

# Non-intubated cryobiopsy using an ultrathin cryoprobe has high diagnostic utility and safety for diagnosing peripheral pulmonary lesions, with additional diagnostic benefits over conventional biopsy.

*Nakai T, Watanabe T, Kaimi Y, Shiomi K, Ando K, Miyamoto A, Ogawa K, Matsumoto Y, Sawa K, Sato K, Asai K, Matsumoto Y, Mikami Y, Ohsawa M, Kawaguchi T. Respiration. 2023 Jun 28:1-12. doi: 10.1159/000531010. PMID: 37379810.*

## Background

Low-dose CT screening has improved lung cancer prognosis, increasing the need for accurate peripheral pulmonary lesion (PPL) diagnosis. Conventional bronchoscopic sampling instruments may cause crush artifacts and have limited diagnostic capabilities. Cryobiopsy offers larger tissue samples preserved tissue architecture and is useful for diagnosing PPLs lung transplant allograft rejection and diffuse parenchymal lung diseases. However, earlier cryoprobe models were limited in regard to their operability in challenging clinical scenarios and require endotracheal intubation. The flexible single-use 1.1 mm cryoprobe assists addressing these limitations, providing further peripheral reach, smaller but equally well-preserved tissue samples, and reduced risk of complications when retracted through the working channel<sup>1</sup>. It can pass through a thin bronchoscope's 2.0 mm working channel, allowing repeated cryobiopsies without bronchoscope removal. The study of Nakai et al. aims to assess the usefulness and safety of non-intubated cryobiopsy using the flexible single-use 1.1 mm cryoprobe for diagnosing PPLs.

## Methods

The study enrolled consecutive patients with suspected bronchial carcinoma who underwent non-intubated cryobiopsy of PPL. The bronchoscopy procedure involved using a thin bronchoscope (2.0 mm working channel diameter) under conscious sedation with combined pethidine hydrochloride and midazolam or propofol plus local anesthesia but without an airway device. Virtual bronchoscopic navigation and

fluoroscopy were used to navigate to the lesion. The lesion position was confirmed using radial endobronchial ultrasound (rEBUS) probe. Conventional biopsies using standard forceps, or an aspiration needle were performed repeatedly, based on their ability to reach the location of the target lesion detected by rEBUS (within, adjacent to or invisible). Cryobiopsy with the flexible single-use 1.1 mm cryoprobe was performed after conventional biopsies using forceps or aspiration needle. The cryoprobe was guided toward the target lesion, activated for 2–3 seconds, and the tissue specimens attached to the tip were retrieved through the working channel. The bronchoscope remained wedged inside the airway feeding the biopsy area. Histopathological analysis was conducted on the collected tissue specimens. The diagnostic yield, specimen quality, and size were evaluated. Complications associated with bronchoscopy were recorded.

## Results

In the study, a total of 113 patients with peripheral pulmonary lesions underwent non-intubated cryobiopsy using the flexible single-use 1.1 mm cryoprobe after receiving sampling with forceps or aspiration needle. The median size of the lesions was 23.4 mm. The bronchoscopy procedure, performed without intubation, had a median duration of 27.0 minutes. Conventional biopsies and cryobiopsies using the ultrathin cryoprobe yielded 70.8 % and 82.3 % diagnostic rates, respectively ( $p < .001$ ). The total diagnostic yield (85.8 %) was significantly higher than that of conventional biopsy alone ( $p < .001$ ). The specimen quality score was significantly higher for cryobiopsy compared to conventional biopsy. Complication rates were generally low,

with mild and moderate bleeding occurring in 7.1 % and 0.9 % of patients, respectively. Pneumothorax occurred in 1.8 % of patients. Cryobiopsy provided additional diagnostic utility in 15 % of cases that were not diagnosed by conventional biopsies. Conversely, 4/20 cases where cryobiopsy came out non-diagnostic could be diagnosed with conventional sampling methods. Adjacent position on rEBUS was associated with higher diagnostic yield of cryobiopsy compared to forceps sampling.

## Discussion

The authors highlight the favorable safety profile, added diagnostic benefit, and the impact of performing cryobiopsy with the flexible single-use 1.1 mm cryoprobe extracted through the working channel for diagnosing peripheral pulmonary lesions (PPLs). It provided significantly higher diagnostic yields with fewer biopsy passes compared to conventional biopsy techniques. A particular added value could be found in the subgroup of lesions adjacent on rEBUS, due to the cryoprobe's ability to 360-degree tissue acquisition. This finding may be helpful when selecting the sampling tool.

Complication rates were generally low in line with earlier data that found a safety profile comparable to that of the forceps<sup>1</sup>. Only one case (0.9 %) of moderate bleeding occurred. The cryoprobe's maneuverability and flexibility allowed for sample collection in difficult-to-reach areas, such as bilateral upper lobe bronchi and B6. Retrieving the cryoprobe through the working channel offered advantages such as:

- **immediate wedging**
- **immediate suction for bleeding control**
- **potential for quick repeated sampling passes**

Notably, no damage to the bronchoscope was reported in this study.

Ultimately, these advantages are: enabling sampling without an intubation while ensuring safety at the same time. Overall, the flexible single-use 1.1 mm cryoprobe demonstrated superior diagnostic yield, minimal complications, and improved procedural convenience for diagnosing PPLs within the setting of a standard endoscopy room.

## Products

In this study, the flexible single-use 1.1 mm cryoprobe was used in combination with the ERBECRYO® 2.



*Flexible cryoprobe for single use, 1.1 mm  
(20402-401)*

## Reference

1 Thiboutot J, Illei PB, Maldonado F, Kapp CM, DeMaio A, Lee HJ, Feller-Kopman D, Lentz RJ, Sathyanarayan P, Rahman NM, Silvestri GA, Yarmus L; Interventional Pulmonary Outcomes Group. Safety and Feasibility of a Sheath Cryoprobe for Bronchoscopic Transbronchial Biopsy: The FROSTBITE Trial. *Respiration*. 2022;101(12):1131-1138. doi: 10.1159/000526876. Epub 2022 Oct 20. PMID: 36265451.