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ORIGINAL ARTICLE

Diagnosis of mediastinal lesions unassociated with lung carcinoma diagnosed by endobronchial ultrasound transbronchial needle aspiration (EBUS-TBNA)

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KEYWORDS
Endobronchial;
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Introduction Endobronchial ultrasound transbronchial needle aspiration (EBUS-TBNA) is a safe, cost-effective, and accurate diagnostic modality for the lung/mediastinum. Although some studies have been published on EBUS-TBNA of isolated mediastinal lesions, none have been reported from the United States. This study examines EBUS-TBNA for diagnosis of isolated mediastinal lesions.

Materials and methods All cases of mediastinal EBUS-TBNA (defined in radioanatomic terms) during a 7-year period (July 2007-September 2014) were obtained from the anatomic pathology database. Pathologic reports, clinical notes, bronchoscopy notes, and imaging studies were reviewed. Only patients with a mediastinal lesion or non-pulmonary parenchyma-based lesions sampled by EBUS-TBNA without a prior or synchronous lung carcinoma were included in this study.

Results Of the 3005 EBUS-TBNA cases accessioned during this time period at our institute, 47 fulfilled the inclusion criteria. The median patient age was 61 years (range: 27-84 years). Both genders were nearly equally represented. A definitive cytologic interpretation was rendered in 40 out of 47 cases (85.1%). Malignancies included non-pulmonary carcinomas (8), sarcomas (5), hematolymphoid malignancies (5), neuroendocrine neoplasm (1), melanoma (1), and undifferentiated malignancy (1). Surgical follow-up was available in 18 of 47 cases (38.3%). There was cytologic-histologic correlation in 16 of 18 cases (88.9%). Surgical follow-up of all cysts diagnosed by cytology were benign cysts. Over the 7-year period, an increasing proportion of all EBUS-TBNAs performed were for mediastinal lesions unassociated with lung carcinoma.

Conclusions EBUS-TBNA has a high accuracy rate when used to diagnose mediastinal lesions unassociated with lung carcinoma. Its utility as a primary diagnostic modality in this setting needs to be explored further.

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Introduction

Endobronchial ultrasound transbronchial needle aspiration (EBUS-TBNA) biopsy is gaining popularity in the United States, and worldwide, in recent years.[1,2] The reason for this is the minimally invasive nature of this technique, its good safety profile, as well as its cost-effectiveness.[1-4] The primary role of EBUS-TBNA has been the diagnosis and staging of lung cancer, but its role is expanding to include diagnosis of early stage sarcoidosis, mediastinal or hilar lymphadenopathy, and other mediastinal lesions.[5-9] Studies have described the utility of EBUS-TBNA, endoscopic ultrasound-guided fine-needle aspiration (FNA), and both modalities used together for the evaluation of mediastinal lesions.[10-13]

Patients with lung carcinoma and concomitant mediastinal lesions are often evaluated by EBUS-TBNA, and mediastinal lesions unassociated with lung carcinoma are being increasingly sampled by this technique. Numerous case reports of unusual lesions in the mediastinum sampled by EBUS-TBNA have been published, although only a few case series have been published of isolated mediastinal lesions sampled by EBUS-TBNA—most of which were conducted/reported from institutions outside the United States.[14-19] This study was undertaken to evaluate the use of EBUS-TBNA in the setting of isolated mediastinal lesions unassociated with lung carcinoma.

Materials and methods

After appropriate institutional review board approval, all consecutive EBUS-TBNA cases during a 7-year period (July 2007-September 2014) were obtained from CoPath Plus (the anatomic pathology database) at the Cleveland Clinic. All cases of mediastinal EBUS-TBNA (defined in radioanatomic terms) were retrospectively reviewed. Clinical notes obtained from the electronic medical record were reviewed with special attention to radiology reports and bronchoscopy notes.

All mediastinal lesion(s) or non-pulmonary parenchyma-based lesion(s) sampled by EBUS-TBNA were selected. Pathologic reports were retrieved and reviewed. Cases with a prior history of lung carcinoma, or a diagnosis of lung carcinoma obtained as a result of the EBUS-TBNA procedure, were excluded. The study also excluded all cases of sarcoidosis or other granulomatous lesions; the experience with these has been previously published in a separate study.[20]

The pathologic reports were also reviewed and the following data were collected: the site(s) sampled; the total number of slides evaluated per case; enumeration of total number of slide types evaluated per case, including smears; usage of liquid-based preparations, cell blocks, and special stains (including immunostains); the on-site interpretation; and final diagnosis.

Rapid on-site evaluation (ROSE) is routinely performed at our institution, and air-dried smears are evaluated on-site using modified Giemsa stains. ROSE is performed in a dedicated station within the EBUS suite, and stains, slides, and other materials for slide preparation and staining are stored in the EBUS suite. Radiology suites are not used for EBUS at our institution. The cytology station also has a dual-headed microscope with a camera attachment to a nearby computer monitor for others to view the sample, if more than two individuals are present. The EBUS-TBNA specimen is typically obtained by a pulmonologist or pulmonology fellow-in-training under a pulmonologist's guidance, although smears are most often prepared by a nurse on the EBUS team. Less commonly, smear preparation is performed by a cytotechnologist or cytopathology fellow or, much more rarely, the cytopathologist or pulmonologist. Typically a cytopathologist attends the ROSE with a cytotechnologist or a cytopathology fellow. Telecytology is not used in our institution.

Only direct smears are evaluated at ROSE. Both direct smears and a corresponding alcohol-fixed Papanicolaou stained smear is obtained per pass, along with a ThinPrep from the needle rinse into a PreservCyt vial from each site. Cell blocks are routinely obtained from all specimens except bronchial brushings, although this practice is variable based on individual pathologists' preferences and the characteristics of the specific case. Cytospin is not used in our institution for evaluation of EBUS-TBNA specimens. Cell blocks are obtained using the residual needle rinse after the ThinPrep is obtained, and Cellient (proprietary blend) is the most common fixative used. Note that thrombin clot cell blocks are obtained instead of, or in addition to, a Cellient block in occasional cases, dependent on the individual case.

Although no set of standard criteria was used for adequacy evaluation at our institution, the interpretation "non-diagnostic" is used when the pathologic specimen(s) cannot explain the clinicoradiologic impression, after confirming needle placement within the lesion of interest. Cell blocks were routinely obtained in most aspirates, although in some cases this was deferred to the cytopathologist's determination of appropriate specimen triage. The cases were subsequently signed out by board-certified cytopathologists who requested additional studies in a subset of cases. Cytologic-histologic correlation was performed in each case by correlating with concurrent, subsequent, or prior tissue diagnoses from the same site sampled on cytology. A minimum of 8 months follow-up time was allowed for any possible tissue confirmation of the lesions sampled by cytology.

Calculations were performed to derive ranges, medians, means, ratios, and proportions. Trends were assessed in the use of EBUS-TBNA for mediastinal lesions unassociated with lung carcinoma. All cytology slides were reviewed in cases with cytologic-histologic discrepancy. Slides were reviewed on a dual-headed microscope by a board-certified cytopathologist.