

Editorial

Endobronchial Ultrasound: First Choice for the Mediastinum

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The world's first curved linear array ultrasonic bronchoscope was introduced to the market by Olympus in 2004. The development of the endoscope had started more than 5 years earlier based on a request to Olympus Medical Tokyo to miniaturise existing endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) technology to be applied for diagnosis of lesions within the bronchial system. The appeal was born out of the necessity to improve mediastinal staging results.

Computed tomography (CT) and positron emission tomography (PET) are the most widely used non-invasive means for mediastinal lymph nodes. However, based on their reported specificities, CT and PET findings should be verified by cytohistologic sampling.¹

The 60-year-old transbronchial needle aspiration (TBNA) technology has proved its efficacy, safety and cost-effectiveness particularly in diagnosing and staging lung cancer as well as in diagnosing benign granulomatous disease, but unfortunately the technique was always underused. Mainly safety concerns have been the reason.^{2,3}

The success story of endobronchial ultrasound (EBUS)-TBNA starts in 2003 with a publication in the journal *Thorax* by Krasnik *et al.*⁴ This article gave the first description of the principle of EBUS-TBNA. In the same journal, Herth *et al.*² chronicled their study on 502 patients that showed that EBUS-TBNA resulted in 93% diagnostic yield, a sensitivity of 94%, specificity of 100% and accuracy of 94%, with a positive predictive value at 100% and negative predictive value at 11%. A further interesting outcome of the study was that no significant difference between ultrasound diagnosis under local and general anaesthesia was identified.

With the strong acceptance of EBUS-TBNA as a reliable diagnostic tool for enlarged lymph nodes in patients with non-small cell lung cancer (NSCLC), it soon became clear that EBUS provides the best lymph nodes access.

The technique was also examined against mediastinoscopy. In a study by Ernst *et al.*⁵ it was shown that EBUS-TBNA can have a superior yield compared with cervical mediastinoscopy, which leads to the conclusion that mediastinoscopy is not necessarily of additional diagnostic benefit to evaluate negative EBUS-TBNA staged lymph nodes.

A lot of very important work was also done by Nakajima *et al.*⁶⁻⁹ He and his group have shown strong dedication to evaluate the benefits of EBUS-TBNA samples for immunohistochemical analysis, molecular staging and reported encouraging results with cell cycle related proteins in chemotherapy patients.

In several published meta-analysis, EBUS-TBNA has been shown to have a high-pooled sensitivity of 93% and specificity of 100%.¹⁰⁻¹²

Multiple publications have shown that even in patients with lymph nodes <1 cm in diameter (which had been termed N0 by CT criteria), with the use of EBUS-TBNA a large percentage could still be shown to have N2/N3 disease (some despite also being negative on PET-CT).^{13,14}

Complications such as bleeding or infection are very rare and have only been reported as case reports.

At least it was the work of Annema *et al.*¹⁵ which also convinced guidelines authorities. In a randomized controlled multicenter trial patient either underwent a surgical staging or an endosonography (combined transesophageal and [EUS-FNA and EBUS-TBNA]) followed by surgical staging in case no nodal metastases were found at endosonography. Thoracotomy with lymph node dissection was performed when there was no evidence of mediastinal tumor spread. The group showed that among patients with (suspected) NSCLC, a staging strategy combining endosonography and surgical staging compared with surgical staging alone

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resulted in a greater sensitivity for mediastinal nodal metastases and fewer unnecessary thoracotomies.

All the work changed at the end of our daily doing. The recent published guideline of the American College of Chest Physicians (ACCP) is clearly pointed now. In the article by Silvestri *et al.*,¹⁶ the ACCP recommends “In patients with high suspicion of N2 and 3 involvement, either by discrete mediastinal lymph node enlargement or PET uptake (and no distant metastases), a needle technique (EBUS-needle aspiration [NA], EUS-NA or combined EBUS/EUS-NA) is recommended over surgical staging as a best first test (Grade 1b).”

After 10 years and a lot of scientific work from several groups, a small scope becomes the state of the art.

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