Immunohistophenotyping and 18F-FDG PET-CT in characterizing malignant breast tumors: preliminary results

ABSTRACT

Objective: Malignant breast tumors are associated with a poor prognosis. Accurate tumor localization and characterization of the disease phenotype may avert inappropriate futile surgery and toxic treatment. This study evaluated the roles of standardized uptake value (SUVmax) and flurodeoxygenase (FDG) and immunohistochemical markers in assessing malignant breast tumors. Patients and Methods: This was a prospective study of 21 consecutive patients who underwent 18F-fluorodeoxyglucose positron emission tomography-computed tomography (18F-FDG PET-CT) prior to treatment. Tissue biopsies were sought from patients with BIRADS 4/5 score on mammogram. Tumor SUVmax 18F-FDG PET-CT was assessed for potential correlation with the histological and immunohistochemical categories. Results: We investigated 21 patients (18 malignant, 3 benign) with a mean age of 54.48 ± 12.1 years. In the immunohistochemical categorization, tumors were HER positive (42.86%), HER negative (42.86%) and benign (14.29%). The sensitivity, specificity (on a per patient and per lesion basis), positive predictive value and negative predictive value for the primary lesion by CT and 18F-FDG PET-CT were 82.3%, 20%, 77.8%, 25% (on per patient basis); 88.2%, 25%, 88.3%, 66.7% (on per lesion basis); and 100%, 100%, 100%, 100% (on per patient basis); 100%, 75%, 94.1%, 100%, respectively. The sensitivity, specificity, positive predictive value and negative predictive value for CT and 18F-FDG PET-CT were 15.4%, 50%, 66.7%, 8.33% and 100%, 50%, 92%, 100%, respectively. There was no significant difference in the mean SUV max between HER positive and HER negative immunohistochemical phenotypes, but these values were significantly higher in single hormone receptor (HR), HER negative or HER positive tumors than in benign entities ($p<0.05$). Conclusions: 18F-FDG PET-CT and Immunohistophenotyping are potentially important surrogate markers for characterizing malignant breast disease and axillary lymph node metastasis.