

## Performance of Fluorodeoxyglucose—Positron-Emission Tomography/Computed Tomography for Evaluating Tumor Response to Nonsurgical Treatment

Keiichi Ishihara<sup>1,2</sup>, Yasuhiro Kobayashi<sup>3</sup>, Marie Iwano<sup>3</sup>, Masato Shiiba<sup>2,3</sup>,  
Hisashi Yoshihara<sup>2,3</sup>, Hidetaka Satoh<sup>2,3</sup>, Kazuyoshi Akiyama<sup>1,2</sup> and Shin-ichiro Kumita<sup>2,3</sup>

<sup>1</sup>Clinical Imaging Center for Healthcare, Nippon Medical School

<sup>2</sup>Department of Clinical Radiology, Graduate School of Medicine, Nippon Medical School

<sup>3</sup>Department of Radiology, Nippon Medical School Hospital

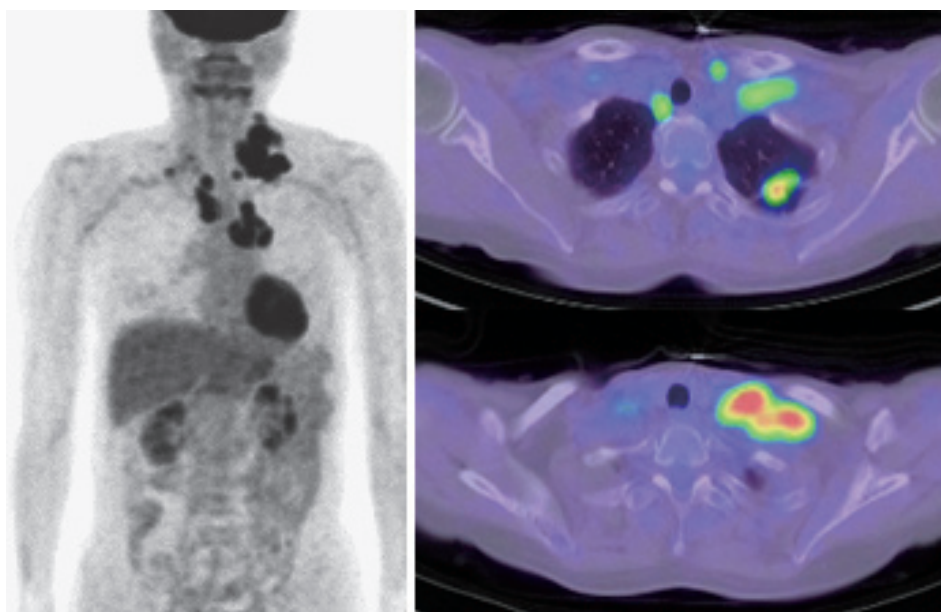


Fig. 1

Responses to nonsurgical treatment have been evaluated on the basis of reductions in tumor size by means of clinical examinations, such as computed tomography (CT) and magnetic resonance imaging. With the spread of positron-emission tomography (PET)/CT, the mismatch between morphologic and metabolic responses has come to attention. We report a case of lung cancer in which PET/CT played an important role in assessing the response to chemotherapy and radiation.

The patient had noticed a mass of the left side of the neck 3 months earlier. A CT scan of the chest revealed an apical tumor in the left lung and multiple swollen lymph nodes in left pulmonary hilar, mediastinal, and left subclavicular areas. Poorly differentiated adenocarcinoma was diagnosed with a subsequent biopsy of left subclavicular lymph nodes. Fluorodeoxyglucose (FDG)-PET/CT showed an FDG-avid lung tumor and high FDG uptake in the above-mentioned lymph nodes (**Fig. 1**), grouping (UNCLEAR) International Union Against Cancer stage IIIB as T<sub>1</sub>N<sub>3</sub>M<sub>0</sub>. FDG-PET/CT was again performed in order to estimate response to treatment 2 months after chemotherapy and radiation. A CT scan showed tumor shrinkage of less than 50%, and traditional response evaluation criteria based on morphology indicated no response to treatment (**Fig. 2**). On the other hand, there was no FDG uptake by the residual tumor, around which FDG uptake due to radiation was shown

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Correspondence to Keiichi Ishihara, MD, Clinical Imaging Center for Healthcare, Nippon Medical School, 1-12-15 Sendagi, Bunkyo-ku, Tokyo 113-0022, Japan

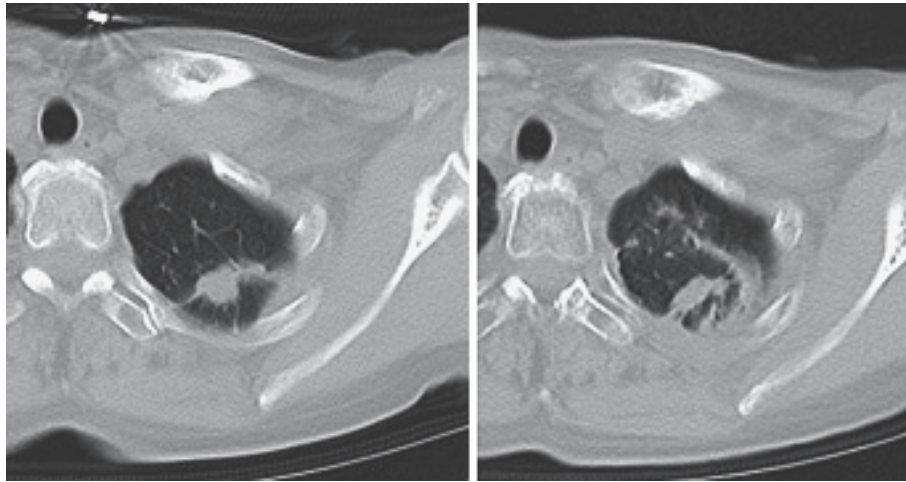


Fig. 2

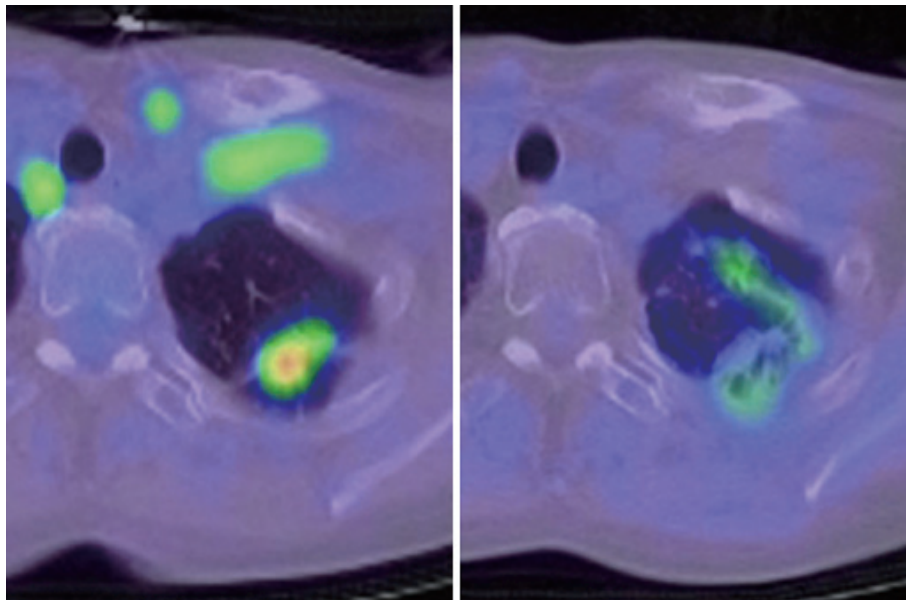


Fig. 3

on a PET/CT image (**Fig. 3**). Because no FDG uptake by lymph nodes was observed, the tumor status was considered to be complete metabolic response. The usefulness of FDG-PET for evaluating tumor response to nonsurgical treatment has been expected because metabolic depletion precedes morphologic shrinkage. One- and 3-month intervals are recommended between the end of therapy and FDG-PET/CT because of tumor stunning after chemotherapy and radiation-induced inflammation, respectively. In the present case, no recurrence was detected 8 months after treatment. We believe that FDG-PET/CT would be extremely useful for determining treatment strategies.

**Fig. 1** Pretreatment FDG-PET/CT. Left: anterior maximum-intensity projection (MIP) image; right: PET/CT fusion images

**Fig. 2** Comparison of plain CT images between before and after treatment

**Fig. 3** Comparison of PET/CT fusion images between before and after treatment