Patient History

This patient is a 22-year-old woman with a long history of uncontrolled asthma who presented to the emergency department in early January 2012 with shortness of breath and chest tightness. The patient also complained of new upper thoracic sharp pain over the previous week. A chest X-ray showed an abnormal bulging of the mediastinal contour in the right hilar region.

A subsequent chest CT showed a centrally necrotic right anterior mediastinal mass measuring approximately 5.4 cm x 3.8 cm. The mass extended medi-ally and anteriorly between the ascending aorta and sternum. Differential diagnoses at that time included thymoma, lymphoma, and teratoma. The CT also showed an extensive lytic lesion within the T2 vertebral body, with abnormal soft tissue extending into the paravertebral space and partially surrounding the esophagus, posterior to the trachea.

A plan was developed to treat the asthma exacerbation and to further evaluate the CT findings. A CT-guided core biopsy of the right anterior mediastinal mass was performed, demonstrating a staining pattern raising the possibility of Hodgkin’s lymphoma—nodular sclerosis subtype. Following an oncology consultation, an ¹⁸F-FDG PET/CT staging exam was ordered.

¹⁸F-FDG PET/CT Findings

The ¹⁸F-FDG PET/CT demonstrated intense FDG accumulation within the anterior mediastinal mass, consistent with tumor. There was centrally diminished uptake in the mass, compatible with necrosis. The ¹⁸F-FDG PET/CT also showed intermediate FDG accumulation within a low right paratracheal lymph node, likely due to local tumor involvement.

Intense FDG accumulation was also seen within the lytic lesion nearly completely destroying the T2 vertebral body, with destruction both anteriorly and posteriorly. There was also associated soft tissue mass along anterior aspects of T1, T2, and T3 vertebral bodies, consistent with tumor, approximately 4.2 cm in craniocaudal dimension and 1.2 cm in AP dimension. Also, there was some scalloping and sclerosis in the adjacent T1 and T2 vertebral bodies, most consistent with bony involvement. In addition to supporting the presence of likely tumor in the mediastinal mass and thoracic spine, the PET/CT report emphasized the near destruction and likely instability of the T2 vertebra and recommended further surgical evaluation of this issue. An MRI was recommended in order to evaluate for the presence of any associated spinal canal narrowing.

Due to the possible instability of her spine, the patient was admitted to the hospital on an urgent basis shortly after the ¹⁸F-FDG PET/CT exam and was to be discharged to a tertiary care medical center for neurosurgical evaluation.

How Did ¹⁸F-FDG PET/CT Help?

¹⁸F-FDG PET/CT played an important role in this case in helping to confirm the likelihood of tumor within the known mediastinal mass. Importantly, PET/CT was also able to demonstrate the extent of the FDG-avid lytic lesion within the T2 vertebra and surrounding soft tissue and bony involvement, and particularly the likelihood of spinal instability, leading to an urgent change in the patient’s treatment plan.

Even-Sapir et al¹ have discussed the important role that ¹⁸F-FDG PET/CT can play in accurate localization of disease and evaluation of extranodal involvement in patients with Non-Hodgkin Lymphoma and Hodgkin’s Disease. In this case, ¹⁸F-FDG PET/CT proved invaluable in identifying the somewhat uncommon bone involvement in Hodgkin’s Disease in this patient.