

## Impact of Variability in Delineation on PET Radiomics Features in Lung Tumors

**Authors :** Mahsa Falahatpour

**Abstract :** Introduction: This study aims to explore how inter-observer variability in manual tumor segmentation impacts the reliability of radiomic features in non-small cell lung cancer (NSCLC). Methods: The study included twenty-three NSCLC tumors. Each patient had three tumor segmentations (VOL1, VOL2, VOL3) contoured on PET/CT scans by three radiation oncologists. Dice coefficients (DCS) were used to measure the segmentation variability. Radiomic features were extracted with 3D-slicer software, consisting of 66 features: first-order (n=15), second-order (GLCM, GLDM, GLRLM, and GLSZM) (n=33). The inter-observer variability of radiomic features was assessed using the intraclass correlation coefficient (ICC). An ICC > 0.8 indicates good stability. Results: The mean DSC of VOL1, VOL2, and VOL3 was  $0.80 \pm 0.04$ ,  $0.85 \pm 0.03$ , and  $0.76 \pm 0.06$ , respectively. 92% of all extracted radiomic features were found to be stable (ICC > 0.8). The GLCM texture features had the highest stability (96%), followed by GLRLM features (90%) and GLSZM features (87%). The DSC was found to be highly correlated with the stability of radiomic features. Conclusion: The variability in inter-observer segmentation significantly impacts radiomics analysis, leading to a reduction in the number of appropriate radiomic features.

**Keywords :** PET/CT, radiomics, radiotherapy, segmentation, NSCLC

**Conference Title :** ICBMP 2024 : International Conference on Biophysics and Medical Physics

**Conference Location :** New York, United States

**Conference Dates :** November 07-08, 2024