

AbstractID: 14244 Title: Treatment Planning of Left-sided Breast Cancer Patients with regional Lymph Nodes using Dynamic Jaws and Dynamic Couch Technique on TomoTherapy'

**Purpose:** To compare the quality of treatment plans and delivery times for breast cancer patients with involved lymph-nodes generated using Tomotherapy's emerging technology of variable jaw widths and couch speeds called "Dynamic Jaws and Dynamic Couch" (DJDC) against existing helical delivery with fixed jaw widths and couch speeds (FJFC).

**Methods:** Five left-sided breast-cancer patients with involved lymph-nodes were retrospectively planned using Tomotherapy's FJFC and DJDC techniques. Patients were CT-scanned with a 5mm-bolus and two planning target volumes (PTVs) were segmented. The main PTV included chest-wall/breast plus lymph-nodes minus superficial region while Flash-PTV includes a 5-mm-thick superficial target plus bolus. Optimized plans were generated on the Hi-Art-II research platform using FJFC and DJDC techniques. All five plans have the same prescription dose of 50.4 Gy to the PTV while limiting Flash-PTV to 45 Gy. Directional blocking was applied on contralateral breast and lung. Doses to heart, lungs, and contralateral breast were limited to reduce complication probabilities. Plans using DJDC were compared against those using FJFC for plan quality and delivery times.

**Results:** Minimum and maximum doses for the PTV were the same for both techniques. Maximum dose for the PTV-Flash was elevated by 2.5% for DJDC technique. Average mean doses to all critical structures were same within the margin of error. However, the volume receiving 5 Gy ( $V_{5Gy}$ ) of ipsilateral and contralateral lung was elevated in DJDC plans by 15% and 10%, respectively. Average  $V_{5Gy}$  and  $V_{10Gy}$  volumes of the contralateral breast were decreased by 17% and 5%, respectively, in DJDC plans. Average  $V_{25Gy}$  and  $V_{35Gy}$  volumes of the heart were also decreased by ~2% in DJDC plans. Average delivery times for DJDC and FJFC technologies were  $6.06 \pm 0.94$  and  $11.12 \pm 0.69$  minutes, respectively.

**Conclusions:** Tomotherapy's DJDC technology shortened the treatment times by 5 minutes while maintaining the plan quality of FJFC.