

Purpose:To research the feasibility of high dose radiotherapy for brain metastases guided by the contrasted cone beam CT through studying how to implement and improve the contrasted cone-beam CT scanning and image registration in the progress of CBCT guided brain metastasis radiotherapy.

Methods:8 brain metastases cases were selected (lung cancer 3cases, liver cancer 1 cases, breast cancer 2 cases and nasopharyngeal carcinoma 2 cases), and achieved the CBCT scanning, in 20 minutes, 30 minutes, 40 minutes after contrasted stimulation CT scanning. Analyzed the CBCT image quality and the demonstration capability of the tumor on CBCT images comparing with the simulation CT. Radiotherapy plans were designed quickly with the Prescription dose 5Gy/fraction and the image registration work were completed online, and analyze the potential role of the contrasted CBCT in radiotherapy for brain metastasis.

Results: The contrasted CBCT could improve the image resolution, the tumor area and the location relationship between tumor and normal brain tissue were showed clearly. The demonstration capability of tumor on CBCT in 30 minutes was bigger than in 20 minutes and 40 minutes. The setup errors were $3.0\pm 0.8\text{mm}$ in z-axial, $2.8\pm 0.6\text{mm}$ in y-axial and $2.0\pm 0.5\text{mm}$ in x-axial.

Conclusions:The contrasted CBCT image can display the tumor and location relationship between tumor and normal tissue clearly, it can exhibit the result of adjustment for setup error directly, it could become an effective way to ensure the security in high dose radiotherapy for brain metastases.