Radiomics of the primary tumour as a tool to improve 18F-FDG-PET sensitivity in detecting nodal metastases in women with apparent early endometrial cancer. IGCS19-0521

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Introduction. The introduction of SLN biopsy ultrastaging, able to identify micrometastatic deposits, increased false-negative PET/CT findings in nodal staging of endometrial cancer, as small metastatic LNs lesions may remain undetected at visual analysis because of limited spatial resolution of PET technique.

Objectives. The aim of this study was to investigate the role of radiomic applied in women with endometrial cancer underwent 18F-FDG PET scan, to evaluate if imaging features computed on the primary tumor could improve sensitivity in detection of lymph node (LN) metastases.

Methods: Between January 2009 and August 2018, One hundred fifteen women with histologically proven endometrial cancer who underwent preoperative 18F-FDG PET/CT were retrospectively considered. SUV, MTV, TLG, geometrical shape, histograms and texture features were computed inside tumour contours. In the first group of 86 patients (group 1) association between imaging features and LN metastases was performed by univariate Mann-Whitney test and by neural network multivariate model. Univariate and multivariate models were assessed with leave one out on 20 training sessions and on a second group of testing 29 women (group 2). Combination between LN metastases visual detection results and radiomic analysis was also assessed.

Results: Sensitivity and specificity of LN visual detection were 50% and 99% on group1 and 33% and 95% on group, respectively. A unique heterogeneity feature computed on the primary tumour (the zone percentage of the grey level size zone matrix, GLSZM ZP) was able to predict LN metastases better than any other feature or multivariate model (sensitivity and specificity of 75% and 81% in group 1 and of 89% and 80% in group 2). The combination of visual detection and GLSZM ZP values in a unified framework obtained sensitivity and specificity of 94% and 67% in group 1 and of 89% and 75% in group 2, respectively.

Conclusions: In our study the computation of imaging features on the primary tumor increases nodal staging for detection sensitivity in 18F-FDG PET and can be considered for a better planning of the surgical treatment.

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