Continuing Medical Education Article

Oncologic PET/MRI, Part 2: Bone Tumors, Soft-Tissue Tumors, Melanoma, and Lymphoma

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Disclosure

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Target Audience

This article contains information of value to oncologists and other professionals working with molecular imaging, CT, PET, or MRI.

Objectives

On successful completion of this activity, participants should be able to describe:

1. The advantages and disadvantages of PET/MRI in oncologic applications in comparison to conventional imaging methods and PET/CT.
2. The limitations of PET/MRI compared with invasive staging procedures (biopsy).
3. The metabolic–anatomic imaging procedure of choice (PET/MRI vs. PET/CT) based on tumor entity and location.

Questions
1. Compared with PET/CT, which of the following statements is correct for whole-body PET/MRI in primary bone tumors?
   A. The radiation dose applied is higher.
   B. PET/MRI offers accurate local tumor staging and whole-body staging in a single session.
   C. PET/MRI is less accurate for the detection of bone metastases.
   D. PET/MRI cannot be used for planning biopsies of the primary tumor.

2. Which of the following characterizes PET/MRI?
   A. Short acquisition times.
   B. Ability to detect sub–millimeter-sized micrometastases.
   C. New insights into biologic response of tumor tissue to local or systemic therapy.
   D. More accurate N-staging than PET.

3. Which statement is correct for true simultaneous PET/MRI compared with sequentially acquired and retrospectively fused PET and MRI?
   A. Simultaneous PET/MRI provides less accurate coregistration of PET and MRI.
   B. Sequential acquisition of PET and MRI requires less time than simultaneous PET/MRI.
   C. Functional MRI sequences cannot be acquired during simultaneous PET/MRI.
   D. Simultaneous PET/MRI provides accurate temporal coregistration of functional PET and MRI.

4. Which is an indication for whole-body PET/MRI in melanoma patients?
   A. Initial staging for all melanoma patients.
   B. T-staging of the primary tumor.
   C. Initial staging of high-risk melanoma.
   D. As a replacement for sentinel lymph node biopsy in patients with higher-risk melanomas.

5. Which is an advantage of PET/MRI over PET/CT in lymphoma patients?
   A. Ability to differentiate thymic rebound from recurrent lymphoma.
   B. Lower requirements for administered activities of radiopharmaceuticals than PET/CT.
   C. Ability to differentiate lymphoma subtypes and potential to replace biopsy.
D. Standard of care for early response assessment.

6. Which of the following is an indication for whole-body PET/MRI over PET/CT in soft-tissue sarcoma patients?
A. Definite diagnosis of newly diagnosed soft-tissue masses.
B. Detection of the primary in patients with sarcoma metastases but unknown primary.
C. Detection of small (<1 cm) lung metastases.
D. Initial T-staging of the primary tumor.

7. Which statement is correct about the overall diagnostic accuracy of PET/MRI for the detection of bone metastases?
A. Lower than radiography.
B. Lower than PET/CT.
C. Higher than PET/CT.
D. Equal to CT.

8. Which statement is correct about lymph node staging using PET/MRI in malignant primary bone tumors?
A. PET/MRI is as accurate as PET/CT.
B. Lymph node staging cannot be performed with PET/MRI.
C. PET/MRI is more accurate than lymphadenectomy and pathology.
D. Separate imaging sessions for PET and MRI are preferential.

9. Which statement applies to PET/MRI for detection of bone metastases?
A. MRI detects bone marrow invasion before the development of structural damage.
B. PET/MRI is less sensitive than bone scintigraphy.
C. PET/MRI is less sensitive than PET/CT.
D. The sensitivity of PET/MRI is independent of the radionuclide used.

10. PET/MRI is more accurate than PET/CT for detection of common distant metastases in which organs?
A. Brain, bone, and liver.
B. Bone, liver, and pancreas.
C. Brain, bone, and lung.
D. Brain, liver, and kidneys.