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Volumetric Modulated Arc Therapy versus Intensity Modulated Radiotherapy on the Left-Sided Chest Wall and Loco-Regional Nodes Irradiation in Treating Post Mastectomy Breast Cancer Patients: A Comparative Dosimetric Analysis

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Purpose: This study aimed to compare the suitable treatment plan for leftsided chest wall, regional node's irradiation by using the Intensity Modulated Radiotherapy (IMRT) and Volumetric Modulated Arc Therapy (VMAT).

Materials and methods: Fifteen patients CT data set was import into the treatment planning system (Oncentra). Two plans were generated for each patient, the first one using the VMAT technique with two partial arcs and the second one using the IMRT technique with seven co-planner radiation portals using 3D-Oncentra TPS with 6 MV photons, step and shoot treatment delivery technique with 80 leaf multi-leaf collimator and 1 cm leaf width at the isocenter.

The VMAT plans optimized using the collapsed cone (GPU) algorithm and IMRT plans optimized using a collapsed cone algorithm. A hypofractionated prescription Citation: Zope M, Patil DB, Kuriakose A, dose of 40 Gy/15# was using. The VMAT and IMRT plans were compared for PTV Target Coverage, Homogeneity Index, Conformity Index, MUs were evaluated. The OAR doses also compared.

Results: A comparable PTV coverage (V95%), mean PTV doses were observed between VMAT and IMRT plans. The PTV maximum dose was higher within IMRT than the VMAT. We observed a better Homogeneity Index for VMAT plans. Conformity Index comparable plans non-significant differences were observed. MU values of VMAT are higher than the IMRT treatment in this study.

However, VMAT plansshow significantly better right lung, heart, and larynx sparing when compared to the IMRT plans. No significant difference was observed in both groups of plan for the right breast and spinal cord. The maximum dose for left humerus head were comparable for both groups of plans.
Conclusion: VMAT is dosimetrically superior to the IMRT for irradiation of leftsided chest wall and regional nodes patients in terms of target coverage and OAR
sparing.

Keywords: Radiotherapy; Photons; Tomophan; Radiation oncology