

AbstractID: 9581 Title: Optimization and normalization of hypofractionated lung treatment plans

Purpose: For small solitary lesions in the lung, we have adopted a protocol for hypofractionated treatment using multiple conformal or IMRT beams. Since the lesion is near unit density and the surrounding lung tissue is low density, the loss of scatter in the lung tissue can reduce the dose to the PTV, when, in reality, the CTV or ITV may be adequately covered with margin. We have performed calculations using several ways to create the PTV and to normalize the treatment plan to provide adequate coverage of the CTV or ITV with margin while minimizing hot spots which result from normalizing to the low density PTV.

Method and Materials: Gated CT scans were obtained on 2 patients and target volumes were drawn on axial series representing several individual phases of the breathing cycle. An ITV was then created and used for planning. In addition, a PTV was created by adding a clinically relevant margin around the ITV. The resulting treatment plan was then used to calculate the dose delivered to the CTV for each of the phases of the breathing cycle using different normalization methods. ITV coverage was also studied by moving the ITV inside the PTV to simulate setup error.

Results: 2 patients were planned using the above mentioned technique. Properly selected normalization results in adequate CTV and ITV coverage through all phases of the breathing cycle. Effect of setup error also results in adequate ITV coverage as the high dose region moves with the ITV.

Conclusion: Small isolated lesions in the lung can be treated with hypofractionation, but care should be taken in selecting the normalization technique to minimize the creation of unnecessary hotspots. Coverage of the near unit density lesions is not predicted by the low density PTV coverage.