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IMAGES IN HEMATOLOGY

^{11}C-Methionine PET/CT for multiple myeloma

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A 57-year-old woman with 6-year history of IgA-λ myeloma experienced an increase of serum IgA level from 331 to 683 mg/dl during maintenance therapy with thalidomide after autologous peripheral blood stem cell transplantation followed by allogeneic mini-transplantation. Bone marrow aspiration revealed no sign of relapse of the myeloma. We conducted positron emission tomography/computed tomography (PET/CT) scans using ^{11}C-methionine (MET) and ^{18}F-fluorodeoxyglucose (FDG). In MET-PET/CT, there were multiple abnormal hypermetabolic lesions, while FDG uptake in these lesions was faint (Fig. 1). After four courses of bortezomib therapy, MET-PET/CT revealed no abnormal uptake of MET, with decreased serum IgA level (25.3 mg/dl), indicating that MET uptake was correlated with the clinical course, as denoted by IgA level.

^{11}C-Methionine is a radiolabelled PET tracer that is clinically used for brain tumor. An earlier study reported that MET-PET depicted active myeloma clearly, which might reflect the increased metabolism of amino acids in myeloma cells for producing abundant immunoglobulin [1]. In the present case, MET-PET/CT was very useful for determining the precise localization of the myelomatous lesions and evaluating therapeutic effects. Although FDG-PET/CT is reported to have higher sensitivity for localized myelomatous lesions than other imaging modalities, our case suggests the possibility that MET-PET/CT detects myelomatous lesions more clearly than FDG-PET/CT. Considering that in myeloma patients higher FDG uptake or a larger number of FDG-avid lesions is reported to be associated with inferior overall survival and event-free survival, the lower FDG uptake in this patient is possibly related to the slowly progressive nature of her myeloma. In addition, in 30% of myeloma patients, FDG-PET/CT reportedly failed to show the abnormal findings in the spine and pelvis; this may account for the lower FDG uptake in these lesions.

Although many imaging modalities, including FDG-PET/CT are now widely available, the findings of the present case suggest that MET-PET/CT can provide valuable information for patients with myeloma and has a potential to become an important imaging test. However, further investigation to compare the MET-PET/CT with FDG-PET/CT or other imaging modalities are needed to confirm the diagnostic efficiency and the clinical feasibility of MET-PET/CT for multiple myeloma.

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Reference

1. Dankerl A, Liebisch P, Glatting G, Friesen C, Blumstein NM, Kocot D, et al. Multiple myeloma: molecular imaging with ^{11}C-methionine PET/CT—initial experience. Radiology. 2007; 242(2):498–508.

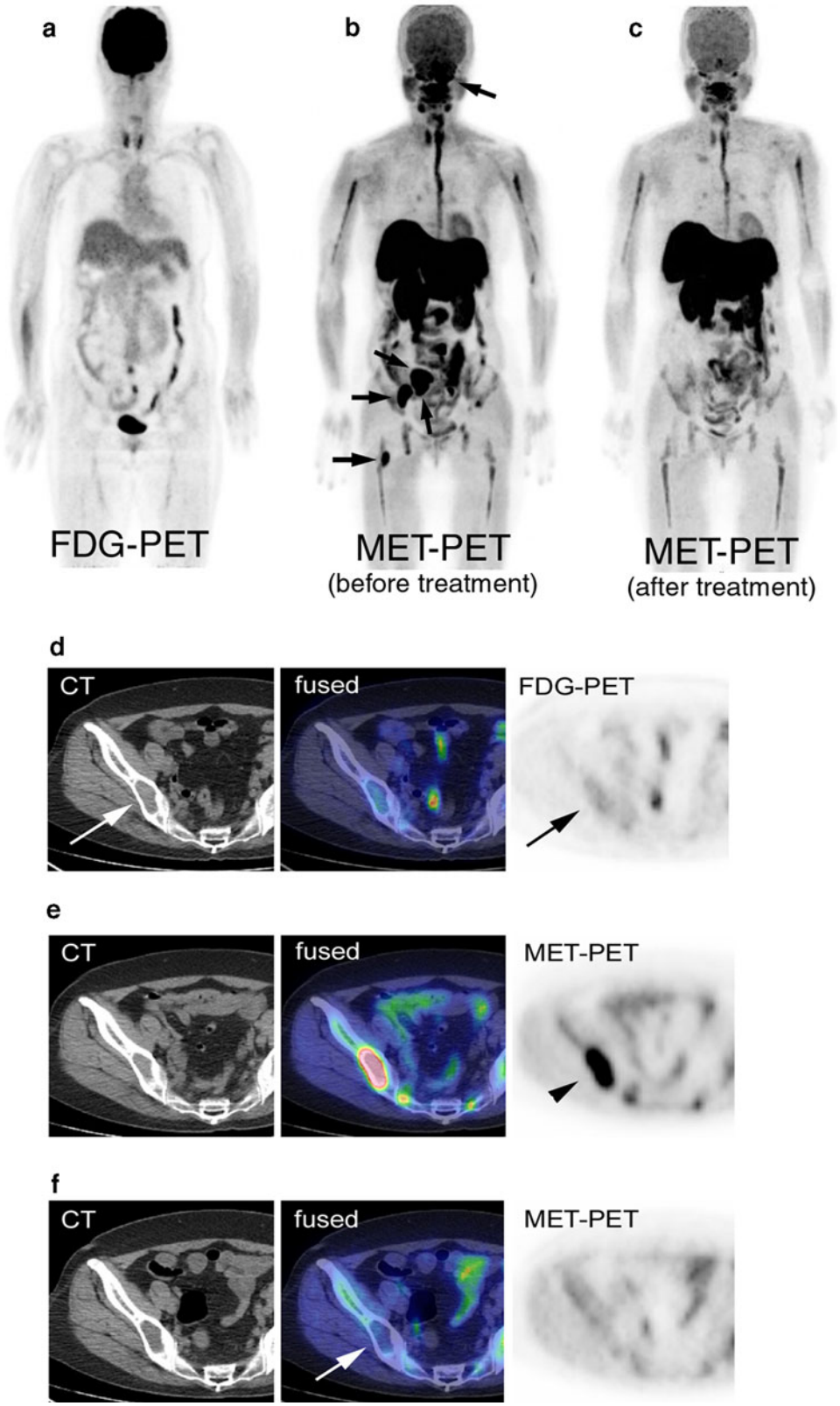

Fig. 1 Images of the whole body of FDG-PET (**a**), MET-PET before treatment (**b**), and MET-PET after treatment (**c**); and images of the right iliac bone of FDG-PET/CT (**d**), MET-PET/CT before treatment (**e**), and MET-PET/CT after treatment (**f**). FDG-PET showed slight abnormal uptake in only the right iliac bone and fifth lumber vertebra (the maximal standardized uptake value, 2.7) (**a**, **d**), corresponding to the osteolytic lesion seen on CT scan (**d** *white arrow*). In contrast, MET-PET showed intense uptake in the right iliac bone (**e** *arrowhead*), right neck of the femoral bone, fifth lumbar vertebra, sacral bone, and base of the skull (the maximal standardized uptake value, 13.2) (**b** *black arrows*). After four courses of bortezomib therapy, MET-PET showed that the abnormal accumulation disappeared (**c**) (**f** *white arrow*). Physiological uptake of FDG was shown in the brain and urinary tract and that of MET was shown in the gastro-intestinal tract, liver, pancreas, urinary tract, and salivary glands