What are the Best Ways to Reduce the False-positive Rate of 18F-FDG PET/CT in Patients with Breast Cancer?

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Dear Editor,

We were interested to read the recent article by Park et al [1] that described the interpretation of physiologic and benign sites of ¹⁸F-fluorodeoxyglucose (18F-FDG) uptake on positron emission tomography/computed tomography (PET/CT) imaging of patients with breast cancer.

The central messages were: (1) to know and (2) to discriminate the main sites of FDG-avidity, avoiding a misinterpretation and thus reducing the false-positive rate.

Some considerations referring to the report can be made.

The authors declared that several normal and altered physiologic foci and various benign lesions demonstrated significant FDG uptake in patients with breast cancer and the accurate interpretation of these findings can be challenging for clinicians; they concluded that “to avoid misinterpretations, we suggest that careful attention to these normal or altered physiological FDG uptake patterns and hypermetabolic benign disease is required for more accurate image interpretation for the correct staging and detection of disease recurrence in patients with breast cancer”.

In our Department, in cases of indeterminate or inconclusive PET/CT exams, we try to conclude for pathological or physiological uptake on the basis of

abnormal/normal correspondence of CT findings (Fig. 1), considering the natural history of disease (i.e. loco-regional lymph node or others) and using specific protocols (i.e. dual-time PET/CT). As reported in the literature [2, 3], metabolic abnormalities detected on PET images can be precisely localised anatomically by hardware fusion with the CT images obtained in the same sitting; the CT portion of PET/CT, in fact, provides anatomical details and offers an anatomical mapping for FDG distribution. Moreover, an accurate lesion localisation leads to accurate staging, a clear advantage of PET/CT over PET alone in the clinical situation [4].

Some steps could be taken to reduce the false-positive rate of PET/CT in breast cancer:

1. Prolonging the time between the last treatment (chemotherapy, surgery and radiotherapy) and PET/CT
2. Performing, when it is possible, a dual-phase technique of early (after 60 min from FDG injection) and late (after 3 h from FDG injection) scans [5]
3. Validating a specific SUV cut-off that could be used when some doubtful areas are revealed by PET/CT
4. Using multi-tracer studies and labelled amino acid PET scans instead of the FDG scan {i.e. it has been demonstrated that ¹⁸F-fluoro-3'-deoxy-3'-L-fluorothymidine (18F-FLT) has a higher tumour specificity than FDG for some tumours [6]}
5. Including intravenous and oral contrast enhancement might increase the accuracy of the CT portion [7]

In our population of 190 patients with breast cancer, FDG PET/CT was conducted during the follow-up period to evaluate relapse or progression of disease. The sensitivity, specificity, and negative- and positive-predictive values of PET/CT for disease relapse or progression were 89%, 73%, 90% and 72%, respectively.

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Fig. 1 Correspondence of CT and 18F-FDG PET/CT: abnormal FDG uptake in inflammatory lung lesion

Utilisation of the above-mentioned tricks might give a major advantage to PET/CT, which has already been demonstrated to be more useful than CT for breast cancer patients [8].

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