

AbstractID: 7362 Title: Methodology and Guidelines in Treatment Planning of IMRT for Lung Cancers

Purposes: To review the current clinical outcome of lung cancer patients treated with IMRT; to develop a treatment planning methodology and guideline for using IMRT in treating lung cancers.

Methods: Lung cancer patients treated with IMRT were reviewed with respect to clinical outcome and treatment plans used. Major toxicity including radiation pneumonitis and esophagitis were analyzed. In the process of IMRT inverse planning, methodologies of selecting appropriate beam angles and planning objectives were developed to limit the spread of beam angles and low-dose radiation in protecting normal lung and other critical structures. Important IMRT planning parameters and their guidelines were derived, e.g. on the number of beams, beam angles, degree of intensity modulation, and DVH constraints for normal tissues.

Results: We reviewed 68 locally advanced lung cancer cases treated with IMRT and with adequate clinical followup time. The rate of grade ≥ 3 TRP at 12 months was reduced to 8% in IMRT patients in contrast to 32% in 3D-CRT patients treated historically, despite larger GTV sizes in the IMRT cohort. Mean lung dose and the volume of low-dose radiation to healthy lung may be important factors affecting the risk of radiation pneumonitis. In achieving quality IMRT plans, 6 beams were used in average, with the optimal beam angles being most frequently along the anterior-posterior direction of the thorax; the number of MLC segments per beam was confined to be less than 15 with the total MU per fraction approximately 3 times of the prescribed tumor dose.

Conclusions: With proper considerations given to treatment planning methodology and other technical issues involved, IMRT may be an effective and safe modality in radiation therapy of locally advanced lung cancers.