


## Pleural cryobiopsy during local anaesthetic thoracoscopy in dry pleural dissemination

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### Keywords

Dry pleural dissemination, flex-rigid thoracoscope, lung cancer, pleural cryobiopsy, pleural diseases.

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## Introduction

Local anaesthetic thoracoscopy (LAT), in the hands of a pulmonologist is a minimally invasive, single-port endoscopic technique whose feasibility in patients without pleural effusion is not well documented. Obtained samples, however, are small and of insufficient depth due to the small size of the biopsy forceps' cup and the procedure offers limited mechanical leverage for sampling tougher, fibrous pleural deposits. As cancer therapy is becoming more individualized, better quality tissue with preserved cellular architecture and tissue integrity is deemed important. Pleural cryobiopsy has recently gained popularity because of yielding larger biopsy samples with better tissue integrity and better quality specimen for histological analysis.

## Case Report

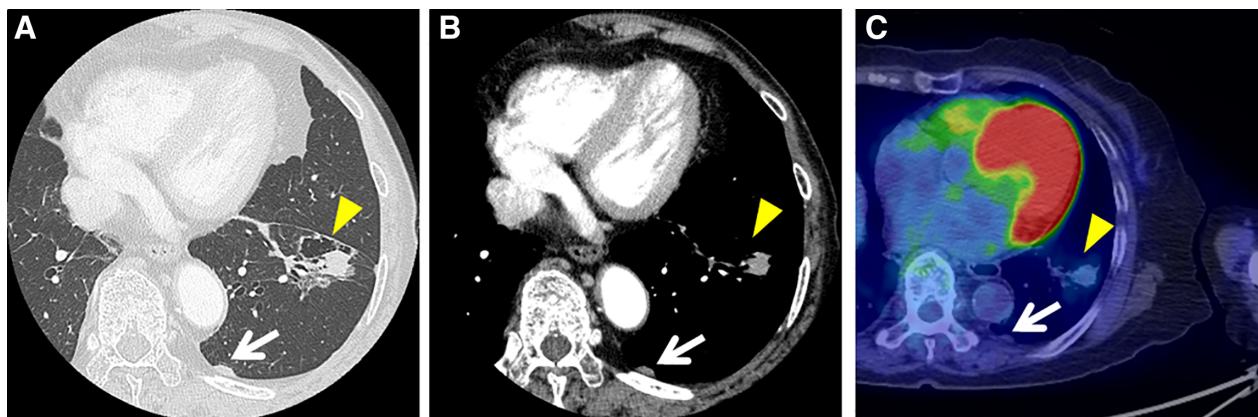
Our patient was an 85-year-old female, non-smoker with Eastern Cooperative Oncology Group performance status 0, metastatic workup with integrated positron emission tomography/computed tomography scan showed basal pleural nodules

### Abstract

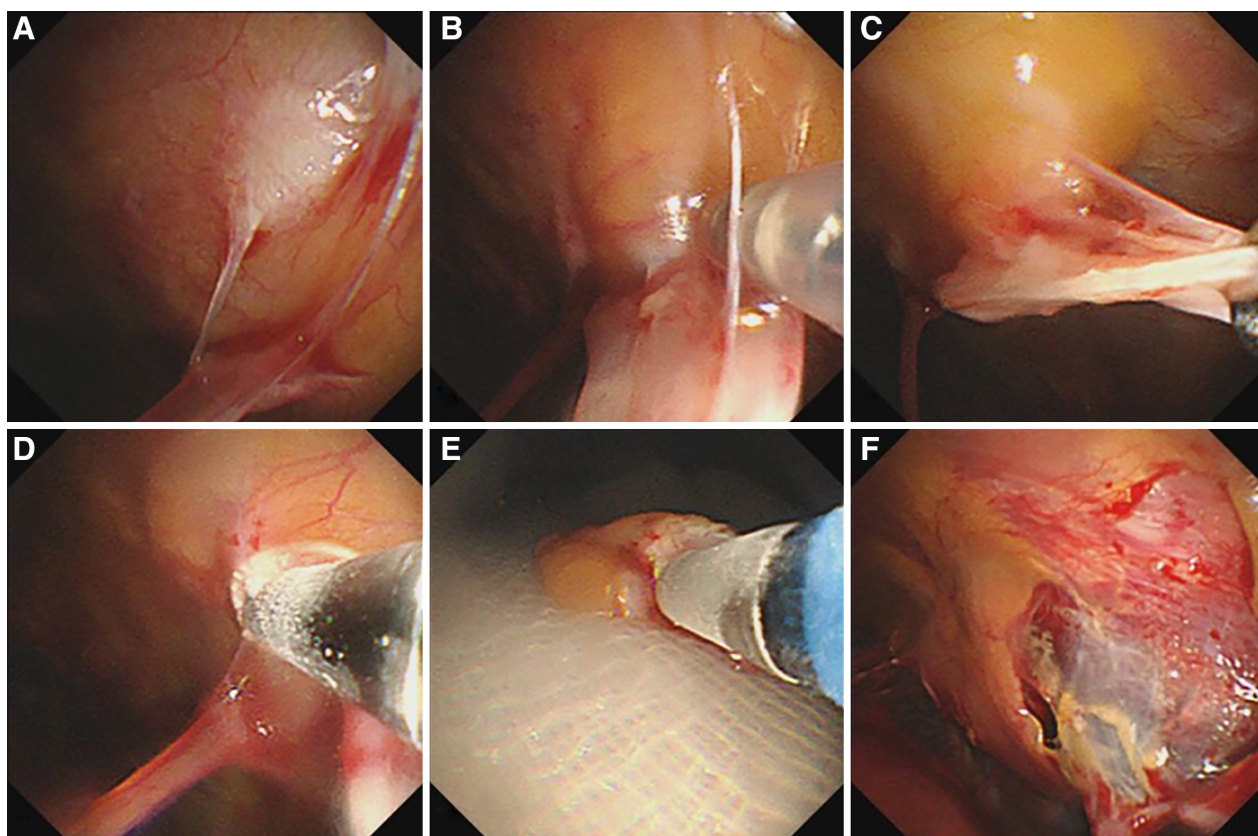
A minimally invasive thoracic intervention, such as local anaesthetic thoracoscopy, can be used to collect the samples in malignant pleural lesions. But cancerous pleurisy without pleural effusion, called dry pleural dissemination, is considered difficult to perform thoracoscopy from concerns about pleural injury. We present a diagnosed case of dry pleural dissemination safely sampled using cryobiopsy using flex-rigid thoracoscope under local anaesthesia.

without significant fluoro-deoxyglucose uptake and absence of pleural effusion (Fig. 1). Mandatory histopathological diagnosis of pleural nodules is needed for accurate staging prior to definitive treatment; hence, LAT was done.

Real-time imaging with bedside transthoracic ultrasonography (TUS) identified the optimal thoracic entry site through visualization of lung-sliding sign. Lidocaine was administered subcutaneously then intramuscularly followed by blunt dissection through the muscle layers until the parietal pleura was reached and stripped off using a Pean clamp. Collapse of the affected lung is confirmed audibly by a popping sound upon entry of air into the pleural space; insertion of flexible trocar was done and inspection of the pleural cavity and identification of pleural nodules to be sampled using a flex-rigid thoracoscope (LTF-260, Olympus, Japan) commenced. The mechanical strength and shallow cup of the flexible forceps (FB-211D, Olympus, Japan) offset the technical ease of lift and peel technique when sampling diffusely thickened and fibrotic pleural nodules (Fig. 2); hence, cryoprobe (20402-032, Erbe Elektromedizin GmbH, Germany) was used to overcome this limitation. The tip of the probe was attached to the selected pleura, cooled by carbon dioxide



**Figure 1.** Computed tomography (CT) cross-sections, (A) lung window and (B) mediastinal window, showed a part-solid mass in left lower lobe (arrowheads), and pleural nodules (arrows). Integrated positron emission tomography/CT scan demonstrated no significant fluoro-deoxyglucose uptake at the pleural nodules (C).



**Figure 2.** Thoracoscopy revealed densely adherent and fibrotic pleural nodules (A). Sub-pleural injection of lidocaine created pleural bulge (B). Compared to time-consuming sampling using flexible forceps (C), sampling using cryoprobe is much easier from densely fibrotic and adherent pleural nodules (D). A large amount of tissue sample was extracted by cryobiopsy (E). Just localized and self-limited bleeding was observed at the post-biopsy site (F).

for 5 s; the frozen tissue sample was extracted by pulling and released from the probe by thawing with normal saline. Localized and self-limited bleeding was observed at the post-biopsy site and histopathological report showed metastatic

adenocarcinoma. The patient was finally diagnosed as primary lung adenocarcinoma (T2aN0M1a), and genetic tests were also sufficiently performed using pleural biopsy specimens.

## Discussion

LAT is used by an increasing number of respiratory physicians for diagnostic and therapeutic purposes in the setting of pleural disease. Proposed advantages of LAT using flex-rigid thoracoscope include ease of manoeuvrability in the pleural space, smaller incision site and lower anaesthetic requirements; with sensitivity of 91%, specificity of 100%, and 1.5% rate of major complications [1]. LAT allows pleural exploration and biopsies in conscious patients, and is safe and effective diagnostic modality [2], with high diagnostic accuracy as reported [3,4]. However, there is shortage of published data regarding the efficacy and safety of LAT in the absence of pleural fluid, either with or without use of TUS as procedural adjunct [5,6]. We previously reported that use of TUS offers many advantages, including ability to avoid adhesions and to target sites with best access in dry pleural dissemination [5]. In this case, it was possible to approach using real-time imaging with TUS identified the optimal thoracic entry site through visualization of lung-sliding sign.

In recent years, sufficient tissue sampling is essential for personalized medicine in lung cancer. There is a need for larger and better quality specimen to have sufficient sample for next generation sequencer. The flex-rigid thoracoscopy may not have enough specimens due to small forceps [6]. Increasing the demand for high quality tumour specimens, an alternative technology such as cryoprobe has been described for therapeutic and diagnostic purposes. The advantages of cryobiopsy include good quality samples with level of artefacts below 25%, larger, better preserved cellular architecture and tissue integrity with less operator time in difficult patients with thickened fibrotic pleura by reducing the number of passes required to improve diagnostic yield, and greater depth of tissue sample [7–9]. In spite of the above favourable evidence, cryoprobe is still not routinely used mainly because of concerns of bleeding, but reported studies showed no bleeding more significant than mild oozing [10]. In case with dry pleural dissemination, lung collapse during LAT may be weak and working space in the thoracic cavity may not be secured. Cryobiopsy is considered easy and quick to handle even in such a situation.

This case report has shown that LAT using flex-rigid thoracoscope can be safely done in patients even without

pleural effusion with the aid of TUS and visualization of lung-sliding sign, most importantly avoiding pleural adhesions. Moreover, cryobiopsy from pleural lesions is safe and well-tolerated even in dry pleural dissemination.

## Disclosure Statement

Appropriate written informed consent was obtained for publication of this case report and accompanying images.

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