

Purpose: This manuscript aimed to investigate the value and feasibility of CT perfusion imaging in brain glioma radiotherapy treatment planning primarily.

Methods: 7 cases with brain glioma were selected into the research and underwent the localization and immobilization by CT simulation (Siemens Sensation 32). Next to the routine scanings (CT-r) without enhancement, perfusion were undertaken at once. In several series of perfusion scanning images, we selected one as the CT-p, in which the tumor sectional area was the biggest. And then the two series images were transferred to the Treatment Planning System (Pinnacle 8.0m). The MR scanings were undertaken in the same body localization system, according to the CT scanning. And the images were transferred, too. After reconstruction, registrations of CTs and MR were undertaken: a) MR vs. CT-r; b) CT-p vs. CT-r. Tumors were confirmed and contoured by a diagnostic radiologist and a radiation oncologist together referring to the registration images. Then GTV-p, referring to perfusion images (mainly to the information of bloodflow of brain), and GTV-MR, referring to MR images were obtained. The volume of the GTVs were calculated and compared using the SPSS 13.0 software. Paired, two-tails Student's t-test was applied to the comparison. Secondly, volume-1, both containing GTV-p and GTV-MR, was obtained; volume-2, covering not only GTV-p but also GTV-MR was obtained, too.

Results: GTV-p was a little, but significantly bigger than GTV-MR. GTV-p was 26.77 ± 4.52 m³, a 2.92% increase on average compared to GTV-MR, 26.01 ± 4.65 m³. And then, the difference of volume-1 and volume-2 was merely 0.83 ± 0.11 m³.

Conclusions: Confirmation and contour GTV of the brain glioma referring to brain CT perfusion images is as effective and reliable as referring to MR images. The feature is that CT routine scanning and perfusion could be carried out synchronously, without body shift, which is ideal to image registration.