techniques cannot provide definitive tissue diagnosis and are associated with high false-positive rates and low sensitivities and specificities.<sup>1–9</sup> Therefore, it is very important to confirm

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a positive N2 or N3 lymph node on PET-CT scan with a definitive tissue diagnosis. In this article, the authors discuss the current controversy between surgical and endosonographic mediastinal staging and the reasons why the authors think combined endosonographic lymph node staging should be the new gold standard in staging non-small cell lung cancer.

### WHY DO WE STAGE IN NON-SMALL CELL LUNG CANCER?

Stage dictates therapy in non-small cell lung cancer. Staging helps to identify N2/N3 lymph nodes and distant metastases and thereby prevents futile thoracotomies/video-assisted thoracoscopic surgery (VATS). Staging is also important in certain circumstances in order to identify N1 lymph node metastases in candidates with poor lung function before planning stereotactic radiosurgery or sublobar resection.

### IN WHOM DO WE INVASIVELY STAGE THE MEDIASTINUM IN NON-SMALL CELL LUNG CANCER?

According to the current guidelines from the American College of Chest Physicians (ACCP), National Comprehensive Cancer Network, European Respiratory Society, and European Society of Thoracic Surgeons (ESTS), staging is indicated in all central tumors, peripheral tumors larger than 3 cm, CT scans showing lymph nodes larger than 1 cm, N1 lymph node involvement on PET, and PET positivity (standardized uptake value [SUV] >2) even if lymph node size is less than 1 cm. Certain situations mandate nodal staging in the setting of normal PET and CT scans in the mediastinum. These situations include central tumors, positive N1 nodes on CT, and if there is low fludeoxyglucose (FDG) uptake (SUV <2) in the primary tumor.

### WHO DOES NOT NEED INVASIVE MEDIASTINAL STAGING IN NON-SMALL CELL LUNG CANCER?

Patients with peripheral tumor size less than 3 cm (T1a-T1b) with no lymph node involvement on CT and no or low SUV (<2) uptake of the lymph node on PET scan do not need invasive mediastinal staging.

### WHAT IS AN IDEAL GOLD STANDARD TEST IN STAGING LUNG CANCER?

The test should be able to get tissue diagnosis from most lymph nodes and metastases. It should

have a high sensitivity, specificity, accuracy, and negative predictive value. The complication rate should be low. It should be safe and cost-effective.

The traditional gold standard test in mediastinal lymph node staging has been cervical mediastinoscopy. The authors now discuss the reasons as to why mediastinoscopy may no longer be the gold standard for invasive mediastinal staging and why it is time to put an end to the era of a traditional gold standard surgical procedure.

### ENDOSONOGRAPHIC ULTRASOUND (COMBINED ENDOBRONCHIAL ULTRASOUND-ENDOSCOPIC ULTRASOUND), LYMPH NODE BIOPSY, OR MEDIASTINOSCOPY?

#### *Lymph Node Access, Sensitivity, Accuracy, and Negative Predictive Value*

Standard mediastinoscopy allows access to stations 2R, 2L, 4R, 4L, 7, 10R, and 10L (Fig. 1, Table 1). Access to posterior and inferior mediastinum is limited. Sensitivity of mediastinoscopy has been reported to be between 79% and 93% with a false-negative rate of 8% to 11%.<sup>10-12</sup> Standard mediastinoscopy can access the paratracheal and subcarinal lymph node stations but not the paraesophageal, inferior pulmonary ligament,<sup>8,9</sup> and aortopulmonary (AP) window and para-aortic<sup>5,6</sup> lymph node stations. In addition, the lower aspect of the subcarinal

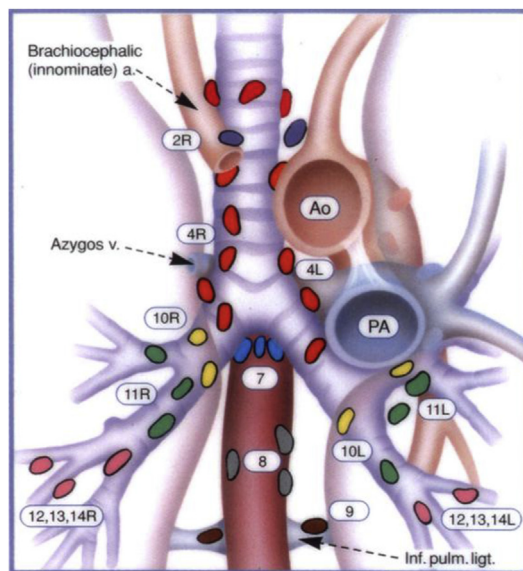


Fig. 1. Lymph node stations. PA, pulmonary artery; AO, aorta; Inf.pulm.ligt, inferior pulmonary ligament; a, artery; v, vein. (Adapted from Mountain CF, Dresler CM. Regional lymph node classification for lung cancer staging. Chest 1997;111:1718-1723. Copyright © 1996 Mountain and Dresler.)

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