New Radiomics Model Helps Better Predict Cancer

Colorectal cancer (CRC) is one of the most common digestive tract malignancies with the fourth highest death rate among all cancers. In particular, CRC patients with lymph node (LN) metastasis are more difficult to be treated, as all invasive LNs need be cleared away completely during operation or postoperative recurrence and metastasis may occur. Although several previous histopathologic findings such as lymphatic invasion and tumor differentiation are known to be predictors of LN metastasis, they are only available postoperatively. In addition, whether LN is metastasized or not is difficult to identify by traditional preoperative computed tomography, while information about LN metastasis is hard to obtain through needle biopsy.

Recently, researchers from the Key Laboratory of Molecular Imaging, CAS Institute of Automation and Guangdong General Hospital have used a novel radiomics method to improve the prediction accuracy for preoperative lymph node metastasis in colorectal cancer by 14.8%.

The researchers reviewed and analyzed over 500 cases of CRC at Guangdong General Hospital from 2007 to 2011. Based on the framework of radiomics, they combined clinical pathological data with radiomics imaging features to construct a model for predicting LN metastasis in colorectal cancer status by using the retrospective data collected from patients with CRC. To do this, they first extracted from portal venous-phase CT of CRC for 150 radiomics features. Then, they used Lasso regression model for data dimension reduction, feature selection and the radiomics signature building. Wherein, they selected 24 radiomics features as key features. The researchers then adopted a multivariable logistic regression analysis to develop the prediction model, with radiomics signature, CT-reported LN status and independent clinicopathological risk factors incorporated, presented with a radiomics nomogram.

The performance of the nomogram was assessed with respect to its calibration, discrimination and clinical usefulness. The primary cohort and validation cohort included 326 cases and 200 cases. The C-index on primary cohort and validation cohort were 0.718 and 0.773, which showed the effectiveness of the radiomics method.

Their research entitled “Development and Validation of a Radiomics Nomogram for Preoperative Prediction of Lymph Node Metastasis in Colorectal Cancer” has been published online by the *Journal of Clinical Oncology.*