

## Clinical Image

# Visualization of Transbronchial Cryobiopsy of a Pulmonary Lesion Using Radial Endobronchial Ultrasound (r-EBUS)

Felipe Andreo García<sup>a,b,c,\*</sup>, Carmen Centeno Clemente<sup>a,b,c</sup>, Antoni Rosell Gratacós<sup>a,b,c</sup>

<sup>a</sup> Respiratory Department, Thorax Clinic Institute, Hospital Universitari Germans Trias i Pujol, Badalona, Barcelona, Spain

<sup>b</sup> Department of Medicine, Universitat Autònoma de Barcelona, Barcelona, Spain

<sup>c</sup> Institut Investigació Germans Trias i Pujol, IGTP, Badalona, Barcelona, Spain

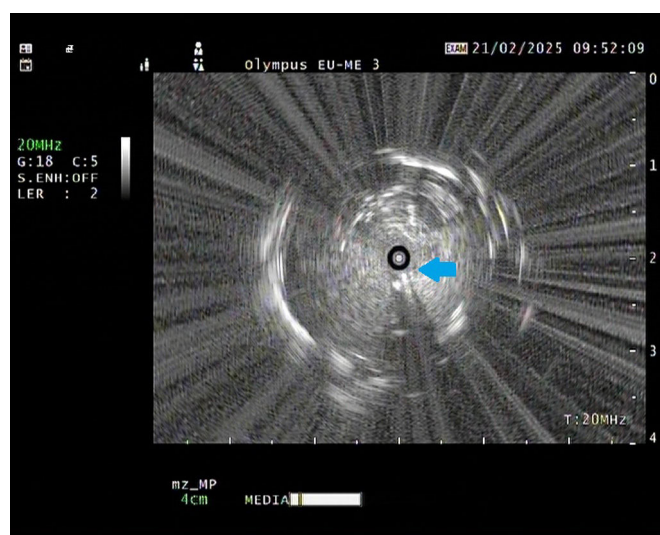
A 57-year-old male, current smoker, with a history of right testicular neoplasia treated with orchiectomy in 1996 and subsequent resection of retroperitoneal, left supraclavicular, and pulmonary teratomas, was referred after incidental detection of a complex cystic lesion in the left lower lobe on chest CT. PET-CT revealed a 17 mm lesion without increased glucose metabolism, with a bronchus sign and adjacent bronchiectasis. Bronchoscopy was performed through an orotracheal tube using thin and ultrathin bronchoscopes. r-EBUS identified a hypoechoic, heterogeneous image surrounding the ultrasound miniprobe. A 1.1 mm cryoprobe was then introduced through the ultrathin bronchoscope and advanced to the target location. Real-time visualization of the distal end of the cryoprobe adjacent to the miniprobe appeared as a hyperechogenic beam (Fig. 1 and Video), confirming proper positioning. Biopsy specimens showed acute and chronic inflammation. We had previously demonstrated the feasibility of this precise technique in an unanimated model using a therapeutic bronchoscope (Video). A major limitation of r-EBUS has been the lack of real-time biopsy tools visualization [1,2]. Few reports have explored the use of r-EBUS to localize the biopsy tool [3–5]. We describe a novel ultrasound sign for the cryoprobe localization at the same site as the radial probe, which may provide valuable real-time guidance for accurate cryobiopsy of peripheral pulmonary lesions.

## Authors' contribution

All the authors of the article have contributed substantially to the elaboration of the manuscript.

## Artificial intelligence involvement

The authors declare that artificial intelligence tools were used solely to improve the clarity of the English language.



**Fig. 1.** Ultrasonographic image showing a hyperechogenic beam (arrow) due to the presence of the cryoprobe.

## Funding on the research

This project was awarded the second prize in the innovation program Healthcare Entrepreneur Exchange International Programme 2023 (HEEP), organized by Germans Trias i Pujol University Hospital (HUGTiP) and Leeds Teaching Hospitals NHS Trust (United Kingdom). The award includes funding from the Avança HUGTiP Grant.

## Conflict of interest

The authors declare that they have no conflict of interest directly or indirectly related to the contents of this manuscript.

## Acknowledgements

We would like to thank Alan Solís for his technical support to the project, as well as the HUGTiP Innovation team, led by Daniel

\* Corresponding author.  
E-mail address: [fandreo@separ.es](mailto:fandreo@separ.es) (F. Andreo García).

Moreno Martínez (Head of Innovation at Germans Trias i Pujol University Hospital) and Josep M<sup>a</sup> Torras (Innovation Project Manager, Germans Trias i Pujol Research Institute – IGTP).

## Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.arbres.2025.08.012](https://doi.org/10.1016/j.arbres.2025.08.012).

## References

- [1] Torky M, Elshimy WS, Ragab MA, Attia GA, Lopez R, Mate JL, et al. Endobronchial ultrasound guided transbronchial cryobiopsy versus forceps biopsy in peripheral lung lesions. *Clin Respir J* 2021;15:320–8, [http://dx.doi.org/10.1111/crj.13301](https://doi.org/10.1111/crj.13301).
- [2] Andreo García F, Torky M, Centeno Clemente C, Serra Mitjà P, Rosell Gratacós A, Tazi Mezalek R. Transbronchial cryobiopsy of peripheral pulmonary lesions guided with real-time transthoracic ultrasonography. *Arch Bronconeumol* 2021;57:772–4, [http://dx.doi.org/10.1016/j.arbr.2020.10.018](https://doi.org/10.1016/j.arbr.2020.10.018).
- [3] Shinagawa N, Yamada N, Asahina H, Kikuchi E, Oizumi S, Kurimoto N, et al. Transbronchial biopsy for peripheral pulmonary lesions under real-time endobronchial ultrasonographic guidance. *J Bronchology Interv Pulmonol* 2009;16:261–5, [http://dx.doi.org/10.1097/LBR.0b013e3181bb8058](https://doi.org/10.1097/LBR.0b013e3181bb8058).
- [4] Anagnostopoulos N, Petrarulo S, Ravaglia C, Dubini A, Piciucchi S, Stratakis G, et al. Transbronchial lung cryobiopsy under real-time radial EBUS: first report on a novel twist of the classical technique. *Respirol Case Rep* 2024;12:e01435, [http://dx.doi.org/10.1002/rcr2.1435](https://doi.org/10.1002/rcr2.1435).
- [5] Cruz-Rueda JJ, Velasco-Albendea FJ, Gil-Belmonte MJ, Moreno-Sánchez F, Agredano-Ávila B, López-Pardo A. Transbronchial cryobiopsy under real-time radial mini-probe with a flexible bronchoscope: six case reports. *Egypt J Bronchol* 2025;19:44, [http://dx.doi.org/10.1186/s43168-025-00401-6](https://doi.org/10.1186/s43168-025-00401-6).