

The utility of the standardized uptake value, metabolic tumor volume and total lesion glycolysis as predictive markers of recurrent breast cancer

ABSTRACT

Background: Breast cancer is the second leading cancer killer of women globally. An early measure utilizing a noninvasive molecular marker for predicting cancer aggressiveness is important to better manage the patient and to avert early disease progression. We aimed to determine whether metabolic tumor volume (MTV) and total lesion glycolysis (TLG) are able to predict risk in high TNM tumor staging and the need for the appropriate treatment in breast cancer patients. This is a retrospective study of confirmed breast cancer patients who underwent neoadjuvant, local and adjuvant treatment and follow-up. The 18F-FDG PET/CT study for initial staging was performed, and metabolic parameters (MTV, TLG, SUVmax mean) were analyzed. Spearman correlation was used to assess correlations between metabolic parameters and clinicopathological factors with TNM staging and treatment intention. SUVmean, wbMTV and wbTLG were analyzed to predict the dichotomization of patient endpoint for low (stage I and II) and high (stage III and IV) TNM stage.

Results: Twenty-six patients (4 low stage, 22 high stage) with a mean age of 51.8 ± 11.8 years with confirmed breast cancer underwent 18FFDG PET/CT. The MTV and TLG parameters in the tumor (T) were significantly correlated with the TNM stage ($P < 0.050$); the SUVmax mean (4.18 ± 1.68 g/dl), wbMTV mean (404.68 ± 558.02 cm³) and wbTLG (1756.55 ± 2432.11 g) differed significantly in the high versus low TNM staging with the best predictive cut-off value of SUVmax mean (3.55 g/ml, $p < 0.05$), wbMTV (20 cm³, $p < 0.05$) and wbTLG (130 g, $p < 0.05$) when these values were exceeded. Only wbTLG (130 g, $p < 0.05$) showed significance difference in treatment intention.

Conclusions : In this study, the metabolic parameters SUVmax mean, MTV and TLG showed potential good relationships with TNM staging. TLG was the only marker that influenced the treatment intention in predicting breast cancer aggressiveness.