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IMAGE OF THE MONTH

Elevated [^{68}Ga]Ga-DOTA-FAPI-04 activity in degenerative osteophyte in a patient with lung cancer

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A 66-year-old man was recently diagnosed with lung cancer and complained of back pain. He underwent [^{18}F]FDG and [^{68}Ga]Ga-DOTA-FAPI-04 (FAPI) PET/CT scans for cancer staging and assessment. [^{18}F]FDG PET/CT revealed a lesion in the right upper lung with increased FDG uptake, which corresponded to the lung cancer (a–d, arrowheads, SUVmax = 2.3, approximately 1.0 cm in size), with multiple spinal osteophytes on the sagittal images without FDG uptake (e–g, dotted arrows). In comparison, [^{68}Ga]Ga-DOTA-FAPI-04 PET/CT detected the lung cancer with a higher uptake and clarity (h–k, curved arrows, SUVmax = 3.6), with multiple foci of intense FAPI uptake in the vertebral column (l, solid arrows, SUVmax = 3.3). On the sagittal spine images, this activity was noted anterior to the T9/10 and T11/12 vertebrae (m–n, solid arrows), and the lesions corresponded to degenerative osteophytes. Several other similar spinal osteophytes showed no FAPI uptake. An MRI scan of the spine revealed no signs of malignancy in the osteophytes with a high FAPI uptake. Immunohistochemical analyses of the surgically removed cancerous lung tumor showed moderately differentiated lung adenocarcinoma (o–p). The patient remained alive with a good quality of life during the 9-month follow-up period.

[^{68}Ga]Ga-DOTA-FAPI is a promising tracer for oncological patients due to its low physiological uptake in normal tissues [1]. In this case, the FAPI uptake of lung cancer is relatively lower than in previously published research, which could be due to small lesions with a low partial volume effect and low tumor metabolic activity [2]. Nevertheless, [^{68}Ga]Ga-DOTA-FAPI is advantageous over [^{18}F]FDG in clearly visualizing small lung tumor with a higher uptake and a better tumor-to-background ratio, although not more tumor-specific than FDG [2, 3]. Degenerative osteophyte, a benign lesion, also resulted in a focally increased FAPI activity in our case. The corresponding CT images make it easier to distinguish degenerative osteophytes from bone metastases and contribute to increased PET/CT specificity. The FAPI uptake by degenerative osteophytes may be contributed to the presence of fibroblasts in early osteophytes. This may also explain the lack of radiopharmaceutical uptake by all other osteophytes [4, 5]. Therefore, further research is needed to assess the diagnostic utility of [^{68}Ga]Ga-DOTA-FAPI.

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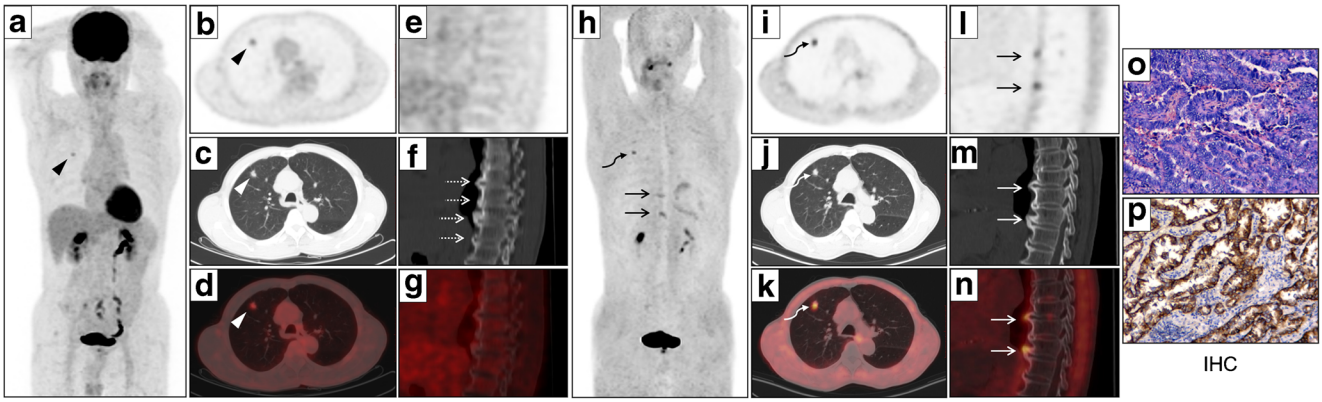

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interest.

Informed consent and ethical approval This study was approved by the institutional review board in our institution, and written informed consent for publication of this report was obtained from the patient.

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