

# Diagnostic Yield of Endobronchial Ultrasound-Guided Fine Needle Aspiration (EBUS-FNA) in Lung Cancer Staging, Subtyping and Diagnosis of Unexplained Mediastinal Lymphadenopathy

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## INTRODUCTION

- Lung cancer (LC) is the most commonly diagnosed cancer worldwide and the most frequent cause of cancer death in both men and women in the US (more deaths than the next three most common cancers combined)<sup>1</sup>
- Clinical staging of LC is an integral part of patient care because it directs therapy and has prognostic value
  - Patients are routinely investigated with a conventional workup (medical history, PE, lab tests, bronchoscopy), CT and integrated whole-body PET-CT, followed by mediastinal tissue staging for enlarged or PET-positive intrathoracic nodes<sup>2</sup>
- Mediastinal tissue staging has been classically performed by mediastinoscopy, but they can also be sampled under real-time ultrasound control from the airways (endobronchial ultra-sound guided fine needle aspiration [EBUS-FNA]).
  - Current lung cancer staging guidelines acknowledge endosonography as a minimally invasive alternative to surgical staging to detect nodal disease,<sup>3,4</sup> reducing the need for surgical staging in up to two thirds of patients<sup>5,6</sup>
- The purpose of this study was to evaluate the diagnostic yield of EBUS-FNA for accurate lung cancer staging, subtyping and assessment of mediastinal lymphadenopathy**

## METHODS

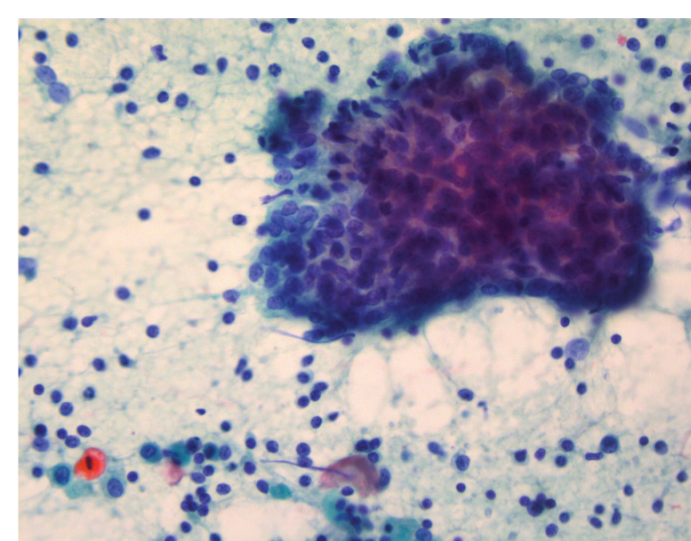
- Retrospective evaluation of 189 mediastinal or hilar lymph node specimens from 99 patients, obtained by EBUS-FNA in the last two years at Thomas Jefferson University Hospital
- Adequacy defined by the presence of malignant cells, granulomatous lymphadenitis or sufficient number of lymphocytes
- Half of smears for each specimen were prepared by using Diff-Quik stain on air-dried slides, and half were stained with Papanicolaou method on alcohol fixed slides
- Cell pellets of centrifuged needle washings were formalin fixed and paraffin embedded for cell block preparation
  - Immunohistochemical and special stains were used on cell blocks for tumor subtyping and fungus or AFB detection.

## RESULTS

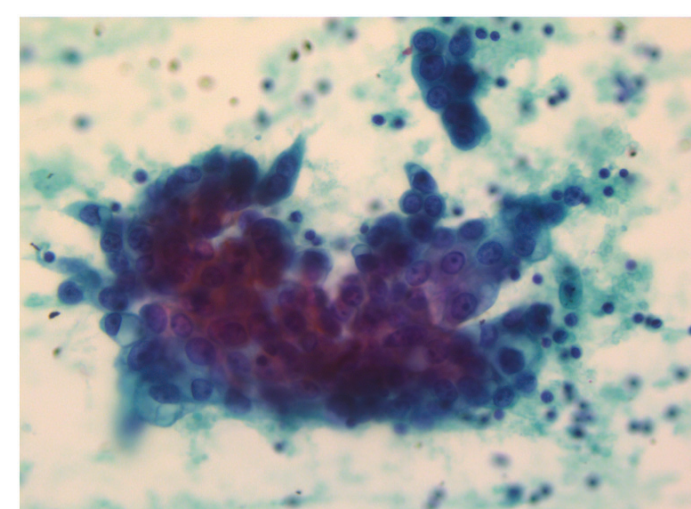
- Of the 189 mediastinal or hilar lymph node specimens, only 14 were deemed insufficient (**93% adequate**) (table 1)
- Of the 175 adequate specimen, 46% were malignant (metastatic neoplasm), 35% were benign, and 5% were atypical/suspicious

Table 1:Diagnosis from EBUS-FNA Specimen

| Diagnosis                       | # of Specimen |
|---------------------------------|---------------|
| Malignant (metastatic neoplasm) | 75            |
| Suspicious/atypical             | 9             |
| Lymphoma                        | 6             |
| Granulomatous Lymphadenitis     | 23            |
| Benign                          | 62            |
| Insufficient                    | 14            |



**Fig.1 Metastatic squamous cell carcinoma.** Group of malignant cells with irregular nuclei with coarsely clumped chromatin in a background of benign lymphocytes. Single cell with eosinophilic keratinization and hyperchromatic nucleus. Papanicolaou stain; x40.



**Fig.2 Metastatic lung adenocarcinoma.** Group of malignant cells with prominent nucleoli and cytoplasmic vacuolation in a background of benign lymphocytes. Papanicolaou stain; x40,

## RESULTS

- Table 2: Subtyping results of malignant and lymphoma specimens

| Subtypes                     | # of Specimen | %   |
|------------------------------|---------------|-----|
| Lung Adenocarcinoma          | 29            | 36% |
| Lung Squamous cell carcinoma | 15            | 19% |
| Lung small cell carcinoma    | 10            | 12% |
| Large cell neuroendocrine    | 2             | 2%  |
| Other than lung primary      | 19            | 23% |
| Lymphoma                     | 6             | 7%  |

- Cell blocks prepared for 179 specimen and of those, 5 did not survive and/or were nondiagnostic (**97% sufficient**)
- Of the 75 malignant diagnosis, immunohistochemistry was performed on 40 cellblock preparations, 18 were performed on another part on the same patient, 1 was performed but was insufficient, and 16 were not performed

## CONCLUSION

- Endobronchial ultrasound-guided fine needle aspiration (EBUS-FNA) in lung cancer staging, subtyping and diagnosis of unexplained mediastinal lymphadenopathy provides a good diagnostic yield
- This study supports endosonography as a minimally invasive alternative to surgical staging

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