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A Study to Assess the Role of 18F-FDG PET/CT Radiomic Features in Predicting KRAS, BRAF and EGFR Mutation Status in Metastatic Colorectal Cancer Patients

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In

Radiobiology

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Abstract

Colorectal cancer (CRC) CRC is the second most deadly cancer and the third most commonly diagnosed cancer in the world. But besides an increase in incidence, advances in early detection screenings, genetic testing, improved management, and treatment options have reduced CRC mortality. KRAS, BRAF, and EGFR mutation status is critical for tailoring therapeutic approaches and predicting treatment potential for CRC patients. Fluorine-18-fluorodeoxyglucose (18F-FDG) PET/CT scans are frequently used for cancer diagnosis, staging, and post-operative monitoring, including the investigation of metastatic diseases in a variety of malignancies. The goal of this study was to investigate the correlations between the prognostic value of 18F-FDG PET/CT radiomics with KRAS, BRAF, and EGFR mutations status in patients have a mCRC. Our results indicated SUVmax, SUVmean, SUVmin, TBR, and in the mutation group, TLG was significantly higher than in the wild-type or heterozygous groups. ROC curve analysis of SUV max shows high-to-moderate sensitivity (77.5%) and specificity (63.0%). As such, SUVmax, SUVmean, SUVmin, TBR, and TLG were independently predictive of mutation status in CRC patients. However, only SUVmax was independently predictive of the mutation status of CRC metastasis regardless of the other adjusted factors. From these results, we can conclude the clinical significance of SUVmax, SUVmean, SUVmin, TBR, and TLG in diagnosis and prognosis prediction of mCRC mutation status.