

Splenic ^{18}F -FDG uptake on baseline PET/CT is associated with oncological outcomes and tumor immune state in uterine cervical cancer

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Abstract

Objective: The spleen represents an important contributor to tumor immune escape, but the relevance of increased splenic metabolic activity remains to be fully elucidated.

Methods: We retrospectively measured the spleen-to-liver standard uptake value (SLR) on ^{18}F -FDG PET/CT examinations of 92 consecutive patients with FIGO stage IB1 to IVA cervical cancer and integrated the results with survival, response to treatment, tumor immune infiltrate, and baseline characteristics.

Results: $\text{SLR}_{\text{max}} > 0.92$ ($p = .026$) and $\text{SLR}_{\text{mean}} > 0.94$ ($p = .005$) were significantly associated with decreased DFS in univariable analysis. Multivariable models were built using best subset selection; $\Delta\text{SLR}_{\text{max}}$ and either SLR_{max} or SLR_{mean} were consistently selected, strongly reinforcing the association between SLR variables and DFS in relation to potential confounders (all models $p \leq .002$). Independent associations were found for SLR_{max} using multivariable Cox regression models for DFS (all $p \leq .003$). Further, uni- and multivariable analyses demonstrated the negative impact of higher SLR values on pathological complete response. A statistically significant higher proportion of patients with high SLR_{max} had a dense infiltrate of CD20^+ ($p = .036$) and CD68^+ ($p = .015$) immune cells, as well as PD-L1^+ tumor cells ($p = .019$) as compared to those with low SLR_{max} . Finally, high SLR_{max} status was neither associated with systemic inflammatory markers (except for an increased white blood cell count; $p = .038$), nor with clinically overt infection.

Conclusion: This hypothesis-generating study provides the first evidence that increased splenic metabolic activity is a negative prognostic and predictive biomarker in locally advanced cervical cancer. In addition, it might help to discriminate immunologically 'hot' from 'cold' cervical tumors.

Keywords: (18)F-FDG PET; Biomarker; Cervical cancer; Chemoradiation; Immune infiltrate; Spleen.