

AbstractID: 7154 Title: Dosimetric Effect of Respiratory Motion on The Treatment of Breast Cancer with Tangential Fields

There is an increasing interest to treat breast cancer with modalities such as IMRT or quadrant radiotherapy. In such highly conformal treatments, dosimetric effect of respiratory motion should be systematically evaluated. As a starting point, in this presentation we propose a practical method to study this effect in tangential treatment. Breast cancer patients under the treatment are CT scanned at three respiration status, under the monitoring of a spirometer. One set of scans are obtained during normal breathing and used for treatment planning. The other two sets of data are acquired with breath holding at inspiration and expiration. These two extrema scans are used to estimate the magnitude and main direction of breast motion during normal breathing for each individual patient. The breast motion is simplified as one-dimensional sigmoidal rigid body movement. The dose effect can then be estimated by shifting the tangential fields relative to the planning CT images. Multiple pairs of tangential fields with proper weighting factors are used in the plan to simulate breast motion. Beam isocenters are shifted using a hypothetical sigmoidal function based on the measured breathing amplitude and main direction. The plan is compared with the clinical plan that assumes no breast motion. It is found that respiration motion, as expected, smears the dose distribution. The target coverage is slightly degraded. For lung and heart (in left breast treatment), radiation dose spreads to a larger volume. The results suggest that breast motion during normal breathing may not be a severe problem in tangential treatment.