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Utilizing Radial EBUS in Bronchoscopic Evaluation of Lung Nodules Detected in Lung Cancer Screening Program

Clinical Case Report



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Introduction

The introduction of lung cancer screening programs across Europe has presented a new challenge in determining the etiology of peripheral lung lesions¹. Although CT-guided transthoracic biopsy is a standard procedure for such cases, with diagnostic yield of 90%, the significant burden of periprocedural complications highlights the need for a safer and more successful diagnostic alternative^{2,4}. Bronchoscopy with a slim bronchoscope combined with radial endobronchial ultrasound (radial EBUS), offers a viable approach for sampling peripheral lesions significantly reducing the risk of iatrogenic complications such as pneumothorax and bleeding⁴. Here we present the case of a patient who underwent both procedures.

Case Presentation

A 63-year-old male was referred to our clinic for a diagnostic workup following a suspicious nodule detected in the left upper lobe of the lung on low-dose computed tomography (LDCT) as part of the Croatian National Lung Cancer Screening Program (Figure 1). The patient had a significant smoking history with a cumulative exposure of 45 pack-years and occupational exposure to wood dust. He did not have malignant diseases in his family history and he was without any significant comorbidities. Laboratory investigations did not reveal any abnormal findings. Initially the patient was presented for transthoracic biopsy under multislice computed tomography (MSCT). A positron emission tomography-computed tomography (PET-CT) scan was also recommended.

Two biopsy cores were successfully obtained, however the procedure was complicated by moderate bleeding (Figures 2,3). The patient was subsequently observed in the Day Care Unit and was discharged after several hours without further incident.



Figure. 1

Figure. 2

Figure. 3

Pathologic examination of the biopsy specimens revealed a limited number of atypical cells, which were insufficient for comprehensive pathological analysis. In case of sustained clinical suspicion, a repeated biopsy was advised.

Following the transthoracic CT-guided biopsy the patient was referred for a bronchoscopy and radial EBUS procedure. Bronchoscopy was performed using the BF-P190 bronchoscope, and showed no evidence of endoluminal pathology. Subsequently, an examination using the radial EBUS mini-probe (UM-S20-17S) was conducted. The procedure was performed with the GuideSheath Kit (K-401) and revealed an irregular pathological echo in the LB2 subsegmental bronchus. (Figure 4).





The preplanned sampling strategy involved obtaining tissue samples utilizing all tools available with the GuideSheath Kit which consists of biopsy forceps, a cytology brush and catheter aspiration. Additionally, to maximize tissue yield for pathological analysis especially given the challenging location of the lesion, transbronchial needle aspiration (TBNA) was additionally performed using the PeriView FLEX 21G needle. Biopsy samples, three TBNA samples, cytology brush and catheter aspirate were successfully collected. The procedure was completed without any periprocedural complications.

Pathological analysis of collected specimens confirmed a diagnosis of lung adenocarcinoma. Predictive biomarker testing showed that the tumour was negative for EGFR, ALK, and ROS1 mutations, with a PD-L1 expression of 70%. After PET-CT scan that confirmed operable disease the patient was referred to thoracic surgery.

Conclusion

Peripheral lung nodules pose a significant diagnostic challenge in clinical practice. As lung cancer screening programs become more widely implemented there is increasing demand for accurate characterization of these nodules¹. Radial EBUS represents a viable and effective diagnostic method for assessing peripheral lung nodules with a diagnostic yield of approximately 70% and a valuable safety profile in comparison with the CT-guided transthoracic biopsy^{4,6}. We found the GuideSheath supportive for the positioning of the target lesion during sampling, while the combination of multiple sampling techniques helped to collect sufficient tissue acquisition for comprehensive pathological analysis.

It was also beneficial, in this case to incorporate the PeriView FLEX 21G needle into the armamentarium of sampling tools. This needle is particularly valuable for smaller lesions or in cases with an eccentric ultrasound view during a radial EBUS examination. In this patient, radial EBUS was the diagnostic method that confirmed lung adenocarcinoma and the selected sampling tools successfully provided sufficient tissue for complete pathological analysis including predictive biomarker testing.

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