

Nerve Root Metastasis of Breast Carcinoma Detected by Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography Scan

Abstract

A 35-year-old woman with history of breast cancer was referred to our department for restaging by F-18 fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) scan. Aside from multiple other FDG-avid metastatic lesions, a segmental increased FDG uptake was visualized along the asymmetrically thicker left first sacral nerve root, highly concerning for metastatic disease, which was confirmed by the subsequently performed magnetic resonance imaging. Our case highlights the capability of FDG PET/CT scan in the correct diagnosis of the extremely rare phenomenon of nerve root metastasis as well as the importance of differentiating FDG-avid lumbosacral nerve roots from adjacent skeletal metastases.

Keywords: Breast cancer, F18-fluorodeoxyglucose positron emission tomography/computed tomography scan, nerve root metastasis, sacral nerve root

A 35-year-old woman with history of breast cancer was referred to our department for restaging by F-18 fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) scan. Acquisition was performed 60 min after intravenous (IV) injection of 362 MBq (9.8 mCi) F-18 FDG Figure 1a-h, revealing FDG-avid metastatic lesions, including a left breast soft tissue, pulmonary nodules, adrenal glands, and right pelvic sidewall mass. There was expectedly increased FDG uptake in the left pleurodesis site. In addition, a segmental increased FDG uptake (maximum standardized uptake value = 9.1) was visualized along the asymmetrically thicker left first sacral nerve root (Figure 1a-h, arrowhead), better appreciated in coronal view Figure 1b, highly concerning for metastatic disease. The patient was reinterviewed in more detail. She had a recent complaint of radicular pain coursing through her left lower limb. Magnetic resonance imaging (MRI) correlation and neurosurgical consultation were recommended. The subsequently performed gadolinium-enhanced MRI revealed asymmetrical thickening of the left S1 nerve root with homogeneous

contrast enhancement, consistent with metastatic disease. Chemotherapy was chosen as the initial treatment step. Nerve root metastasis (NRM) of solid tumors without a direct extension from an adjacent malignant lesion is an extremely rare phenomenon. NRM has been reported in pulmonary, breast, colon, gastric and uterine adenocarcinoma, renal cell carcinoma, Ewing's sarcoma, gastrointestinal stromal tumor, and follicular thyroid carcinoma, more commonly involving the lower lumbar and sacral nerve roots.^[1-8] Development or worsening of radicular pain has been reported in >90% of cases, with symptoms mimicking a typical radiculopathy and/or cauda equina syndrome.^[1,2] MRI findings closely mimic those of peripheral nerve sheath tumors, namely, asymmetrical thickening and contrast-enhancement of the involved nerve root.^[1-4] So far, there has been one report of FDG PET/CT scan demonstrating increased FDG uptake in S1 NRM of gastric adenocarcinoma.^[2] NRM can be surgically removed by minimally invasive neurosurgical approaches giving access to the intervertebral foramen which in turn have been shown to result in prompt, near-complete alleviation of patient's radicular pain symptoms regardless of the overall malignancy burden, providing

**Ghazal Norouzi,
Zohreh
Adinehpour¹,
Alireza Rezaei¹,
Reza Vali²**

Department of Nuclear Medicine, Taleghani Medical Center, School of Medicine, Shahid Beheshti University of Medical Sciences, ¹Khatam PET/CT Center, Khatam Al-Anbia Hospital, Tehran, Iran, ²Department of Nuclear Medicine, The Hospital for Sick Children, University of Toronto, Toronto, Ontario, Canada

Address for correspondence:

*Dr. Ghazal Norouzi,
Department of Nuclear
Medicine, Taleghani Medical
Center, Arabi St.,
Yaman St. Chamran Highway,
Tehran, Iran.
E-mail: ghazal.norouzi@sbmu.
ac.ir*

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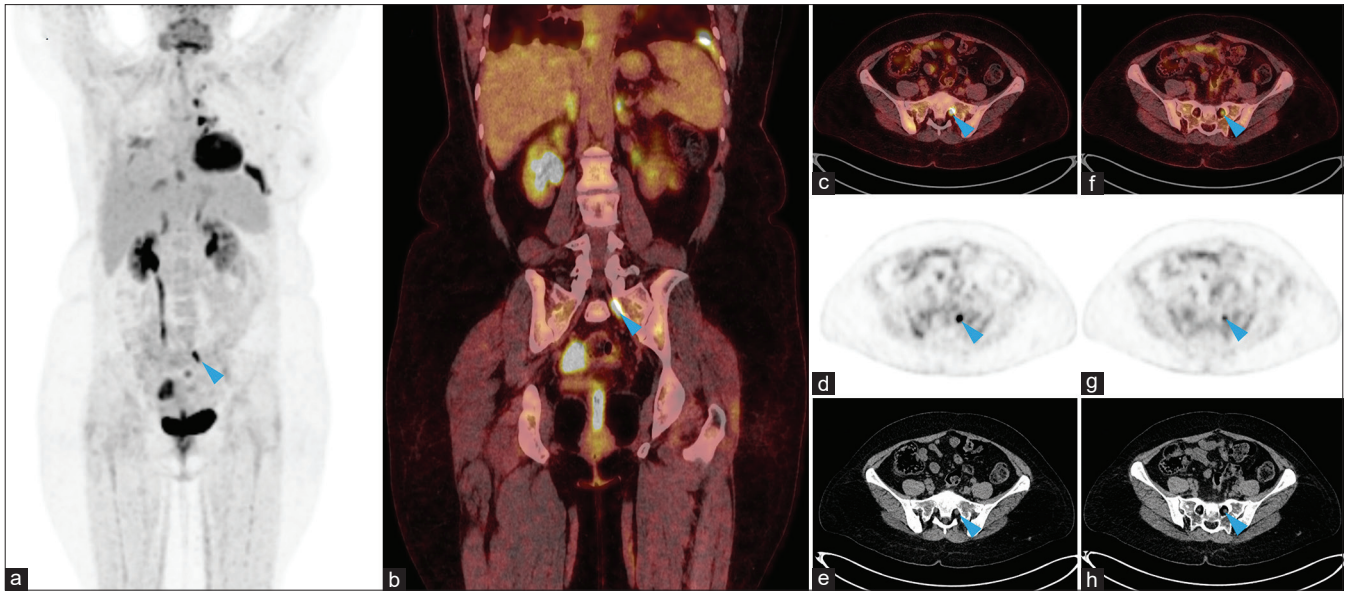


Figure 1: FDG PET/CT scan of a woman with history of breast cancer reveals multiple metastases along with a segmental increased FDG uptake along the asymmetrically thicker left first sacral nerve root (a-h, arrowhead), consistent with nerve root metastasis

effective pain palliation to patients who fail to respond to systemic treatment.^[1] Our case demonstrates the capability of FDG PET/CT scan in diagnosing NRM of breast cancer, emphasizing the importance of differentiating focal uptakes of the vertebra adjacent to the intervertebral foramen from uptakes along an asymmetrically thickened nerve root, the latter being suspicious for NRM in appropriate clinical setting, and warranting further investigation.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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