

AbstractID: 13506 Title: Study of constant beam shaping method in tumor tracking radiotherapy during respiration

Purpose: To evaluate the tumor tracking radiotherapy without consideration for the deformation of moving tumor.

Method: Four dimensional computed tomography (4D CT) corresponding to every 10% phase intervals were acquired for 4 lung and 4 liver cancer patients treated in our institution and the initial treatment planning was established for the end of inhalation phase (phase 1). **Results:** As a simulation of deformation-free tumor tracking radiotherapy, the beam center of initial plan was moved to the tumor center in other phases and the constant tumor shape acquired from phase 1 was assumed in all phases. The feasibility of the proposed method was analyzed based on various dosimetric tools such as equivalent uniform dose (EUD), homogeneity index (HI), coverage index (COV), etc. In photon radiation treatment, the movement-induced dose reduction was not that critical showing 0.5%, 17.3% and 2.8% as the average variation of EUD, HI, COV, respectively. This difference become greater in proton treatment, which shows the change of 0.3%, 40.5%, 2.2% compared to initial EUD, HI, COV, respectively. **Conclusion:** These results suggest that proton is more sensitive than photon in tumor movement and the deformation of tumor may be disregarded in tumor tracking radiotherapy for photon treatment.