

AbstractID: 5108 Title: Dosimetric evaluation of MammoSite breast treatments

Purpose:

This study was performed to assess the volumetric dosimetry of single point optimization with single dwell position technique for MammoSite brachytherapy treatment and compare the results with accepted dosimetric constraints in the ongoing NSABP B39/RTOG 0413 partial breast irradiation protocol.

Method and Materials:

74 patients received MammoSite breast treatments with single dwell position, single point optimization technique using orthogonal film based planning. CT-images were transferred to the PLATO treatment planning system version 14.2.6 and retrospectively planned for volumetric calculations without changing dwell time and position. The D90, V100, V150 and V200 and dose homogeneity index (DHI) were calculated. For comparison 9 randomly selected patients were planned with 3D volumetric optimization using multiple dwell positions and compared with 2D plan.

Results:

The mean D90 and V100 were 96% and 88% respectively. The mean V150 and V200 were 26 cc and 3.4 cc. The mean DHI was .68. All except three patients met the dosimetric criteria and constraint required in protocols. Two patients had D90 of 88.5% and 89% instead of $\geq 90\%$ and another patient had V200 of 18cc instead of $\leq 10\text{cc}$. The D90 and V100 for single vs. multiple dwell position were 93% vs. 98% ($p = .0003$) and 86% vs. 97% ($p = .0004$) respectively. The V150 and V200 were 23.5 cc vs. 34 cc ($p = .0006$) and 2.9 cc vs., 7.2 cc ($p < .0001$) respectively. The DHI was .71 vs. .61 ($p = .0006$).

Conclusion:

Single dwell position with single point optimization gives acceptable coverage and meets the requirements outlined in the NSABP B39/RTOG 0413 protocol in majority of patients. The multiple dwell position technique can generate plans with significantly better dose coverage of target but at the cost of increased dose inhomogeneity and increased hot spot. Correlations of outcomes with dosimetry will better help us assess these different treatment plans.