CNS tumours

COMPARISON OF CT AND 18F-FLT PET/CT IMAGING FOR TARGET VOLUME DELINEATING IN PATIENTS WITH Glioma

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Aim: The aim of this pilot study was to compare computed tomography (CT) and 3′-deoxy-3′-[18F] fluorothymidine (18F-FLT) positron emission tomography/computed tomography (PET/CT) imaging for gross tumor volume (GTV) and clinical target volume (CTV) delineation, and to analyze the impact of proliferative tumor volume delineated by 18F-FLT PET/CT.

Methods: 12 patients with glioma were enrolled into this study. The relation of 18F-FLT uptake and pathology, Ki-67 index were studied in 9 patients. All of the 12 patients underwent 18F-FLT PET/CT imaging before radiotherapy. The enhanced CT images and 18F-FLT PET/CT images were all transferred to planning system and the target volumes from each image were delineated and compared.

Results: 18F-FLT PET/CT SUVmax increased significantly with glioma grade (p = 0.007). SUVmax of 18F-FLT PET/CT (p< 0.03), T/N ratio (p < 0.0013) and Ki-67 proliferation index were positively correlated. The average of GTVCT was 226.82 ± 78.55, and the average of GTVPET/CT was 151.47 ± 76.64 (p = 0.001). CTVPET/CT volume are smaller than CTVCT volume (367.71 ± 32.35 vs. 245.23 ± 32.74, p= 0.039). CT target volume was big than PET target volume, there are two situations: first, 58.3% (7/12) of the CT include PET target; second, 41.7% (5/12) target CT and PET target cross.

Conclusions: The uptakes of 18F-FLT were positively correlated with grade of glioma and tumor cell proliferation index. To delineate target volume by 18F-FLT PET/CT imaging, the GTV and CTV are smaller than CT. It maybe improves the accuracy of GTV and CTV in patients with glioma and, meanwhile, provides potential benefits to normal brain tissue.

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