

The Influence of Image Selection and Segmentation on the Extraction of Lung Cancer Imaging Radiomics Features Using 3D-Slicer Software

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Abstract

Purpose: Extracting image features can predict the prognosis and treatment effect of non-small cell lung cancer, which has been increasingly confirmed. However, image segmentation is manually performed based on the lung window, mediastinal window, enhanced or plain scanned will affect the extraction results and which results will be affected. This article intends to preliminarily explore the above issues. *Methods:* This article downloaded images of 22 patients with lung cancer from The Cancer Imaging Archive (TCIA). Draw the region of interest on the lung window and mediastinal window of the plain scan image, and then draw the region of interest on the lung window and mediastinal window of the enhanced image. A total of 88 sets of imaging features, each containing 107 features entered the analysis. Firstly, analyzed the image features of the original sequence. Then, analyze the pathology. *Results:* Four sets of influencing features were extracted for each patient, namely the plain lung window group, plain mediastinal window group, enhanced lung window group, and enhanced mediastinal window group. A total of 88 sets of imaging features were extracted, with 107 features in each group. Among them, 33 features showed significant differences. Continuing with pairwise repeated testing, it was found that there were 2 significant differences between enhanced and plain lung windows, 12 significant differences between enhanced lung windows and plain mediastinal windows, one significant difference between plain scanning and enhancement mediastinal window, 14 significant differences between the plain lung window and the enhanced mediastinal window groups, 14 significant differences between the lung window and the mediastinal window in the plain scan, 13 significant differences between the enhanced lung window and the mediastinal window and 54 significant differences between squamous cell carcinoma and adenocarcinoma. *Conclusion:* The enhancement of lung CT has a relatively small impact on extracting image features, while selecting lung or mediastinal windows for image segmentation has a significant impact on extracting image features. Therefore, choosing lung or mediastinal windows for feature extraction should be carefully considered, as the size of the image segmentation range has a significant impact on image features. The impact of lung squamous cell carcinoma and adenocarcinoma on imaging features is also significant, indicating a high possibility of distinguishing between squamous cell carcinoma and adenocarcinoma based on radiomics.

Keywords

Lung Cancer, 3D-Slicer, Radiomics, Imaging