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622.LYMPHOMAS: TRANSLATIONAL-NON-GENETIC

Radiomic Features Prognosticates Treatment Response in CAR-T Cell Therapy

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BACKGROUND: Diffuse large B-cell lymphoma (DLBCL) is the most common, aggressive disease form that accounts for 30% of all lymphoma cases. Recent development in chimeric antigen receptor (CAR) T-cell therapy has shown tremendous promise in providing a cure to patients with relapsed/refractory (R/R) DLBCL. We propose to develop Radiomics (quantitative image metric) based biomarker as a surrogate to tumor burden assessment and compare its ability to prognosticate treatment response to engineered cell-based treatments.

METHODS: We identified a cohort of 58 patients with R/R DLBCL, whose largest lesions on the baseline positron emission tomography /computed tomography (PET/CT) imaging were identified along with their anatomical sites related to non-lymphatics. The lesion's co-registered PET imaging was used to converge on a regional boundary to obtain the most active part of the lesion, applying Standardized Uptake Value definition with 41% regional threshold. The lesion regions were characterized using imaging metrics (radiomics) followed by principal component (PC) analysis to reduce the dimensionality in the feature categories (Size, Shape and Texture). These Radiomics metrics along with metabolic tumor volume (MTV) were used both collectively and independently to assess prognosis to disease progression measured by overall survival. We assessed and report the correlation between the principal components and the tumor burden.

RESULTS: We find that Shape-PC (Non-Lymph) were prognostic ($p < 0.0073$) along with MTV ($p < 0.00026$) of Overall survival (1 year after treatment), using median value of the respective metrics as a cutpoint. We find these Shape-PC metrics showed moderate to weak correlation with MTV (spearman's ρ of 0.42, $p < 0.01$, for Shape-PC1).
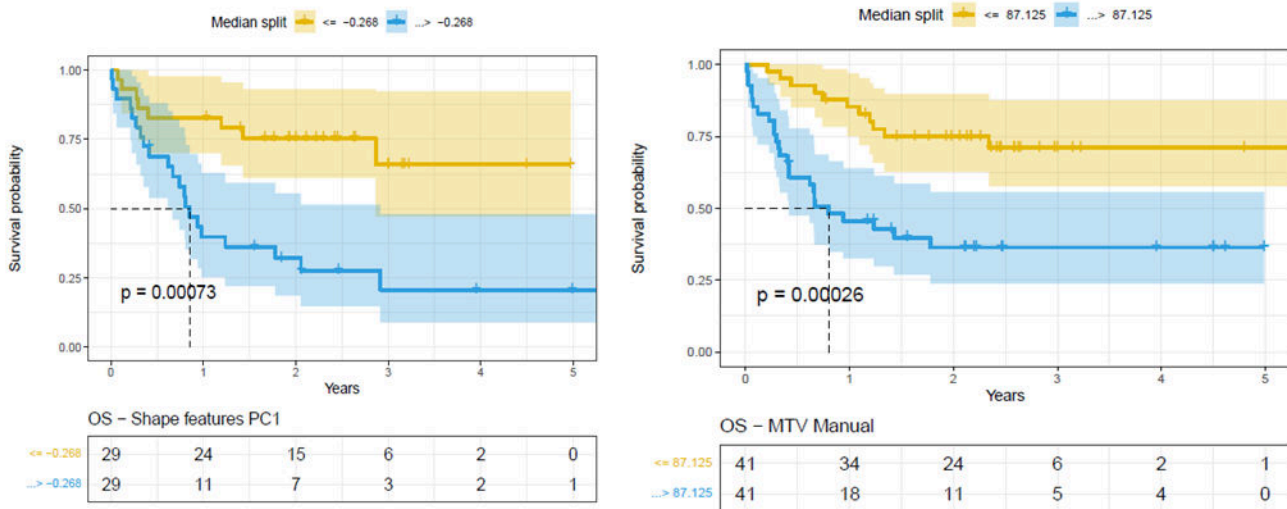
CONCLUSION: We identified Non-Size based features that are prognostic to patient response to treatment. These metrics provide complementary information to MTV and may serve as a surrogate to treatment response.

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Figure 1. Kaplan Meier (KM) plots of patient cohort separated using median split based on features extracted on the largest extra-nodal lesions in a patient's PET/SUV scans, for a) Shape based Principal Component (PC1) – Overall survival, b) metabolic tumor volume.- OS.

Figure 1