

# Staging of breast cancer with PET/CT

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Imaging plays a vital role in the staging and restaging of breast cancer. Traditionally, chest X-ray, bone scintigraphy and liver ultrasound or computed tomography are used.<sup>1</sup> Fluorine-18 fluorodeoxyglucose (F-18 FDG) positron emission tomography/computed tomography (PET/CT) has great potential for whole-body staging with a single procedure. The greatest utility of PET/CT lies in distant or M-staging, whereas its role in locoregional staging is generally considered to be complementary to other modalities.<sup>2,3</sup>

We present details of a 48-year-old woman with breast carcinoma, clinically staged as a T3N2 lesion. Initial ultrasonography showed a liver lesion with an equivocal appearance. A F-18 FDG PET/CT scan was then performed. It showed a left breast mass with two pathological axillary lymph nodes. The breast tumour and lymph nodes were associated with intense FDG-activity. A hypodense liver lesion with absent FDG activity was noted, consistent with a haemangioma (not shown). With the pelvic images, a myomatous uterus was seen with a small mass right postero-lateral to the uterus. The mass measured 19 mm x 14 mm, with a density

of 80 Hounsfield units and increased metabolic activity. After review, the differential diagnosis was finally proposed as follows: primary ovarian lesion, pedunculated uterine myoma with sarcomatous degeneration and an ovarian metastasis.

A hysterectomy with bilateral salpingo-oophorectomy was performed. Metastatic breast carcinoma was seen in the ovary with

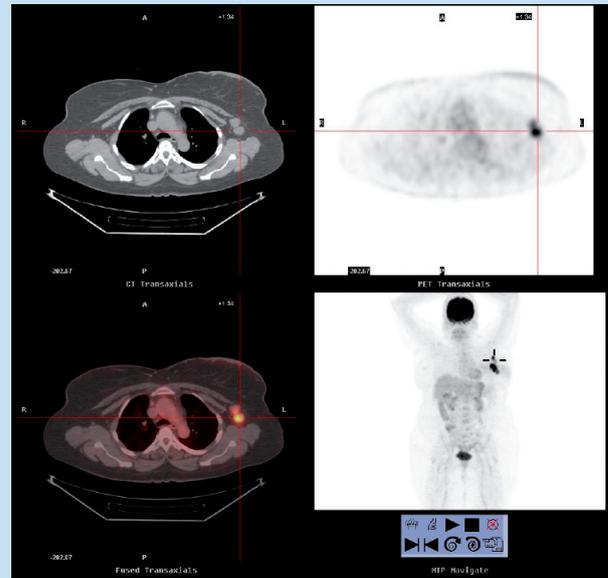


Fig. 2. Axillary lymphadenopathy, with abnormal metabolic activity.

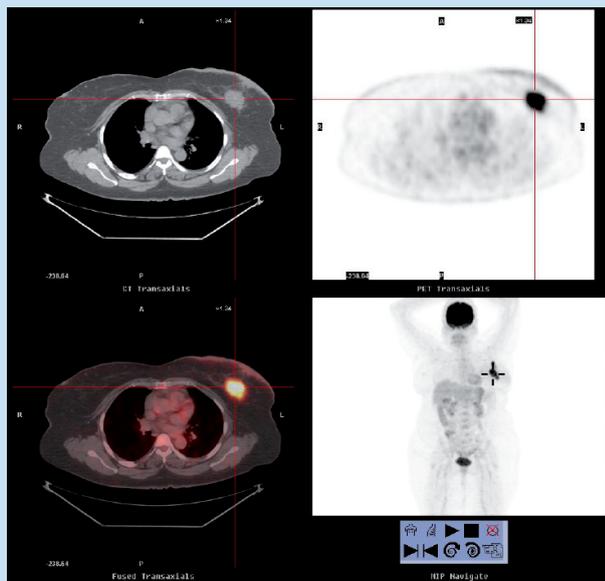


Fig. 1. Transaxial PET/CT images of the primary breast tumour.

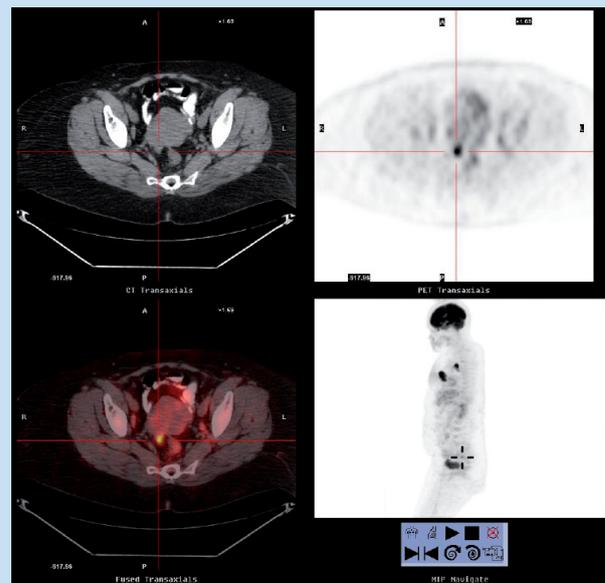


Fig. 3. Small, metabolically active mass postero-lateral to the uterus.

# PICTORIAL ESSAY

micrometastases in the contralateral ovary. It is known that PET may miss micrometastases.<sup>4</sup> The patient was upstaged to M1 with a subsequent change in management. Following chemotherapy, a toilet mastectomy and axillary clearance were performed. Histology confirmed an infiltrating ductal carcinoma with metastatic carcinoma in 5 of the 10 axillary lymph nodes. Post-surgical radiotherapy was not indicated in view of the M1 status. The patient is currently on hormonal therapy and in remission 12 months later.

These findings illustrate the utility of F-18 FDG PET/CT in the staging of breast carcinoma, by clarifying an equivocal liver lesion and

demonstrating an occult ovarian metastasis. However, this report also shows that the sensitivity of PET/CT regarding micrometastases is limited.

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2. Eubank WB, Mankoff DA. Current and future uses of positron emission tomography in breast cancer imaging. *Semin Nucl Med* 2004; 34: 224-240.
3. Lind P, Igerc I, Beyer T, *et al.* Advantages and limitations of FDG PET in the follow-up of breast cancer. *Eur J Nucl Med Mol Imaging* 2004; 31: S125-134.
4. Chung A, Liou D, Karlan S, *et al.* Pre-operative FDG PET for axillary metastases in patients with breast cancer. *Arch Surg* 2006; 141: 783-789.



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