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## Dosimetric comparison of dose to contralateral breast in postmastectomy patients treated using different treatment techniques

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### Purpose

Postoperative radiotherapy significantly reduces the risk of loco-regional failure and improves disease-free survival. However, peripheral dose to the contralateral breast is cause of concern due to its higher radiosensitivity towards radiation induced second malignancy. The present study aimed to measure the contralateral breast dose from the post mastectomy radiotherapy (PMRT) using conventional asymmetric jaw and 3D conformal radiation therapy (3DCRT) treatment techniques separately. A comprehensive analysis of data of contralateral breast dose was made to determine methods if radiation could be delivered safely and effectively with a reduced contralateral breast doses.

### Materials and methods:

Fifty breast cancer patients with post mastectomy were included in the study, which underwent external beam therapy on cobalt-60 teletherapy machine and linear accelerator machine. Patients were planned to treat to the chest wall (CW) to a dose of 50 Gy/ 25# with opposed tangents, Supra Clavicular Field. Of these, twenty five patients treated with PMRT on Bhabhatron-II TAW telecobalt machine using asymmetric jaws with conventional medial and lateral tangential fields were treated on alternate days. Rest twenty five treated on Siemens Oncor Expression linear accelerator using 3DCRT technique with medial and lateral tangential fields daily. The contralateral breast doses in assessed using optically stimulated luminescence dosimeter (OSLD) which was placed at the level of contralateral breast nipple prior to start of the treatment. The dose contribution was measured only for tangential fields; SCF doses were not included in the study.

### Results and discussions:

The dose measured at the contralateral breast nipple for patients treated on telecobalt machine was observed between 114.25 to 193.12 cGy for total primary breast dose of 5000 cGy in 25 equal fractions which accounted to be 2.28-3.86% of total dose to ipsilateral breast while for the patients treated on linear accelerator the dose measured at the contralateral breast nipple was observed between 73.75-171.00 cGy for total primary breast dose of 5000 cGy in 25 equal fractions which accounted to be 1.47-3.42% of total dose to ipsilateral breast. The cause of higher doses observed in patients treated on telecobalt machine is due to fact that the beam modification was achieved with asymmetric jaw in the cobalt-60 teletherapy machine while in linear accelerator the beam modification was achieved with the help of multileaf collimator (MLC), which resulting in a reduced scatter dose to contralateral breast dose. Further, it was observed that the maximum contribution of contralateral breast dose was due to medial tangential (MT) fields, which was about two times higher than dose contribution due to the lateral tangential (LT) field.

### Conclusions:

Though the use of MLC in 3DCRT treatment showed acceptable coverage of PTV provides excellent normal tissue sparing with a reduced dose to contralateral breast. However, MLC does not seem to be suitable for PBRT with unacceptably tight margins of PTV. The use of telecobalt machine with asymmetric jaws is a good choice for PMRT considering socioeconomically factors, at a cost of slightly higher dose to contralateral breast.

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