



Case Report

FDG PET/CT in Patient with Brain Metastasis from Cervical Carcinoma: A Case Report

Pawana Pusuwan, MD.¹, Yaowalak Chansilpa, MD.², Orasa Chawalparit, MD.³

¹ Division of Nuclear Medicine, Department of Radiology, Faculty of Medicine Siriraj Hospital, Mahidol University

² Division of Radiotherapy, Department of Radiology, Faculty of Medicine Siriraj Hospital, Mahidol University

³ Division of Diagnostic Radiology, Department of Radiology, Faculty of Medicine Siriraj Hospital, Mahidol University

Abstract

Central nervous system involvement by cervical cancer is uncommon. We report a rare case of cerebral metastasis from cervical carcinoma which was demonstrated on FDG PET/CT. The prior routine MRI brain study showed no evidence of metastasis. Apart from cerebral metastasis, PET/CT also showed multiple sub-centimeter hypermetabolic nodules in both lungs with metastatic nodes involving the right hilar and sub-carinal region. Whole body PET/CT may be helpful not only to localize the lesion in the brain but also to demonstrate other unsuspected metastatic lesions.

Keywords: Brain metastasis; Central nervous system metastasis; Cervical cancer

Introduction

MRI is the most sensitive test for detecting brain metastasis as it is superior to both CT scan and FDG PET for this purpose.^{1,2} One study comparing PET scans to MRI showed that PET scans detected only 61% of the lesions detected by MRI.³ FDG PET imaging is less sensitive for detecting brain metastases due to the high metabolic rate within the normal grey matter and variable FDG accumulation is reported in a few metastatic lesions.^{2,4,5} We report a case of omission of brain metastasis by routine MRI that were later identified by PET/CT.

Case report

A 82-year-old female with initially diagnosed with stage-IIIB squamous cell carcinoma of the cervix. An abdominal and pelvic CT scan revealed heterogeneous enhancing cervical mass sized 5x7 cm in diameter with a small pulmonary nodule (sized 5 mm) at anterior basal segment of RLL. A chest CT imaging showed a small nodule at each lung base (sized 5 mm and 4.5 mm) that was too small to identify the cause. She was treated with whole pelvis irradiation and high dose radiation therapy. She had a good clinical response after treatment.

Four months after treatment, she presented with back pain. Bone scan showed multiple bone metastases at left frontal and parietal bone, base of skull, left scapula, left acromioclavicular joint, anterior end of left 6th rib and multiple levels of lumbar spines. At the same time, she also had left strabismus. MRI brain showed generalized brain atrophy with secondary ventricular dilatation. No evidence of metastasis (Figure 1). Whole body PET/CT per-

formed 1 week later showed hypermetabolic metastatic lesions at left cavernous sinus and middle cranial fossa most likely from metastatic lesions (Figure 2). Apart from multiple hypermetabolic bone metastases, multiple sub-centimeter hypermetabolic metastatic nodules were noted in both lungs with metastatic lymph nodes involving right hilar and subcarinal area (Figure 3). Retrospectively, the source image of MRA (thin slice ~0.7-1 mm) showed the mass posterior to the left cavernous sinus displaced the left internal carotid artery anteriorly (Figure 4). She was treated by two-opposing views irradiation.

Discussion

Metastatic lesion is the most common mass lesions in the brain with the reported primary sources from lung, breast, malignant melanoma, kidney and gastrointestinal tract cancers.⁶ Brain metastasis from cervical cancer is very rare with reported incidence of 0.5% to 1.2%.⁷ The most common reported symptoms and signs in brain metastasis are headache and hemiparesis.⁷ The presenting symptom in our patient was left strabismus as the lesion was located in the left cavernous sinus.

FDG PET has been accepted as a useful tool for oncologic staging in several types of cancer.⁸ Rohren et al recommended not to routinely perform scanning of the brain in patients undergoing whole-body FDG PET for staging of non-CNS malignancy.³ The reason of the limited use of FDG PET in brain imaging is due to the high metabolic rate within the grey matter.⁴ This case serves to illustrate that FDG PET/CT scan is useful to detect metastatic brain lesion and also other unsuspected metastatic lesions.

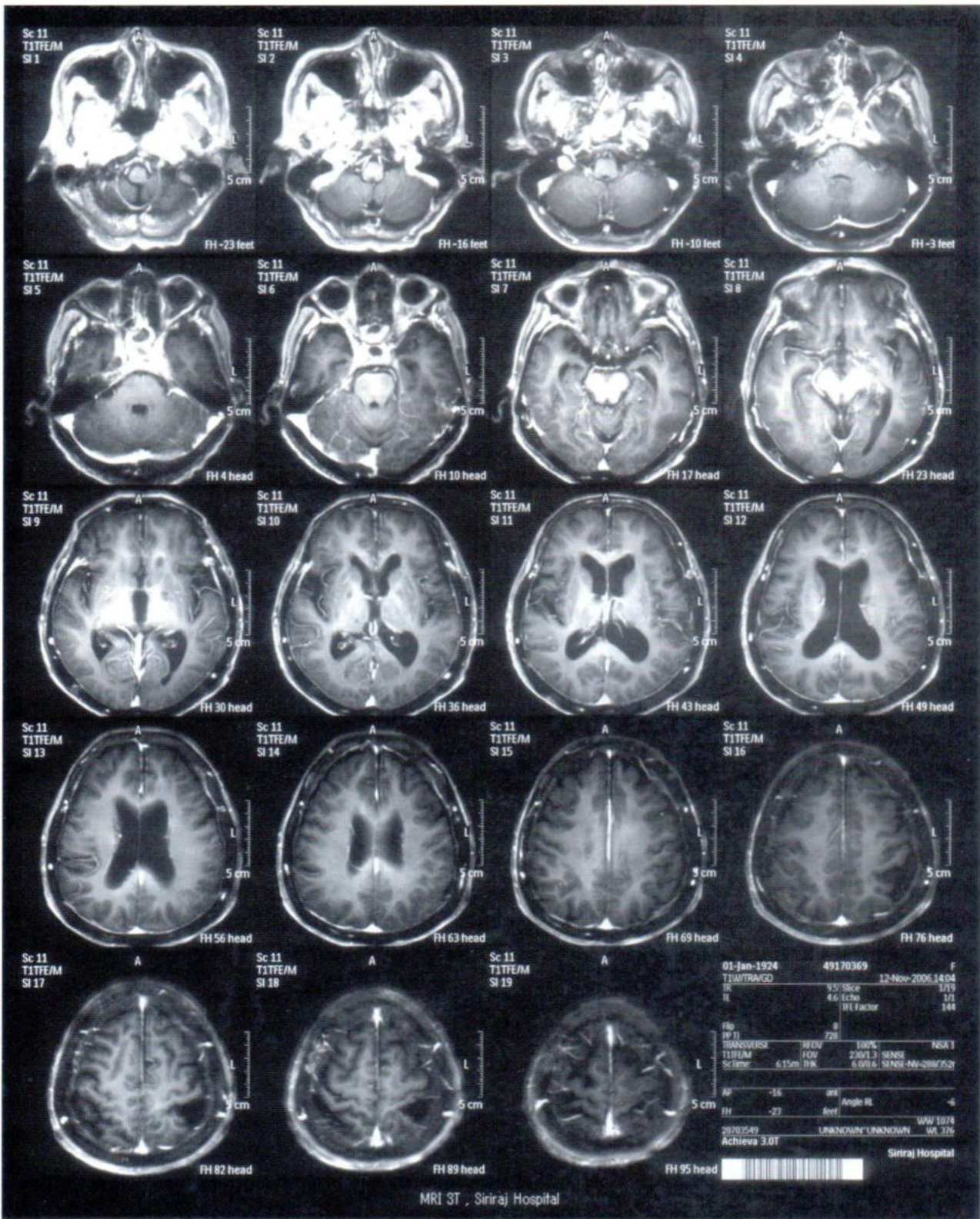


Fig.1 MRI brain shows generalized brain atrophy with secondary ventricular dilatation. No evidence of metastasis.

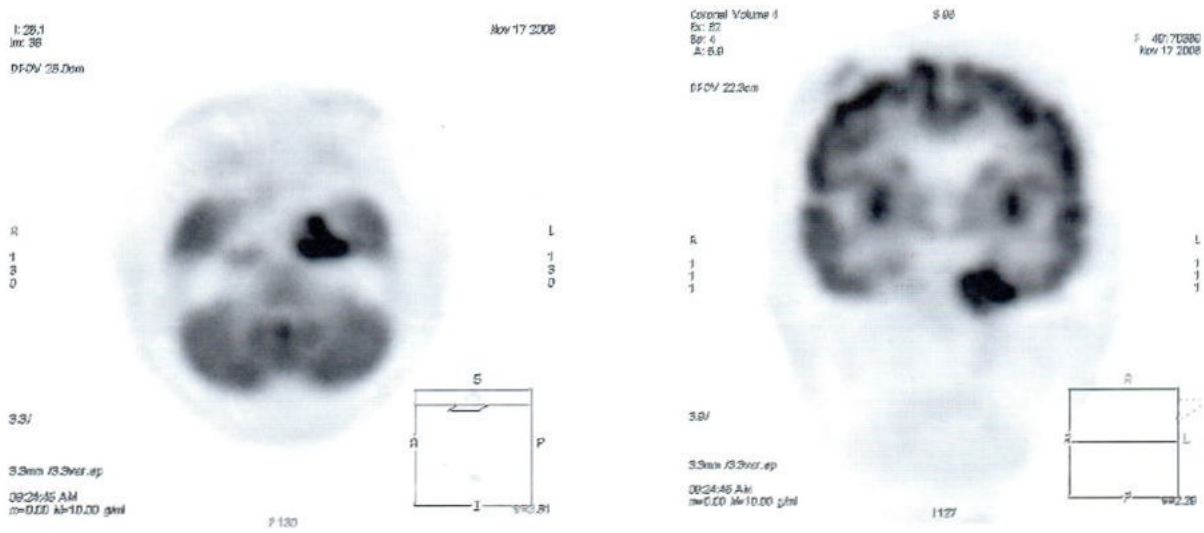


Fig.2 Transaxial and coronal PET scan show hypermetabolic metastatic lesion at left cavernous sinus and middle cranial fossa.

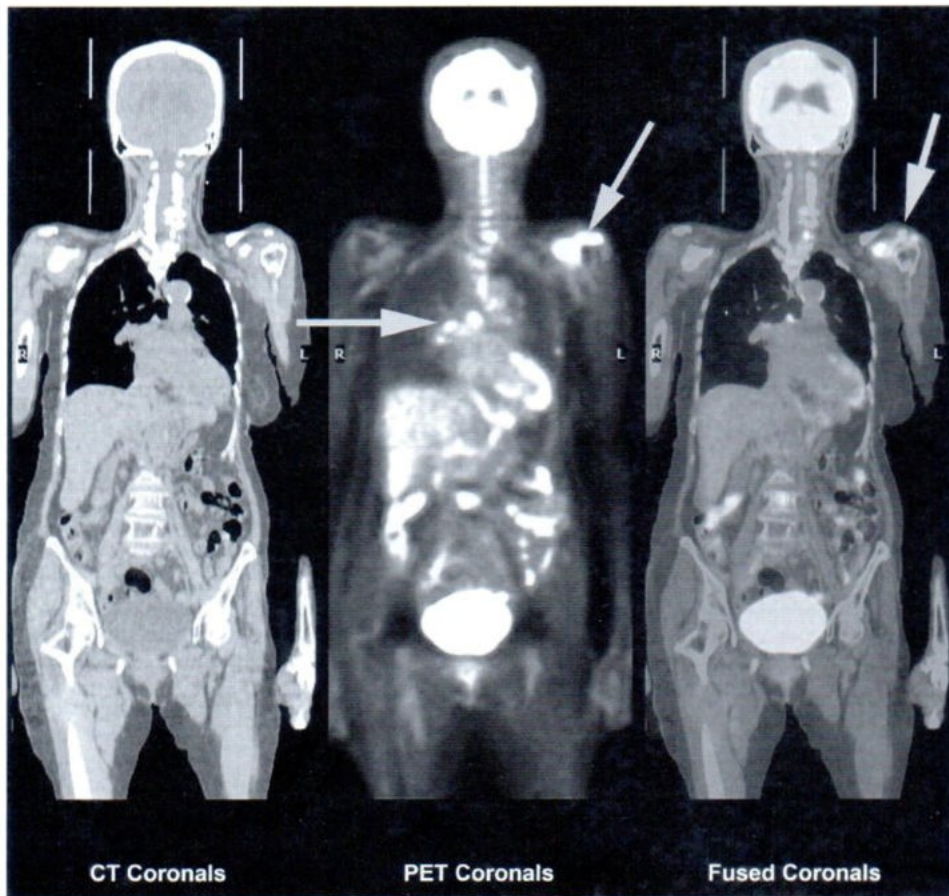


Fig.3 Coronal PET/CT scan shows multiple metastatic lesions at left scapula, right hilar and subcarinal nodes.

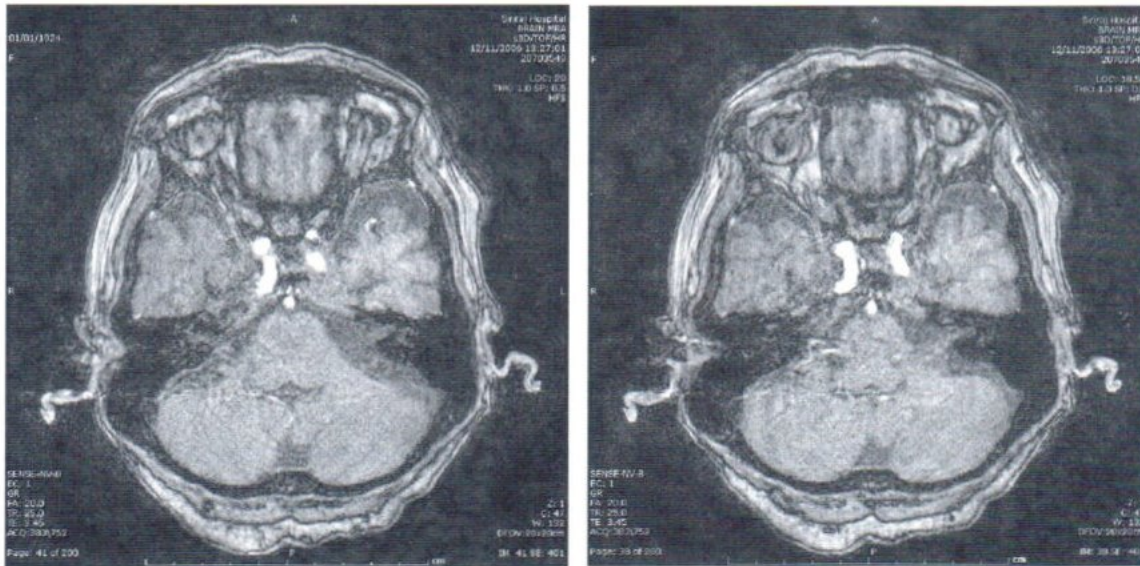


Fig.4 The source image of MRA (thin slice 0.7-1 mm) shows mass at posterior left cavernous sinus. The left internal carotid artery is displaced anteriorly.

References

1. Yokoi K, Kamiya N, Natsuguma H, et al. Detection of brain metastasis in potentially operable non-small lung cancer: a comparison of CT and MRI. *Chest* 1999;115: 714-9.
2. Kuhlman JE, Perlman SB, Weigel T, et al. PET scan-CT correlation: what the chest radiologist needs to know. *Curr Probl Diagn Radiol* 2004;33:171-88.
3. Rohren EM, Provenzale JM, Barboriak DP, et al. Screening for cerebral metastases with FDG PET in patients undergoing whole-body staging of non-central nervous system malignancy. *Radiology* 2003;226:181-7.
4. Lira A. Brain cancers. In: Alazraki NP, Shumate MJ and Kooby DA. *A clinician's guide to nuclear oncology*. The Society of Nuclear Medicine, Reston: 2007;161-9.
5. Hagge RJ, Coleman RE. Positron emission tomography: lung cancer. *Semin Roentgenol* 2002;37:110-7.
6. Gupta NC, Nicholson P, Bloomfield SM. PDG-PET in the staging work-up of patients with suspected intracranial metastatic tumors. *Ann Surg* 1999;230:202-6.
7. Amita M, Sudeep G, Rekha W, et al. Brain metastasis from cervical carcinoma-A case report. *Medscape General Medicine* 2005; 7: 26. Available at www.medscape.com/viewarticle/496603. Accessed August 5, 2008.
8. Gambhir SS, Czernin J, Schwimmer J, et al. A tabulated summary of the FDG PET literature. *J Nucl Med* 2001; 42(5 Suppl.):1S-93S.