

Purpose: We have previously demonstrated that functional tumor volume (TV) and Total Lesion Glycolysis ($TLG=TV \times SUV_{mean}$) measured on pretreatment 18F-FDG PET scans were significant predictors of response and prognostic factors of survival, whereas SUV measurements were not. The objective of this study was to investigate the impact of partial volume effects (PVE) correction (PVC) on this clinical value.

Methods: 50 patients with esophageal cancer treated with concomitant radiochemotherapy were retrospectively analyzed. 18F-FDG PET baseline scans were corrected for PVE with iterative deconvolution with wavelet-based denoising. Tumors were subsequently delineated using the Fuzzy Locally Adaptive Bayesian (FLAB) algorithm on both original and corrected images. Maximum and peak SUV, TV, mean SUV, and TLG were extracted and compared. The value of each parameter (with or without PVC) was investigated using Kruskal-Wallis tests regarding response and Kaplan-Meier curves regarding survival.

Results: Whereas PVC had a significant quantitative impact on the absolute values of each parameter (up to more than 100% for SUV_{max}), the respective clinical value was not significantly modified whether for overall survival or response to therapy. No significant improvement was observed after PVC for the already established significant predictive and prognostic value of TV and TLG. Similarly, the non significant predictive and prognostic value of the various SUV measurements was not improved by PVC and was even lowered in some cases.

Conclusions: PVC did not modify significantly the previously established clinical value of tumor volume or TLG. In addition, the limited value of SUV measurements in this context may therefore not be explained by the lack of PVC since PVC did not improve their clinical value and in most cases it even lowered it.