

A Rare Complication of An Endobronchial Ultrasound-Guided Intranodal Forceps Biopsy (EBUS-IFB)

Marwa Oudah*, M.D., Daniel Baram, M.D., Khalil Diab, M.D.

George Washington University Hospital, Washington, D.C, UNITED STATES

*Corresponding author: Khalil Diab, George Washington University Hospital, Washington, D.C, UNITED STATES. Email: kdiab@mfa.gwu.edu

Citation: Oudah M, Baram D, Diab K (2024) A Rare Complication of An Endobronchial Ultrasound-Guided Intranodal Forceps Biopsy (EBUS-IFB). Annal Cas Rep Rev: ACRR-374.

Received Date: 13 January, 2024; **Accepted Date:** 25 January, 2024; **Published Date:** 05 February, 2024

Abstract

Endobronchial ultrasound-guided intranodal forceps biopsy (EBUS-IFB) is a novel technique used simultaneously after a transbronchial needle aspiration (TBNA). The TBNA needle creates a puncture path for the forceps to enter the lymph node for biopsy. The sample collected can provide an improved histological assessment to help diagnosed mediastinal lymphoma and sarcoidosis. We present the first case of a 22-gauge VizishotTM needle breaking off during sheath dilation for path formation. A 51-year-old man, never-smoker, with generalized weakness and a 30-pound unintentional weight loss presented with hypercalcemia at 13.4 mg/dL. A positron emission tomography (PET) scan confirmed extensive mediastinal and hilar adenopathy with increased uptake up to 7.9 max SUV. Due to suspicion of sarcoidosis or malignancy, he underwent EBUS with TBNA and IFB. TBNA was performed in stations 7 and 11L. Station 11L had the largest diameter and therefore was chosen for IFB. IFB puncture track was initially created using a 22-gauge VizishotTM needle. However, the needle tip was fractured in the lymph node during the fifth dilation pass and not visualized on the bronchial wall. The fractured needle underwent unsuccessful retrieval attempts using 2 mm forceps through the dilated tract. A new path was created with another 22-gauge VizishotTM needle sheet, and the 2 mm forceps advanced smoothly with a successful needle grip and removal. EBUS inspection showed complete removal of the needle. There were no post-procedure complications. Biopsy results showed non-necrotizing granulomas and were negative for infection or malignancy. He was diagnosed with pulmonary sarcoidosis. Most EBUS-IFB procedures were found successful using 19, 21, and 22-gauge needles with sheath dilation. Our case shows a potential complication of needle fracture related to sheath dilation. Further studies are needed to assess the efficacy and safety of various end-bronchial needles for IFB procedures.

Keywords: Endobronchial, ultrasound-guided, intranodal forceps, biopsy, needle, fracture, pulmonary sarcoidosis.

Introduction

Endobronchial ultrasound-guided intranodal forceps biopsy (EBUS-IFB) is a novel technique used concomitantly with a transbronchial needle aspiration (TBNA). First, EBUS-TBNA of a lymph node or other parabronchial lesion is performed with serial aspiration for cytology. After several samples and while the needle is within the target, the sheath is maximally extended through the scope and advanced into the lesion, dilating a pathway through which a 1.8 mm forceps can be advanced. We present the first case of a 22-gauge VizishotTM needle breaking off during sheath dilation for path formation.

Case Report

A 51-year-old man, never-smoker with generalized weakness and a 30-pound unintentional weight loss, presented with hypercalcemia at 13.4 mg/dL. A positron emission tomography (PET) scan confirmed extensive mediastinal and hilar adenopathy with increased uptake up

to 7.9 maximum Standardized Uptake Value (SUV) (Figure 1a). EBUS-TBNA was performed at Station 11L using an Olympus (Bartlett, TN) 22-gauge VizishotTM needle, and the material was sent for study. Additional passes were performed with sheath dilation. On the fifth needle passage, the needle was noted to fracture within the lymph node [Figure 1b]. The remnant was visible by EBUS without any portion remaining within the airway to allow easy retrieval. Boston Scientific (Marlborough, MA) Radial Jaw 4 forceps was inserted through the track under EBUS guidance into the node but was unsuccessful at grasping the fragment.

A new path was created using another 22-gauge VizishotTM needle more proximally. Then, forceps could grasp the needle fragment under EBUS guidance. The tip was retracted back into the airway where it could be removed under direct vision with a regular bronchoscope [Figure 1c]. EBUS confirmed no residual foreign body within the node.

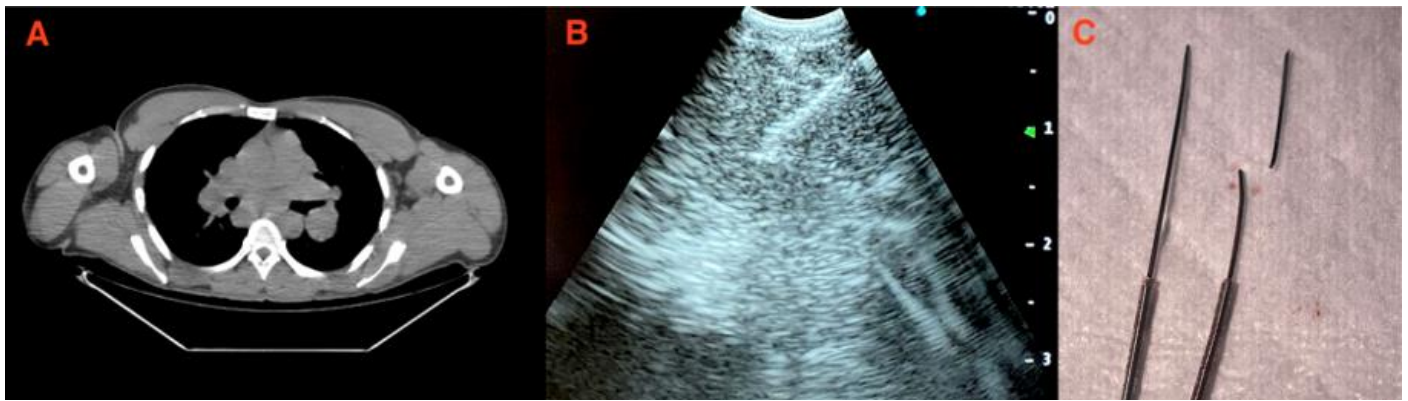


Figure 1a: Computerized tomography demonstrating extensive mediastinal and hilar adenopathy.

Figure 1b: A broken needle is seen in Station 11L lymph node

Figure 1c: An intact 22-gauge Vizishot™ needle compared to the broken 22-gauge Vizishot™ needle retrieved from the patient 11L lymph node

There were no post-procedure complications. Biopsy results showed non-necrotizing granulomas and were negative for infection or malignancy. He started on prednisone therapy for the diagnosis of pulmonary sarcoidosis with hypercalcemia.

Discussion

Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is used to diagnose malignant and benign lung diseases involving the mediastinum with high sensitivity and specificity. One limitation is the size of the samples which may be insufficient for genetic testing, cancer staging, and diagnosis of lymphoma and sarcoidosis [1].

Endobronchial ultrasound-guided intranodal forceps biopsy (EBUS-IFB) is a novel technique that has been shown to safely and effectively obtain larger tissue samples when paired with EBUS-TBNA with good diagnostic yield for sarcoidosis, lymphoma, and lung cancer. The procedure is performed using EBUS-TBNA of a lymph node or other parabranchial lesion with serial aspiration for cytology. After several samples and while the needle is within the target, the sheath is maximally extended through the scope. After sheath dilation and visual and ultrasound localization, a forceps biopsy is advanced into the orifice and used to obtain histologic sampling.

An observational study of 443 patients showed increased diagnostic yield for lymphoma (86% vs. 30%; $P=0.03$) and sarcoidosis (93% vs. 58%; when comparing EBUS-IFB vs. EBUS-TBNA respectively [$P < 0.00001$]) [2]. The combination of both techniques increased the overall diagnostic yield to 97% (72/74) ($P < 0.001$), which was significant when compared with EBUS-TBNA alone [3].

EBUS-IFB studies have shown success with needle sizes 19-21-22- and 25-gauge EBUS-TBNA needles [4]. Per the literature review, 22-gauge needles were most commonly used [5,6]. The forceps biopsy used in those studies was 1.0mm or 1.2mm. In our center, we have been using Olympus Vizishot™ and Vizishot2™ needles and the Boston Scientific Radial Jaw 4™ (M00515180), measuring 1.8 mm.

In our case, we were using a 22G Vizishot™ needle when the shaft of the needle separated from the sheath during sliding, failing to retract the needle within the sheath. There have been reported cases of 22G EBUS-needles fractures during needle aspiration, but none during sheath dilation for EBUS-IFB [7-9]. The only reported complications of EBUS-IFB in 443 patients were pneumomediastinum (1%), bleeding (0.8%), and respiratory failure (0.6%) [2].

Result

Our case shows a potential complication of needle fracture during sheath dilation. Further studies are needed to assess the efficacy and safety of various endobronchial needles for EBUS-IFB procedures.

Acknowledgement: None

Author contributions:

M. Oudah, K. Diab, B. Daniel wrote the manuscript and reviewed the literature.

M. Oudah, K. Diab, B. Daniel cared for the patient and contributed clinical data for the manuscript

Conflict of interest: No conflict of interest

Funding support: None

Reference

1. Ko HM, da Cunha Santos G, Darling G, et al. Diagnosis and subclassification of lymphomas and non-neoplastic lesions involving mediastinal lymph nodes using endobronchial ultrasound-guided transbronchial needle aspiration. *Diagn Cytopathol.* 2013;41(12):1023-103
2. Agrawal A, Ghorri U, Chaddha U, et al. Combined EBUS-IFB and EBUS-TBNA vs. EBUS-TBNA Alone for Intrathoracic Adenopathy: A Meta-Analysis. *Ann Thorac Surg.* 2022;114(1):340-348.
3. McLaughlin J, Liu C, Collins DT, et al. The Safety and Feasibility of Endobronchial Ultrasound Bronchoscopy-guided Intranodal Forceps Biopsies (EBUS-INF). *Clinical pulmonary medicine.* 2020;27(4):113-117.
4. Cheng G, Mahajan A, Oh S, et al. Endobronchial ultrasound-guided intranodal forceps biopsy (EBUS-IFB)- technical review. *J Thorac Dis.* 2019;11(9):4049-4058.

5. Herth FJ, Annema JT, Eberhardt R, et al. Endobronchial ultrasound with transbronchial needle aspiration for restaging the mediastinum in lung cancer. *J Clin Oncol*. 2008;26(20):3346-3350.
6. Darwiche K, Freitag L, Nair A, et al. Evaluation of a novel endobronchial ultrasound-guided lymph node forceps in enlarged mediastinal lymph nodes. *Respiration*. 2013;86(3):229-236.
7. Kuint R, Abutbul A, Fridlender ZG, et al. Endobronchial ultrasound needle breakdown during transbronchial needle aspiration. *J Bronchol Interv Pulmonol*. 2016;23(3): e32–e33.
8. Tariq SM. Accidental fracture of EBUS-TBNA needle during sampling of an enlarged mediastinal lymph node. *Oxf Med Case Reports*. 2016;2016(4):59-61.
9. Sharma D, Loh HC, Bellinger C. Where is the rest of that needle? Needle breakage: A rare complication of EBUS-TBNA. *Chest*. 2015;148(4):837A.