

AbstractID: 1942 Title: Advantages of intensity- modulated radiation therapy in the treatment of intact breast

Irradiation of the breast result in an irregular dose distribution due to the shape of the volume. The use of wedges partially corrects the distribution but only in one plane. Intensity- modulated radiation therapy (IMRT) can optimize the entire volume distribution. Two techniques can be used for IMRT: Electronic compensator (EC) with forward planning and IMRT with inverse planning. We compared the potential benefits of intensity modulated beams with EC, IMRT with inverse planning and the standard therapy wedge for the intact breast.

Three dimensional treatment planning was performed on a phantom and for right and left patients breasts using standard wedged and intensity modulated tangential fields. For the standard plans, the optimal wedge angles were chosen based on the dose distribution in the central plane. Intensity modulated plans were generated using forward planning for electronic compensators, same breast volume as the standard treatment, and inverse planning using a standard set of target and critical structure optimization criteria. Plans were compared using multiple dose distributions and dose volume histograms. Treatment was delivered using the sliding window technique and dosimetry measurements were done with ionization chamber and film. Scatter irradiation to the contralateral breast for each modality was measured using diodes.

Dose homogeneity within the breast improved greatest in the superior and inferior regions, (approximately 10%) using intensity modulation. Scattered irradiation to the contralateral breast was highest using the standard wedged fields and IMRT inverse planning and lowest with the EC (more than 40% decrease).