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REVIEW

Trans-esophageal endobronchial ultrasound-guided needle aspiration (EUS-B-NA): A road map for the chest physician

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Abstract The endobronchial ultrasound (EBUS) scope has been increasingly used in the gastrointestinal tract (EUS-B). Scientific data proves its efficacy and safety to provide a complete lung cancer staging, when combined with EBUS-TBNA, and in the diagnosis of para-esophageal lesions. There are multiple barriers to start performing EUS-B but probably the most important ones are related to knowledge and training, so new operators should follow a structured training curriculum. This review aims to reflect the best current knowledge regarding EUS-B and provide a road map to assist those who are incorporating the technique into their clinical practice.

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Introduction

The development of the endobronchial ultrasound (EBUS) scope and its incorporation into clinical practice was a breakthrough in XXI century respiratory medicine. A simple and elegant procedure, it has permitted safe diagnosis and/or staging of pulmonary and mediastinal disease, avoiding more invasive and costly exams.

As knowledge grew, new indications arose and experienced centers published data concerning the combined use of EBUS and EUS (endoscopic ultrasound through the esophagus) needle aspiration (NA) to correctly stage non-small cell lung cancer patients.[1,2] Although successful, this approach had several limitations as it required a proficient endoscopist – initially only a small group of chest physicians worldwide had enough expertise to use the EUS scope – dedicated equipment, additional time and sometimes different settings, which taken all together contributed to increased costs and to delayed implementation.

Successful transesophageal and gastric use of the EBUS scope (EUS-B) was first reported in 2007.[3] In 2010, two landmark papers proved that the dual use of EBUS, through the tracheal-bronchial tree and the esophagus was feasible and could be performed sequentially in the same setting, by one operator and with a high diagnostic yield for lung cancer staging.[4,5] This strategy has shown that, potentially, most of the previous limitations can be overcome. These publications were soon followed by certification for EBUS scopes to be used in the upper gastrointestinal tract.

In the last few years, EBUS has disseminated from academic centers to community-based hospitals and is now an important equipment in most bronchoscopy units. Gradually, more chest physicians are also inserting the EBUS scope into the esophagus due to its advantages and encouraged by their familiarity with the equipment. EUS-B-NA makes a more complete assessment of the mediastinum possible when added to EBUS-TBNA. It provides nearly complete access to all relevant lymph nodes for staging lung cancer; permits the diagnosis of para-esophageal mediastinal and lung lesions which cannot be accessed through the tracheo-bronchial tree; permits access to the lower mediastinal lymph node stations (e.g. stations 8 and 9) and sub-diaphragmatic lymph nodes; and in comparison to EBUS it may offer an easier alternative for puncturing challenging lymph nodes in certain patients (e.g. stations 2L and 4L). Additionally, EUS-B-NA is usually a well-tolerated procedure under conscious sedation, achieved by lower doses of sedatives and anesthetics and is associated with less cough and oxygen desaturation when compared to EBUS, which is an important consideration in patients with compromised lung function.[6]

Nevertheless, there are multiple barriers to starting performing EUS-B-NA and the most important ones are related to knowledge and training. A few publications provide instructions on how to perform EUS but they are not dedicated to EUS-B.[7–9] The present review aims to reflect the best current knowledge regarding this technique, focusing on recent guidelines, and to provide a road map to assist those who want to integrate EUS-B into their clinical practice.

When to do EUS-B?

Malignant diseases

Lung cancer

Regarding the correct diagnosis and staging of lung cancer patients, tissue confirmation is still mandatory to select the best therapy and to enhance outcomes.[10] In addition, enlarged lymph nodes in the mediastinum and/or the pulmonary hilum are always suspicious for malignancy and require further evaluation.

Histological biopsies obtained by mediastinoscopy have been the diagnostic gold standard for a long time but this surgical approach is invasive and associated with morbidity and additional costs.[11,12] Therefore, minimally invasive techniques have been developed. EUS-NA, the endoscopic sampling of cytological specimens from the mediastinum through the esophagus, is the older technique, largely performed by gastroenterologists. With the EUS-scope the left mediastinum and the upper part of the abdomen can be assessed. In contrast, EBUS provides an endoscopic access to the upper mediastinal and the hilar lymph node stations, but distal paraesophageal lymph nodes or structures below the diaphragm cannot be reached via the endobronchial way. Both techniques represent a valuable alternative to surgical staging (Fig. 1).

The accuracy of EUS-NA and EBUS-TBNA for evaluating mediastinal lymph node metastasis has been assessed in several clinical trials. In meta-analyses concerning this indication, the pooled sensitivity for EBUS-TBNA was 93%, whereas a sensitivity of 83% for EUS-NA was reported.[13,14] Furthermore, in numerous studies it has been shown that the diagnostic value of a combined EBUS/EUS procedure was superior to either EBUS-TBNA or EUS-NA techniques alone, but no randomized controlled trials comparing these attempts had been performed yet 4.[15,16]

In a randomized controlled study, comparing immediate surgical staging to endoscopic staging, the combined endosonography approach with EBUS and EUS was superior to mediastinoscopy. The sensitivity for lymph node metastasis was 79% for surgical staging versus 85% for endosonography without subsequent surgical staging.[17] Current international guidelines therefore recommend the endoscopic needle techniques over surgical staging as the first test for mediastinal staging in lung cancer patients.[11,18,19]

As previously mentioned, in two studies published simultaneously, both EBUS-TBNA and EUS-B-NA were performed in patients with suspected lung cancer for diagnosing and staging.[4,5] The sensitivity for EBUS-TBNA was 91.5% and 84.4% respectively. Sensitivity for EUS-B-NA alone was 88.7% in one trial. For the combined approach of EBUS-TBNA plus EUS-B-NA the sensitivity rose to more than 90% in both trials. Importantly, the negative predictive value for malignancy using combination of EBUS and EUS-B was 96% in both trials. Particularly high negative predictive value for malignancy may in the future reduce the need for surgical confirmation, when the results of the needle acquired specimens are negative for malignant cells.

The utility of the EBUS-scope for performing EUS-B-NA in the same setting was confirmed in a further publication. In this prospective study, 123 patients with undiagnosed

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