

RADIOMICS ANALYSIS PROVIDES A PRECISE PREDICTION OF SEIZURE OCCURRENCE IN LOW-GRADE GLIOMAS PATIENTS

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Purposes: To investigate the association of radiomics features with seizure presentation secondary to low grade gliomas (LGGs), and to propose a radiomics based prediction model of seizure occurrence in LGG patients.

Methods & Materials: This study consecutively enrolled 268 patients with LGGs. A total of 474 features including coordinated location of tumor, three dimensional imaging features and their interactions were detected based on T2-weighted MRI data. The machine learning method support vector machines was applied to generate a prediction model of seizure presentation with radiomics features. Further, the least absolute shrinkage and selection operator method was used to filter out the redundant imaging features from the model.

Results: With the machine learning classification model, it achieved a discrimination performance with classification accuracy of 83.58% and areas under the curves (AUC) of 0.901 combining all 474 features. 104 features with greater contributions to the prediction were detected by using feature selection method. It achieved the best prediction performance (classification accuracy of 85.45% and AUC of 0.920) with the selected key features.

Conclusion: This study presented a prediction model for the seizure occurrence in LGG patients. The results may shed light on the quantitative estimation of seizure risk and suggested that radiomics analysis may enable a step forward precise individualized prediction of LGG-related seizures.

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