

Endoscopic Radiofrequency Ablation with Radial-Ebus and ROSE for Pulmonary Single Nodule Novel Diagnostic and Therapeutic Approach

PAVLOS ZAROGOULIDIS, M.D, Ph.D

DIRECTOR OF PULMONARY DEPARTMENT, GENERAL CLINIC EUROMEDICA, THESSALONIKI, GREECE

ABSTRACT

Background: Single pulmonary nodules are a common issue in the everyday clinical practice. Currently there are navigation systems with radial-ebus and electromagnetic navigation for obtaining biopsies. Moreover; rapid on site evaluation (ROSE) can be used for a quick assessment. These small lesions even when they do not have any clinical significant information with positron emission tomography it is important that are investigated. Radiofrequency and microwave ablation have been evaluated as local treatment techniques. These techniques can be used as therapy for a patient population that cannot be operated. Equipment and Methodology:Radial-Ebus and Rapid on Site Evaluation (ROSE) were used for diagnosis. PET-CT end CONVEX EBUS were used for staging. COVIDIEN radiofrequency probe with 25watts for 8minutes was used as an ablation system. Currently there is one verified operating system used for endoscopic radiofrequency ablation through the working channel of a bronchoscope. Results: Complete and successful ablation was conducted, evaluation of the treatment was performed on site with the radial-ebus, computed tomography scan with i.v contrast and later with PET-CT. Conclusion: In our case a new system was used in order to perform radiofrequency ablation with long term follow up.

Keywords: lung cancer, ablation, radial-EBUS, ROSE, navigation, FNA

CONTACT

PAUL ZAROGOULIDIS, M.D, Ph.D
DIRECTOR OF PULMONARY DEPARTMENT, GENERAL CLINIC EUROMEDICA, THESSALONIKI, GREECE
Email: pzarog@hotmail.com
Phone: 00306977271974
Website: zarogoulidis-pneumologos.gr

INTRODUCTION

Nowadays, radial-endobronchial ultrasound (EBUS) and electromagnetic navigation can be used to perform a biopsy in pulmonary nodules with a high rate of efficiency. Moreover, over the past decade, rapid on-site evaluation (ROSE) has been used to identify malignant lesions. In the case of a single nodule without any other cancer metastatic site, surgery or ablation is performed. Currently, ablation is performed under computed tomography guidance with radiofrequency, microwave, and thermosphere probes. In our case, a Covidien radiofrequency system was used.

METHODS AND MATERIALS

A 65-year-old woman, nonsmoker, was diagnosed in our outpatient cabinet with a single pulmonary nodule in the left lower lobe. Positron emission tomography was performed, and a significant SUV uptake of 8.9 was observed in the nodule (Figure 1). The patient had a persistent cough for 3 weeks, she did not report fever, and her laboratory findings were within normal range. It was decided to have a radial-endobronchial ultrasound with C-ARM for diagnosis with ROSE and convex-endobronchial ultrasound with rapid on-site evaluation for staging (Figure 2). Indeed, the ROSE technique evaluated non-small-cell lung cancer (NSCLC) for the single pulmonary nodule, and lymph node staging by ROSE revealed no metastasis in the lymph nodes or other organs. Local radiofrequency ablation with an endoscopic radiofrequency probe was proposed.

RESULTS

The patient agreed to the minimally invasive procedure of endoscopic radiofrequency ablation. We used two sessions of 20 s each with 40 W. The patient was intubated with a 7.5-mm tracheal tube with a high-volume, low-pressure cuff and was under jet ventilation. The consistency of the nodule was evaluated before and after the procedure with radial-endobronchial ultrasound, and computed tomography verified the results. The patient had a spirometry and heart examination before the procedure to be prepared in the case of lobectomy. We had, at our disposal, balloon blockers and hemostatic dry powder in the case of hemorrhage. After 1 year of follow-up, the patient is disease-free. We performed computed tomography scanning with i.v. contrast infusion after 40 days for disease evaluation and PET-CT after 3 months of the procedure according to guidelines.

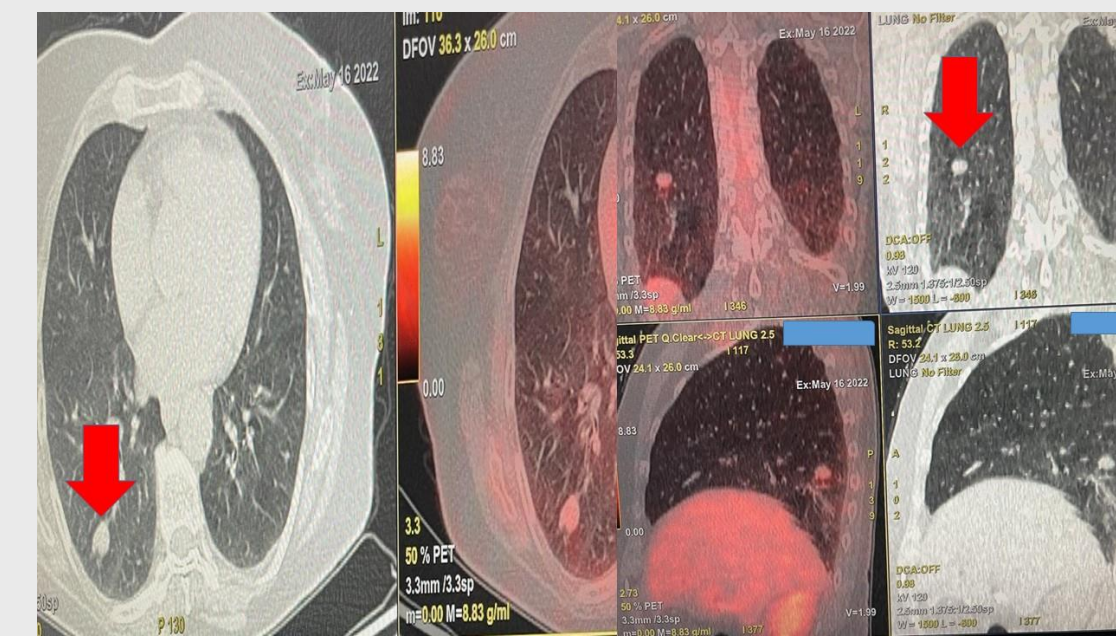


Figure 1. Positron emission tomography findings upon diagnosis. The red arrow indicates the single nodule.

DISCUSSION

ablation is another solution for these patients or those who cannot undergo surgery due to comorbidities. Until recently, we performed ablation under computed tomography with radiofrequency or microwave needles. Both probes are equally efficient; however, the ablation time is less with microwave needles. Each probe has its advantages and disadvantages, which will not be discussed here. The main adverse effects are pneumothorax, hemothorax, or bleeding. Currently, we have evaluated one system for endoscopic radiofrequency ablation. There are technical differences between the percutaneous ablation systems and the endobronchial ultrasound; however, the result is the same. Moreover, the same system that produces steam for emphysema treatment has been used as a thermal endoscopic ablation system in Australia.



Figure 2. Left upper-row red arrow indicates the lesion before ablation, the left lower row demonstrates the lesion sign with radial-EBUS, the right upper-row red arrow indicates the area after two sessions of thermal effect with radiofrequency ablation, and the right lower row demonstrates the lesion sign after the ablation. EBUS, endobronchial ultrasound.

DISCUSSION

For the first time, a Covidien endovascular radiofrequency system was used with more watts and double time based on the previous knowledge from the radiofrequency probes used for computed tomography ablation. The effect of ablation was evaluated with radial-EBUS. The results were encouraging based on our long-term follow-up, and technical aspects of the procedure will be improved since we have two catheters of short and long lengths, 3 and 7 mm, respectively. Finally, computed tomography scanning with i.v. contrast infusion was used to evaluate disease relapse after 30–40 days of ablation. Positron emission tomography was avoided under several weeks since there is going to be a pseudo-positive result of increased SUV due to local inflammation.

CONCLUSIONS

The most important issue is that we can evaluate the effect of radial-EBUS on site after every session of ablation and decide whether to continue or not. We did not have any adverse effects, and the procedures were terminated after 45 min. The only reason for the delay was the approach of the nodule.

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