Bronchoscope: Beyond the Thorax!

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The advent of the endobronchial ultrasound (EBUS) technique represents one of the most important advances in the field of flexible bronchoscopy. Using reflected sound waves, EBUS has revolutionized the bronchoscope's perspective, as it has extended the vision beyond the airways, leading to both diagnosis and mediastinal staging of cancers during the same procedure with an excellent accuracy and safety profile [1, 2]. More recently, echobronchoscopy has offered the pulmonologists another way to reach the mediastinum and lungs, as the EBUS scope can also be inserted through the esophagus, allowing access to lesions adjacent to it. In this context, the acronym EUS-FNA, which refers to endoscopic ultrasound fine-needle aspirations through the esophagus with a dedicated instrument, has become EUS-B-FNA, which stands for the same procedure, but performed with an echobronchoscope. The transesophageal approach may have the advantage of better tolerability due to the rarer occurrence of cough and the absence of cartilage that makes sampling easier. The feasibility of EUS-B-FNA for mediastinal staging has already been established in a number of studies, and has shown an additional diagnostic gain in detecting mediastinal metastasis [3–5].

In this issue of *Respiration*, Meena et al. [6] suggest a further role for the EBUS scope in the diagnostic work-up of cancers, which goes beyond the current indications, and, in fact, for the first time, beyond the thorax. They report a successful series of biopsies from enlarged left

adrenal glands using the convex curvilinear EBUS scope. In this retrospective case series, the EBUS scope was systematically used by the same operator in the same procedure for both mediastinal and extrathoracic staging in 6 consecutive patients with suspected (or known) cancers and enlarged left adrenal glands based on CT scans, showing favorable results.

Up to 4–7% of patients with potentially resectable lung cancer present unilateral adrenal masses, and, of these, approximately two thirds are benign lesions. Due to the limited positive predictive values of current imaging techniques, tissue proof of extrathoracic malignant involvement is mandatory to properly stage the primary disease and determine optimal treatment [7].

EUS-FNA has been recently suggested as a highly accurate and safe alternative to the more invasive traditional procedures (i.e. percutaneous CT-guided FNA and open/laparoscopic adrenalectomies) for the assessment of left adrenal diseases [7]. Moreover, when performed by pulmonologists in a lung cancer setting, the combination with EBUS-TBNA allows a complete evaluation of tumor extent during the same procedure because of the complementary reach of different targets [8]. In this scenario, using a single scope to perform both EBUS and EUS, as proposed by Meena et al. [6], could further optimize the cost-effectiveness of the preoperative assessment, which would easily fit with daily clinical practice due to the widespread lack of time and resources.

Therefore, do these data imply that the EUS scope should just be removed from lung cancer staging tools? Not yet. There is still a long way to go before translating Meena's experience into advice for clinical practice. First of all, these preliminary data were derived from a very limited two-center experience. Although the authors stated that the cases were consecutive, a selection bias could have influenced the results due to the absence of pre-defined eligibility criteria. Moreover, no information was available on the negative predictive value of EUS-B-FNA in this setting, which is usually considered the Achilles' heel of aspiration techniques. The authors reported only successful biopsies, and, in all cases, the tissue obtained from the left adrenal glands was large enough to perform additional studies, such as immunochemistry. However, in the era of targeting lung cancer therapy, a sample should be considered as diagnostic only if provides an amount of cells suitable for both immunocytochemical and molecular studies, but it is unclear whether the latter was performed [9].

Secondly, several technical limitations could affect the performance of EUS with an EBUS scope. These include a lower ultrasound quality and penetration depth compared to those of conventional EUS, and the fixed needle

angle. Moreover, the fact that the EBUS scope is less rigid makes it more difficult to push the digestive tract and to reach the adrenal gland from the stomach, which, unlike airways and the esophagus, does not 'direct' the instrument. Another issue could be related to the height of patients: is the scope long enough to reach adrenal glands in every subject?

Although no adverse events were reported in this series, the safety of EUS-B-FNA in this setting could also be called into question and it needs to be verified in larger series. However, previous investigations on EUS-B-FNA for mediastinal staging have shown an excellent safety profile [4, 5, 10].

Lastly, the learning curve is unknown and would need to be investigated. However, considering that few bronchoscopists are skilled in the EUS technique, an additional specific training would be required in any case, and perhaps using a single scope for both applications could shorten the learning period. In conclusion, pulmonologists' horizons have been broadened a further step. The last decade has witnessed a huge revolution in the bronchoscopist's role in the diagnostic work-up of lung cancer. It seems, however, that this revolution has not been completed – not yet.

References

- 1 Kinsey CM, Arenberg DA: Endobronchial ultrasound-guided transbronchial needle aspiration for non-small cell lung cancer staging. *Am J Respir Crit Care Med* 2014;189:640–649.
- 2 Medford AR, Bennett JA, Free CM, Agrawal S: Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA): applications in chest disease. *Respirology* 2010;15:71–79.
- 3 Hwangbo B, Lee GK, Lee HS, Lim KY, Lee SH, Kim HY, Lee HS, Kim MS, Lee JM, Nam BH, Zo JI: Transbronchial and transesophageal fine-needle aspiration using an ultrasound bronchoscope in mediastinal staging of potentially operable lung cancer. *Chest* 2010;138:795–802.
- 4 Hwangbo B, Lee HS, Lee GK, Lim KY, Lee SH, Kim HY, Lee JY, Zo JI: Transoesophageal needle aspiration using a convex probe ultrasonic bronchoscope. *Respirology* 2009;14:843–849.
- 5 Herth FJ, Krasnik M, Kahn N, Eberhardt R, Ernst A: Combined endoscopic-endobronchial ultrasound-guided fine-needle aspiration of mediastinal lymph nodes through a single bronchoscope in 150 patients with suspected lung cancer. *Chest* 2010;138:790–794.
- 6 Meena N, Hulett C, Jeffus S, Bartter T: Left adrenal biopsy using the convex curvilinear ultrasound scope. *Respiration* 2015;89:57–61.
- 7 Schuurbiens OC, Tournoy KG, Schoppers HJ, Dijkman BG, Timmers HJ, de Geus-Oei LF, Grefte JM, Rabe KF, Dekhuijzen PN, van der Heijden HF, Annema JT: EUS-FNA for the detection of left adrenal metastasis in patients with lung cancer. *Lung Cancer* 2011;73:310–315.
- 8 Annema JT, van Meerbeeck JP, Rintoul RC, Doooms C, Deschepper E, Dekkers OM, De Leyn P, Braun J, Carroll NR, Praet M, de Ryck F, Vansteenkiste J, Vermassen F, Versteegh MI, Veselić M, Nicholson AG, Rabe KF, Tournoy KG: Mediastinoscopy vs endosonography for mediastinal nodal staging of lung cancer: a randomized trial. *JAMA* 2010;304:2245–2252.
- 9 Esterbrook G, Ananthan S, Plant PK: Adequacy of endobronchial ultrasound transbronchial needle aspiration samples in the subtyping of non-small cell lung cancer. *Lung Cancer* 2013;80:30–34.
- 10 Annema JT, Rabe KF: Endosonography for lung cancer staging: one scope fits all? *Chest* 2010;138:765–767.