Topic : Biliary & Pancreas

RADIOMICS CLUSTERING OF F-18 FDG PET/CT FOR THE PREDICTION OF PROGNOSIS IN INTRAHEPATIC CHOLANGIOCARCINOMA

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Background : Intrahepatic cholangiocarcinoma (IHCC) is highly aggressive primary hepatic malignancy with an increasing incidence. Objective: This study aimed to develop machine learning-based radiomic clustering using F-18 fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) for predicting recurrence-free survival (RFS) and overall survival (OS) in IHCC.

Methods: We retrospectively reviewed pretreatment F-18 FDG PET/CT scans of 60 IHCC patients who underwent surgery without neoadjuvant treatment between January 2008 and July 2020. Radiomic features such as first order, shape, and gray level were extracted from the scans of 52 patients and analyzed using unsupervised hierarchical clustering.

Results : Of the 60 patients, 36 experienced recurrence and 31 died during follow-up. Eight patients with a negative FDG uptake were classified as Group 0. The unsupervised hierarchical clustering analysis divided the total cohort into three clusters (Group 1: n = 27; Group 2: n = 23; Group 3: n = 2). The Kaplan-Meier curves showed significant differences in RFS and OS among the clusters (p < 0.0001). Multivariate analyses showed that the PET radiomics grouping was an independent prognostic factor for RFS (hazard ratio (HR) = 3.03, p = 0.001) and OS (HR = 2.39, p = 0.030). Oxidative phosphorylation was significantly activated in Group 1, and the KRAS, P53, and WNT β -catenin pathways were enriched in Group 2.

Conclusions : This study demonstrated that machine learning-based PET radiomics clustering can preoperatively predict prognosis and provide valuable information complementing the genomic profiling of IHCC.

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