Assessment of residual tumour by FDG-PET: conventional imaging and clinical examination following primary chemotherapy of large and locally advanced breast cancer.

BACKGROUND: The aim of this was to evaluate FDG-PET (2-(fluorine-18)-fluoro-2-deoxy-D-glucose positron emission tomography) for assessment of residual tumour after primary chemotherapy of large and locally advanced breast cancer in comparison with conventional imaging modalities. METHODS: In a prospective multicentre trial, 99 patients underwent one or more breast imaging modalities before surgery in addition to clinical examination, namely, FDG-PET (n=89), mammography (n=47), ultrasound (n=46), and magnetic resonance imaging (MRI) (n=46). The presence of residual tumour by conventional imaging, dichotomised as positive or negative, and the level of FDG uptake (standardised uptake values, SUV) were compared with histopathology, which served as the reference standard. Patients with no residual tumour or only small microscopic foci of residual tumour were classified as having minimal residual disease and those with extensive microscopic and macroscopic residual tumour tissue were classified as having gross residual disease. RESULTS: By applying a threshold SUV of 2.0, the sensitivity of FDG-PET for residual tumour was 32.9% (specificity, 87.5%) and increased to 57.5% (specificity, 62.5%) at a threshold SUV of 1.5.
Conventional imaging modalities were more sensitive in identifying residual tumour, but had a low corresponding specificity; sensitivity and specificity were as follows: MRI 97.6 and 40.0%, mammography 92.5 and 57.1%, ultrasound 92.0 and 37.5%, respectively. Breast MRI provided the highest accuracy (91.3%), whereas FDG-PET had the lowest accuracy (42.7%). CONCLUSIONS: FDG-PET does not provide an accurate assessment of residual tumour after primary chemotherapy of breast cancer. Magnetic resonance imaging offers the highest sensitivity, but all imaging modalities have distinct limitations in the assessment of residual tumour tissue when compared with histopathology.