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Metabolic tumor volume using F-18 FDG PET/CT correlates with occult lymph node metastasis in invasive ductal breast cancer

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Objectives: The purpose of this retrospective study was to analyze predictive value of pretreatment metabolic tumor volume (MTV) as determined by F-18 FDG PET/CT for occult LN metastasis (OLM) in invasive ductal breast cancer (IDC).

Methods: A total of forty-one clinically node-negative (cN0) IDC patients (mean age, 50.6±9.5), diagnosed by preoperative workups (biopsy, USG, MRI and PET/CT) were enrolled. All patients had undergone surgical resection of primary-tumor with sentinel LN biopsy and/or axillary LN dissection without any neoadjuvant treatment. The MTV was defined as the tumor volume with more than 75% of the maximum standardized uptake value (SUVmax). Pretreatment variables (age, clinical T stage, MRI-tumor volume (MRI-TV), SUVmax, and MTV) and posttreatment variables (pathologic T stage, tumor histologic grade and lymphovascular invasion) were analyzed to identify their correlation with OLM.

Results: Fourteen (34.1%) of 41 patients were found to have OLM. MTV was significantly higher in patients with OLM (Negative OLM: 0.82±1.10 vs. Positive OLM: 2.08±2.66, P<0.001). A cutoff of 1.09 ml for the MTV was determined to be the most discriminative value for predicting OLM. By univariate analysis, the patients with an MTV of > 1.09 ml had significantly higher number of OLM than those with an MTV of ≤ 1.09 ml (P=0.0018). Also, lymphovascular invasion and MRI-TV showed a statistically significant correlation with OLM by univariate analysis (P=0.0303 and 0.0421). Among these three parameters (MTV, lymphovascular invasion, and MRI-TV), MTV had one of the highest odds ratio associated with the OLM (AUC: 0.730, odds ratio: 10.667, 95% confidence interval: 2.15–52.85).

Conclusion: MTV by F-18 PET/CT demonstrated a significant correlation with OLM in patients with cN0 IDC. Therefore MTV might be used for LN metastasis predictive factor in patients with cN0 IDC.

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