Case 12262
18F-FDG PET-CT to Evaluate Immediate Response After Radiofrequency Ablation of Lung Tumors

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Section: Interventional Radiology
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Patient: 35 year(s), female

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Clinical History
A 35 year-old female with history of synovial sarcoma resection of lower left limb. Follow-up CT showed a lung nodule. During follow-up, an increased in lung lesion size was observed. Radiofrequency ablation of the pulmonary lesion was performed under CT guidance.

Imaging Findings
Follow-up chest CT demonstrated a 6.6 mm nodule in the anterior segment of right upper lobule, with progressive growth in time, reaching 27 mm. (Figure 1)
PET-CT demonstrated metabolic activity of the pulmonary nodule. (Figure 2)
CT-guided pulmonary RFA was performed. (Figure 3)
A total 8 mCi of FDG was administered immediately after the procedure. Sixty minutes later PET-CT was performed and demonstrated no metabolic activity of the treated lung nodule. (Figure 4) Follow-up CT at 3 and 6 months showed a cavitary sequelar and no evidence of the lesion. (Figure 5)
Discussion

Lung radiofrequency ablation (RFA) is a minimally invasive technique used to treat pulmonary malignancies as an alternative to surgery and radiotherapy, with minimal procedure related complications. [1] RFA is indicated in patients with early stage non-small cell lung cancer (NSCLC) who are not eligible for surgery, in patients with end stage NSCLC, cases with tumor recurrence and in metastatic lung disease. In a curative intent, RFA success depends on anatomical criteria, such as nodule size and location. Lesions larger than 5 cm should be excluded from RFA, whereas lesions from 3 to 5 cm should be considered with caution because of the high incidence of recurrence. [2]

The most common CT findings during lung RFA are: a cone-shaped sectorial hyperemia or hyperemia rim, characterized by ground-glass opacity, which may circumferentially or partially envelop the target lesion and intralesional bubbles. [3] These findings might be related to reported appreciable rates of recurrence, varying from 7% to 55% between 1 and 3 years of follow-up, considering CT, a suboptimal image guiding method for these ablative procedures. [4] PET/CT imaging allows immediate analysis of the lesions metabolic activity and is accurate for staging, surveillance and therapeutic response evaluation. [5, 6] It became a useful tool for assessing treatment response during and after RFA; and a reliable predictor of local recurrence. [7] During ablation the lesion presents a peripheral ring-shaped area of hypermetabolic activity surrounding the ablated tumor. [8]

In this reported case, performing PET/CT immediately after the procedure was a useful technical tool, assessing ablation and allowing the possibility to continue the procedure if hyperactivity remained, aiming to decrease the chance of tumor recurrence. Further larger studies are needed in order to consider this modified algorithm, as a step forward for improving ablation procedures success rates. [9]

Final Diagnosis

lung metastasis

Differential Diagnosis List

Lung metástasis, Lung Tumor

Figures

Figure 1 Chest CT scan
May 2011. Showed lung metastasis in the anterior segment of right upper lobule of 6.6mm of diameter.

Chest CT scan of December 2013, showed increasing size lung metastasis compared with previous study (fig. 1a).

Figure 2 PET-CT

Area of Interest: Lung;
Imaging Technique: PET-CT;
Procedure: Diagnostic procedure;
Special Focus: Metastases;

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December 2013. Shows progression of the metabolic activity of lung metastasis, despite treatment (figure 2a).

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Figure 3 Radiofrequency Ablation
Figure 4 Findings immediately after RFA.
Ground-glass area around the lesion, sign of a successful procedure.

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PET-CT 1 hour after RFA. Shows absence of metabolic activity of the metastasis lung.

Area of Interest: Lung;
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Procedure: Diagnostic procedure;
Special Focus: Metastases;

Figure 5 CT follow-up
CT follow-up at 3 months. cavitary sequelar and no evidence of the lesion

Area of Interest: Lung;
Imaging Technique: CT;
Procedure: Diagnostic procedure;
Special Focus: Metastases;

CT follow-up at 6 months. cavitary sequelar and no evidence of the lesion

Area of Interest: Lung;
Imaging Technique: CT;
Procedure: Diagnostic procedure;
Special Focus: Metastases;

References


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