AbstractID: 14294 Title: Prognostic value of Total Glycolytic Volume in esophagus cancer : impact of automatic tumor volume delineation on 18F-FDG PET images

Objectives: Diagnosis and prognosis is usually carried out manually and visually based on maximum SUV. The objective was to investigate the prognostic value of tumor volume (TV) and total glycolytic volume (TGV) measured by various methodologies in esophagus cancer patients.

Material and methods: 43 esophagus cancer patients treated with radiochemotherapy between 2003 and 2007 were retrospectively considered and classified as complete, partial or non responders according to the EORTC recommendations. The following methodologies were applied to the 18F-FDG baseline scans: a fixed threshold at 42% of the maximum, an adaptive thresholding with two different users and the automatic Fuzzy Locally Adaptive Bayesian (FLAB) algorithm. The following parameters were considered: the maximum SUV value within the tumor (SUV_{max}), the tumor volume (TV) and the associated mean SUV (SUV_{mean}), and TGV (TGV = TV multiplied by SUV_{mean}). In addition, each parameter was computed using SUV corrected for partial volume effects (PVC). The prognostic value of each parameter was investigated using Kruskal-Wallis tests for correlation with response to therapy.

Results: SUV measurements correlated poorly with therapy response. The correlation was even lower when considering PVC SUVs. TV allowed significant group differentiation response, but only if measured using FLAB. TGV had better prognostic value and allowed significant differentiation for all delineation methods, with however a better differentiation for FLAB than the threshold-based approaches.

Conclusion: These results suggest that the tumor volume information has significantly greater predictive value than SUV measurements only, for prognosis of patients with esophagus cancer, as long as it is accurately measured. TGV is even better and is in addition less dependent on the method used to delineate the volume, although FLAB offered the best results compared to threshold-based methodologies.