

¹⁸F NaF bone scan in a patient with lung cancer and skeletal metastases

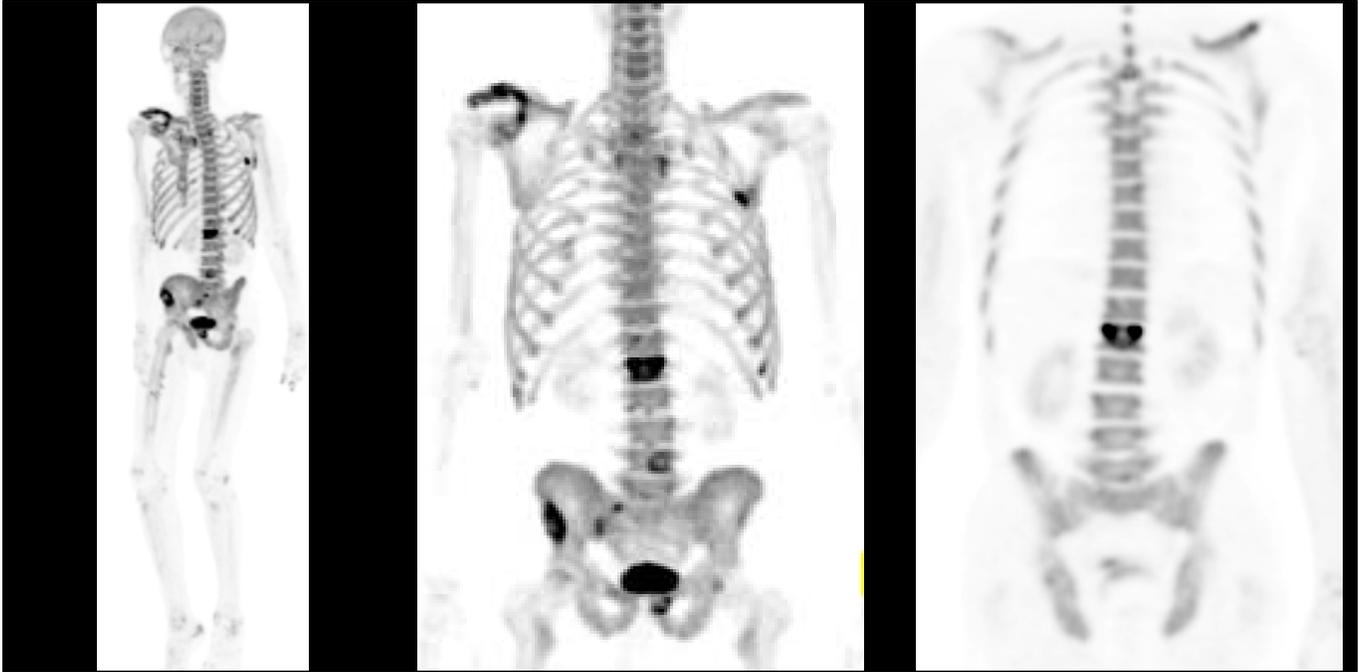
Clinical History

A 65-year-old man with a history of lung carcinoma and treated with chemoradiation presented with back pain. The patient was referred for an sodium fluoride F 18 (¹⁸F NaF) PET•CT bone study for evaluation of skeletal metastases.

Imaging Findings

Imaging Technique*

A whole body PET•CT study was performed approximately 90 minutes after intravenous administration of 10.0 mCi ¹⁸F NaF. Acquisition parameters: 7 bed positions at 3 min/bed. Standard whole body acquisition 16x168 matrix.

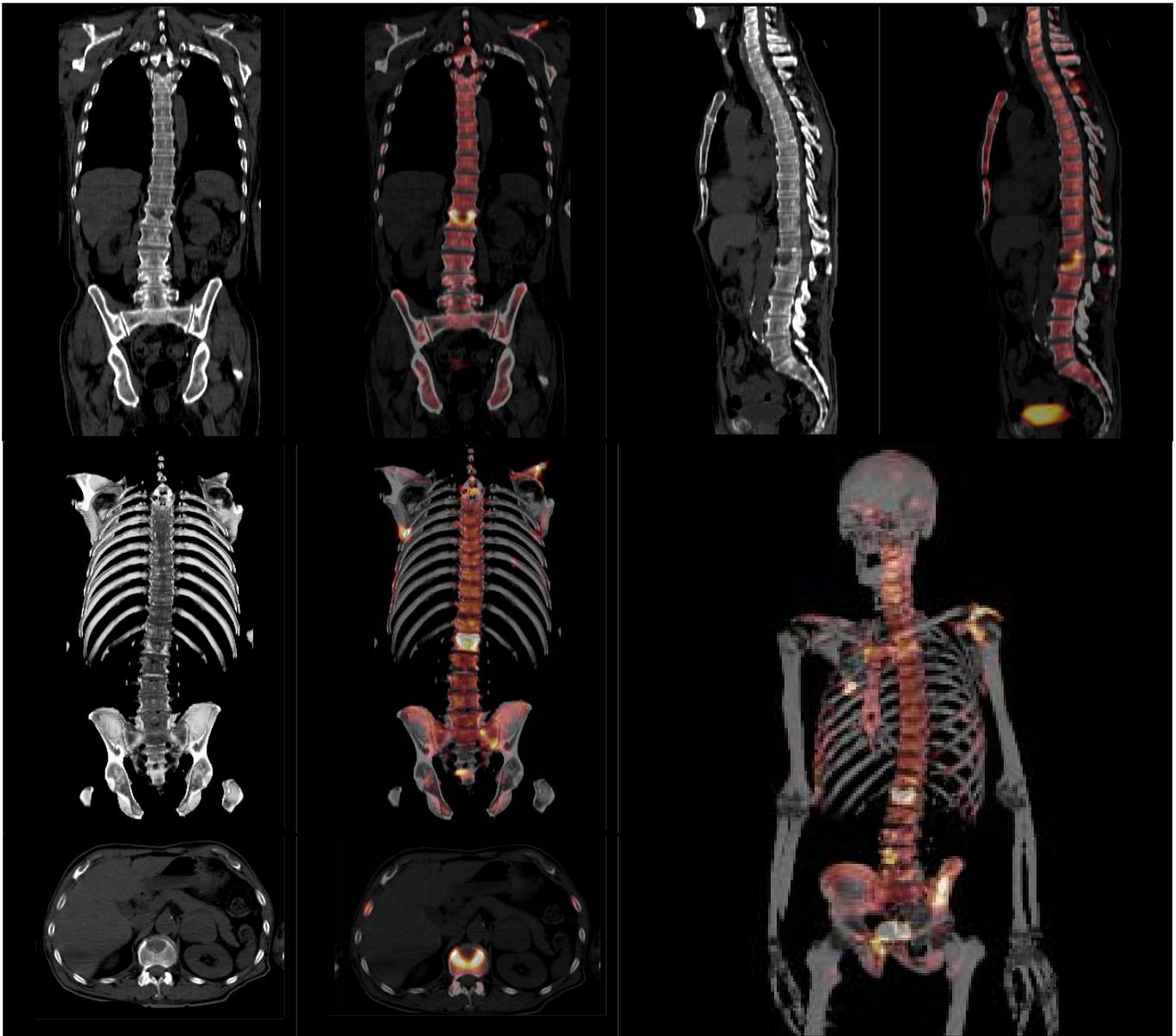


Imaging Findings

The whole body ¹⁸F NaF study showed focal areas of increased skeletal metabolism in the body of L1 and L4 vertebrae with central hypointense areas suggestive of bone metastases with associated central lysis. The CT images also showed corresponding lytic areas with surrounding sclerosis.

Focal hypermetabolism was also visualized in right sacral ala, right sacro-iliac joint, anterior margin of right Iliac crest, left pubic bone and right 5th rib.

Small bony lesions in the sacrum, right sacro-iliac joint and left pubic bone showed high lesion contrast in the PET images.



Discussion

Improved image quality with ^{18}F NaF PET•CT is related to the high and rapid bone uptake of sodium fluoride F 18 injection along with rapid blood clearance, high count rate efficiency and accurate attenuation correction of PET•CT. This makes ^{18}F NaF PET•CT an efficient alternative to $^{99\text{m}}\text{Tc}$ MDP bone scintigraphy.

The advantages of ^{18}F NaF PET and PET•CT over $^{99\text{m}}\text{Tc}$ MDP planar and SPECT bone scanning have been published in several studies. In one study published by Schirrmeister, ^{18}F NaF PET•CT was compared to $^{99\text{m}}\text{Tc}$ MDP planar and SPECT bone scanning in 53 patients with lung carcinoma. PET identified 11 true positive patients while SPECT identified 9 out of the 11. Both studies identified 41 true negatives. SPECT had one false negative while PET had none.

In this case, improved image quality and high lesion contrast provided by PET•CT further improved the sensitivity and improved the delineation of small skeletal metastases in the sacrum and sacro-iliac joint. The CT images helped the physician characterize the lesions by revealing changes within the skeletal lesions and especially by the delineation of central lysis in the vertebral metastases which is common in lung carcinoma.

Reference

1. Schirrmeister et al. Prospective evaluation of the clinical value of planar bone scans, SPECT and (18)F-labeled NaF PET in newly diagnosed lung cancer. J Nuc Med 2001; 42(12):1800-1804.

Data courtesy of Thompson Cancer Survival Center, Knoxville, Tennessee, USA

* Any of the protocols presented herein are for informational purposes and are not meant to substitute for clinician judgment in how best to use any medical devices. It is the clinician that makes all diagnostic determinations based upon education, learning and experience.