

AbstractID: 10199 Title: The study on protection of lung function in radiotherapy by referring SPECT lung perfusion images

Purpose: This study is aimed to prove the efficacy and feasibility of protecting lung function in lung cancer radiation therapy, by referring to SPECT lung perfusion Images. **Methods and Materials:** 10 patients with lung cancer were selected. Each patient received CT simulation location, and then in the same body position, single photon emission computed tomography (SPECT) lung perfusion scans was performed to examine their lung function. After that in the planning system, the image registration and fusion of the CT location images and the lung perfusion images were operated. Based on the CT location images solely, a intensity modulated radiation therapy plan (IMRT) was designed (named as T1). The second step: after the fusion, functional lung areas (lung-Fs) were contoured on the CT images referring to lung perfusion images. Accordingly a conformal radiation therapy (CRT) plan and a IMRT plan (named as T2 and T3) based on lung-Fs were designed. To optimized both two plans above, the radiation dose was minimized in lung-Fs. In several other key organs, such as the spine-cord, the heart and the esophagus, such restrictions were also set. Total radiation dose was set at 66 Gy (2Gy×33 fractions). **Results:** compared T1 to T3, significant dose decrease ($P<0.05$) of both lung-Fs and total-lung were observed. The average reductions in the percentage of volume irradiated with >5 Gy, >10 Gy, >20 Gy , >30 Gy and >40 Gy in T3 were 6.50%, 10.21%, 14.02%, 22.30% and 23.46%, respectively. Then compared T2 to T3, there were no significant differences ($P>0.05$) between the two plans in V_{20} either in lung-Fs or total-lung. **Conclusion:** For lung cancer patients with lung perfusion defects, it's salutary to design a radiation therapy plan referring to lung perfusion images. The CRT and IMRT plans have same effects as to protect lung-Fs and alleviate the complications.