



Contribution ID: 116

Type: oral (20 minutes)

Indications for Intensity Modulated Radiation Therapy (IMRT) for the Treatment of Large Left Breast Volumes

Wednesday, 17 October 2012 14:30 (20 minutes)

PURPOSE: To determine indications for the use of an IMRT technique for large volume size left breast cancers.

MATERIALS/METHODS: Retrospective review of Stage 0-III left breast cancers with large volumes treated with conservation therapy from April 2011 to January 2012. Computer tomography simulation was used to design fields. Patients were treated supine and received 2 Gy fractions to 50 Gy to the whole breast followed by an electron or 3D boost of 16 Gy using 6, 15 or mixed 6/15 MV photons. A variety of techniques including electronic compensation (E-comp), field in field (FinF), and 3D with wedges (3DW) were compared. Dosimetric evaluations were made of the PTV, lung, heart and contralateral breast for each technique. RTOG skin toxicity grades, treatment data, and breast volumes were obtained by chart and treatment plan review.

RESULTS: A total of 30 patients were treated, and all patients received chemotherapy. Volumes ranged from 718-3296 cc (ave. 1483.33 cc). Separations ranged from 20-35 cm (ave. 23.87 cm). During treatment there were 63% Grade 1, 37% Grade 2, 0% grade 3/ 4 RTOG skin toxicity; no treatment breaks recorded. E-comp plans resulted in better coverage of the V95 with improved dose homogeneity of the PTV. This was seen especially in breast volumes > 2400 cc. Also, there was a reduction in V110 and V115 in the FinF and Ecomp plans compared to conventional 3DW technique. In terms of dose to the contralateral breast Ecomp had a slight advantage (1%). No significant difference seen in the LT lung V20 and Heart V25 and Contralateral Breast V5 between Ecomp or FinF which was better than 3DW.

CONCLUSIONS: For women with large breast size Ecomp planning significantly improved dose homogeneity decreased acute skin toxicity and less hot spot value. These factors grow more important in women with large breasts, who may experience more Grade 3/ 4 skin toxicity and increased pain resulting in a lower quality of life with standard tangential fields. Therefore, we suggest using an Ecomp technique for left-sided breast cancer in the following situations: 1) breast volume >1500cc 2) separation of >25cm or 4) combination of large volume/cup size with separation > 22 cm or vice versa, 5) the use of mixed beams. For patients with large breast volumes supine IMRT treatments can provide good dose homogeneity, spare dose to critical structures, and may be preferable to the prone breast irradiation.

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Session Classification: New Cancer Treatment Modalities

Track Classification: New Cancer Treatment Modalities