The role of EUS for evaluation of mediastinal adenopathy

This is one of a series of statements discussing the utilization of GI endoscopy in common clinical situations. The Standards of Practice Committee of the American Society for Gastrointestinal Endoscopy prepared this text. In preparing this guideline, a MEDLINE literature search was performed, and additional references were obtained from the bibliographies of the identified articles and from recommendations of expert consultants. When little or no data exist from well-designed prospective trials, emphasis is given to results from large series and reports from recognized experts.

Guidelines for appropriate utilization of endoscopy are based on a critical review of the available data and expert consensus. Further controlled clinical studies are needed to clarify aspects of this statement, and revision may be necessary as new data appear. Clinical consideration may justify a course of action at variance to these recommendations.

INTRODUCTION

Mediastinal lymphadenopathy may be detected by CT, by chest radiograph, or by the presence of extrinsic compression of the esophagus detected during EGD. Its causes reflect both benign processes (e.g., sarcoidosis, tuberculosis, histoplasmosis) and malignant processes (e.g., metastatic cancer, lymphoma). In addition, mediastinal adenopathy may be suspected in patients with lung or esophageal cancer despite prior negative imaging. EUS can both identify adenopathy and guide FNA of nodes as small as 5 mm. This guideline suggests appropriate situations for which EUS should be used in the evaluation of mediastinal adenopathy. The role of EUS in the evaluation of esophageal cancer is discussed in a separate guideline.

EUS DIAGNOSIS

EUS can readily identify lymph nodes in the subcarinal, paraesophageal, and paratracheal regions, but not the pretracheal space or intrapulmonary regions. When examining nodes by EUS, particular findings may predict malignant nodal involvement, including a hypoechoic echotexture, a sharply demarcated border, a rounded contour, and a size greater than 1 cm. While these individual findings are predictive, accuracy exceeds 80% only when all 4 are present, however all features are present in a minority of cases. In one study, image interpretation alone for the diagnosis of lung cancer metastases to mediastinal lymph nodes was specific (97.5%) but not sensitive (53.6%). In a large series of patients with mediastinal adenopathy, EUS features alone could not distinguish between benign and malignant lesions. It is, therefore, recommended that FNA be performed whenever mediastinal adenopathy is being evaluated during EUS if the results will alter management.

FNA of mediastinal nodes

FNA of nodes improves the accuracy of EUS for determining malignant involvement and may change management (in particular, avoiding mediastinoscopy or thoracotomy) in a significant number of patients. EUS-FNA has been shown to yield a diagnosis even when prior studies, including positron emission tomography (PET) scanning, CT-guided FNA, bronchoscopy, pleurocentesis, and mediastinoscopy are negative or inconclusive. FNA of mediastinal nodes can provide a specimen adequate for interpretation in over 95% of cases and has a complication rate of less than 1%. The specificity of EUS-FNA for malignancy is close to 100%, and the sensitivity for detecting malignancy in mediastinal nodes is 88% to 96%. False-negative results of mediastinal EUS-FNA have been reported in lung cancer, renal cell cancer, Hodgkin’s disease, and non-Hodgkin’s lymphoma. To minimize the number of FNA passes made, a cytopathologist should be available to determine the adequacy of specimens obtained. When this is not feasible, at least three FNA passes should be made to maximize sensitivity. In the event that there are multiple nodes, FNA should be performed on that which is most suspicious in appearance. Alternatively, when staging lung cancer, a contralateral node should be sought before a subcarinal or ipsilateral node to detect the highest N stage. When infection is being considered, special stains and cultures (e.g., for acid-fast bacilli, fungi) should be used in the evaluation of aspirated material. If lymphoma is suspected, flow
cytometry or cytogenetics should be considered, which may require preprocedure consultation with the pathology department. Serious complications from EUS-FNA of mediastinal masses and lymph nodes have not been reported, although there have been cases of serious infection involving mediastinal cysts.21,22

**EUS-FNA for adenopathy of unknown origin**

There have been several series published documenting the utility of EUS-FNA for evaluating idiopathic mediastinal adenopathy found by CT scanning, chest radiography, or EUS for other reasons.7,10-12,15,17 In some of these cases, lung cancer was suspected based upon imaging but no diagnosis had yet been made. In addition, some patients had a history of prior malignancy. Malignant adenopathy was diagnosed by EUS-FNA in 42% to 72% of cases. When performing EUS for evaluation of pancreatobiliary masses, metastatic mediastinal involvement should be sought because this may be found in 6% of cases.23 The infections most frequently diagnosed by EUS-FNA are caused by mycobacteria and histoplasmosis.

**EUS-FNA in lung cancer staging**

Lung cancer is the most frequent cause of cancer-related mortality in the world. Its diagnosis and staging typically involve either CT-guided FNA, transbronchial FNA, mediastinoscopy with biopsy, or thoracoscopy. The staging system established by the American Joint Committee on Cancer requires the determination of the presence and location of nodal metastases in the mediastinum. Subcarinal or ipsilateral malignant adenopathy (N2) conveys stage IIIA disease, while contralateral nodal metastases (or direct mediastinal invasion by tumor, i.e., T4) conveys stage IIIB disease. Management of these two substages in non-small-cell lung cancer (NSCLC) is institutionally dependent, but, generally, patients with stage IIIB disease are unlikely to benefit from surgical intervention.

EUS-FNA has been shown to be an accurate (>90%) and a safe method for nodal staging in patients with previously documented lung cancer.12,13,19,24 Even patients without mediastinal nodes visualized by CT may harbor malignant adenopathy detectable by EUS-FNA.19 One cost-minimization model compared EUS-FNA with PET scanning, CT-guided FNA, transbronchial FNA, and mediastinoscopy in patients with NSCLC and enlarged subcarinal nodes visualized by CT.25 The model determined that EUS-FNA was the least costly method for diagnosing malignant adenopathy (specifically N2 disease) as long as the pretest likelihood of malignant adenopathy was at least 24% and EUS-FNA was at least 76% sensitive. Another model specifically compared mediastinoscopy with EUS-FNA for patients with malignant nodes in the subaortic (aortopulmonary window), para-aortic and subcarinal stations.26 EUS-FNA proved more cost-effective even if the negative predictive value of EUS-FNA was as low as 22%.

**Recommendations**

EUS-FNA is indicated for the evaluation of adenopathy and masses of the posterior mediastinum. It is the procedure of choice for tissue sampling of such lesions in the subcarinal, subaortic (aortopulmonary window), and periesophageal stations found on cross-sectional imaging (CT, MRI, or PET). EUS-FNA also should be considered in the preoperative staging of patients with NSCLC without definite adenopathy on cross-sectional imaging.

**SUMMARY**

For the following points: (A), prospective controlled trials; (B), observational studies; (C), expert opinion.

- EUS-FNA is a safe and accurate method for obtaining a tissue diagnosis in patients with mediastinal adenopathy. (B)
- In patients with NSCLC, EUS-FNA is an accurate and cost-saving method for nodal staging in patients with documented posterior mediastinal adenopathy. (B)
- EUS-FNA is the procedure of choice for the evaluation of posterior mediastinal nodes and masses seen on cross-sectional imaging and may have a role in the preoperative staging of patients with NSCLC without mediastinal abnormalities on cross-sectional imaging. (C)

**REFERENCES**


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