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18F-FDG Uptakes by Primary Tumor as a Predictor of Intratumoral Lymphatic Vessel and Axillary Nodal Invasion in the Initial Staging of Breast Cancer Patients

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Purpose: Intratumoral lymphatics invasion and axillary lymph node involvement are important factors in predicting the aggressiveness of tumor, and planning therapeutic strategy. This study was aimed to evaluate the value 18F-fluorodeoxyglucose positron emission tomography combined CT as a predictor of intratumoral lymphatic vessel invasion and axillary lymph node metastasis. **Methods:** PET-CT findings of 145 patients diagnosed with or suspected of breast cancer were studied, and the peak standard uptake values of the primary tumors were recorded. All patients underwent surgery within 4 weeks of the PET-CT exam. Simple correlation and regression analyses were performed to assess the relationship between pSUV and intratumoral lymphatic invasion and axillary lymph node involvement. **Results:** The average pSUV values of the negative lymphatics invasion, low-grade, moderate-grade and high-grade groups were 3.2, 4.9, 5.7, and 6.3, respectively. PET-CT had 71.42% sensitivity and 77.66% specificity for detecting axillary lymph node metastasis. There was a statistically significant correlation between the pSUV and degree of intratumoral lymphatic vessel invasion ($p<0.001$) and also between pSUV and axillary lymph node metastasis ($p<0.001$). **Conclusion:** Patients with low 18F-FDG uptake in the primary breast lesion had a significantly lower risk of concurrent intratumoral lymphatics invasion and axillary nodal involvement than did the patients with high 18F-FDG uptake. In patients with breast cancer, the pSUV on PET-CT performed for initial staging is a valuable predictor of intratumoral lymphatic vessel invasion and axillary node metastasis, and thus indirect indicators of tumor aggressiveness.

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Clinical application of FDG PET for pathological response of breast cancer after neo-adjuvant chemotherapy

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Purpose: The purpose of this study was to assess the clinical usefulness of FDG PET in predicting the pathological response in breast cancer after neoadjuvant chemotherapy. **Methods:** 33 patients with newly diagnosed, locally advanced breast cancer had PET scans before and after chemotherapy to assess tumor response, and then pathology was confirmed after surgery. FDG PET for assessing tumor response was done by measuring peak SUV (pSUV) and then calculating reduction rate (RR). RR was stratified into RR complete response (rrCR) at >88% reduction, RR partial response (rrPR) at RR between 56~87%, and no response (rrNR) in reductions <55%. Clinical assessment was done with physical exams, U/S, and CT. Histopathological responses were classified into pathological no response(pNR), pathological partial response (pPR) and pathological complete response (pCR). **Results:** 15% (5 of 33) patients had pCR, 85% (28 of 33) had pPR. Using a 88% reduction in SUV as a threshold value for differentiation between pCR from pPR, PET scans correctly differentiated pCR in 3 patients out of 5. When using a cut off value of 55% reduction rate, PET scans correctly differentiated pPR in 19 patients out of 21, and for pNR, the PET scans correctly differentiated only 2 patients out of 7. Diagnostic accuracy of PET for pathologic response was 25 out of 33 cases (75.8%). The diagnostic accuracy of clinical assessment was 25 of 33 cases (72.7%). **Conclusion:** This study suggests that pSUV reduction rate can be a useful tool when predicting the pathological response of primary breast cancers after neo-adjuvant chemotherapy.