Intramedullary Spinal Cord Metastasis from Breast Cancer Mimicking Delayed Radiation Myelopathy: Detection With ^{18}F -FDG PET/CT

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We present the case of a 53-year-old woman with breast cancer who developed vertebral body metastases at the 7-10th thoracic vertebrae (Th7-10) and started radiotherapy in April 2011. Radiotherapy was administered in 15 fractions of 2.5 Gy each to the vertebral bodies. Total dose to the tumor was 37.5 Gy. She gradually developed severe paresthesia and numbness of the lower extremities, and sensory deficit below the Th7 level was revealed in July 2013. Laboratory tests, which included cerebrospinal fluid analysis, were unremarkable. Magnetic resonance imaging (MRI) of the spinal cord demonstrated an intramedullary enhanced lesion extending at the Th7-8 level on gadolinium-enhanced images (Fig. 1a). T2-weighted images showed an oval hyperin-

tense signal area and edema (Fig. 1b). Suspected diagnoses according to MRI were intramedullary spinal cord metastasis (ISCM) or delayed radiation myelopathy (DRM). Subsequent ^{18}F -fluorodeoxyglucose positron emission tomography/computed tomography (^{18}F -FDG PET/CT) (injected dose, 267.7 MBq; serum glucose level, 103 mg/dl; time between injection and acquisition: 60 min [early], 120 min [delayed]) showed focal uptake at the Th7 to Th8 level of the spinal cord (maximum standardized uptake value [SUVmax]: 2.76, early; 3.60, delayed) on early (Fig. 1c) and delayed (Fig. 1d) slices. The avid lesion had fusiform morphology. Delayed ^{18}F -FDG PET-CT showed a 30.4 % increment of SUVmax (retention index was 30.4 %) that suggested malignancy; therefore we suspected ISCM. She received steroid pulse therapy for discrimination from DRM, but it was not effective and neurological findings were getting worse. Follow-up MRI showed expansion of the intramedullary lesion and new appearance of the vertebral body metastasis at Th3 on gadolinium-enhanced images in April 2014 (Fig. 1e). On the basis of her clinical and radiological findings, ISCM was diagnosed.

The results of such studies showed that most of the SUV values in malignant lesions were increased in the delayed scan and for most benign lesions these delayed values decreased [1]. In ^{18}F -FDG PET/CT images, ISCM showed pathological FDG uptake, but, on the other hand, DRM showed no pathological FDG uptake [2, 3].

In conclusion, ^{18}F -FDG PET/CT has an important role to play in the diagnosis of ISCM and the differentiation from DRM.

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Fig. 1 **a** Gadolinium-enhanced MRI. **b** T2-weighted MRI. **c** Early ^{18}F -FDG PET/CT. **d** Delayed ^{18}F -FDG PET/CT. **e** Follow-up gadolinium-enhanced MRI 3 years later

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Conflicts of Interests Terufumi Kawamoto, Toshinari Yamashita, Satoshi Kaito, Yoshiharu Miura declare that they have no conflict of interest.

Informed Consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from the patient for whom identifying information is included in this article.

Statement The manuscript has not been published before or is not under consideration for publication anywhere else and has been approved by all co-authors.

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