

INTRODUCTION:

- Evaluate and compare 3D-CRT, electronic tissue compensation (ECOMP), and hybrid IMRT plans for prone whole breast irradiation in the treatment of early-stage breast cancer.
- Literature describes 3D-CRT and hybrid IMRT planning for prone whole breast irradiation, but the use of ECOMP has not been reported on.

WHOLE BREAST PLANNING:

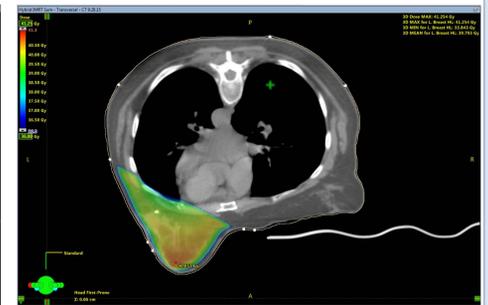
3D-CRT



ECOMP



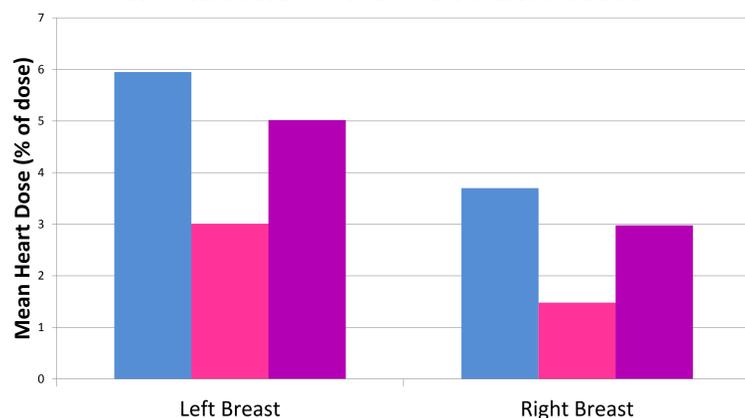
Hybrid IMRT



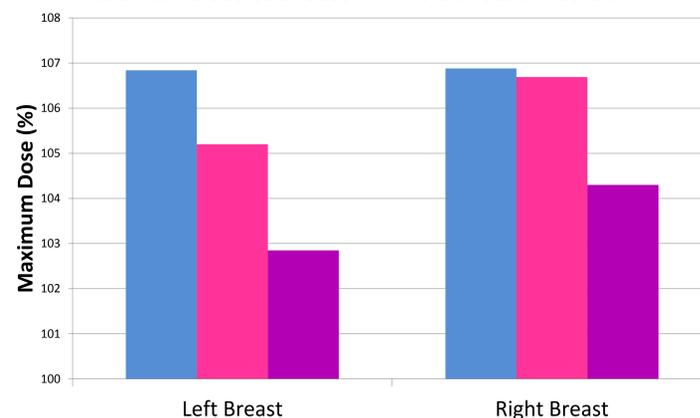
* Shown in dose color wash at the 90% isodose line

RESULTS:

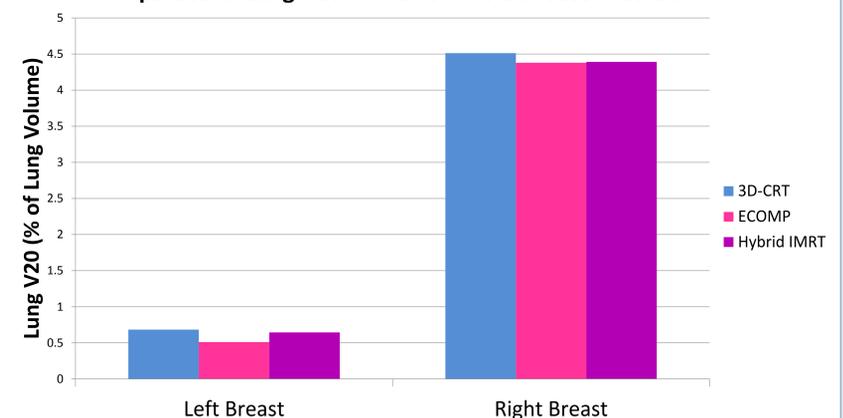
Mean Heart Dose in Prone Whole Breast Irradiation



Maximum Dose to Breast in Whole Breast Irradiation



Ipsilateral Lung V20 in Prone Whole Breast Irradiation



- Global maximum dose for all patients was reduced while maintaining dose homogeneity using both ECOMP and hybrid IMRT when compared to 3D-CRT. Maximum dose reduction using hybrid IMRT averaged a 1.3 Gy dose reduction compared to 3D-CRT planning.
- No difference in ipsilateral lung V20 was seen between the different planning techniques.
- Mean heart dose was reduced in the ECOMP and hybrid IMRT plans compared to the 3D-CRT plans. Hybrid IMRT reduced mean heart dose by 0.7 Gy for the right breast, 0.9 Gy for the left; ECOMP reduced mean heart dose by 2.2 Gy for the right, and 2.9 Gy for the left.
- There was no correlation found between the breast volume and maximum dose, ipsilateral lung V20, or mean heart dose.

MATERIALS & METHODS:

- 20 patients post breast conservation surgery simulated in the prone position on a specialized prone breast board (10 right sided, 10 left sided)
- Dose prescription: 40 Gy in 15 fractions
- 3 treatment plans per patient were designed using Varian Eclipse 11 to treat the whole breast to the 95% isodose line
- Plans were traditional 3D-CRT plan using wedges, ECOMP plan, and Hybrid IMRT—where 2/3 of the daily dose is delivered with 3D-CRT and remaining 1/3 dose with forward planned IMRT

CONCLUSION:

- Use of prone position for whole breast radiotherapy may achieve a significant reduction in lung and heart radiation dose when compared to traditional treatment in the supine position.
- Treatment delivery with ECOMP or a hybrid IMRT technique can further reduce heart and lung dose compared to 3D-CRT with wedges.
- Hybrid IMRT provides a significant reduction in maximum breast dose.
- ECOMP allows for the maximum decreases in mean heart dose while maintaining a relatively low maximum dose.

Summative statement

Evaluation and dosimetric comparison of V20, heart dose and maximum dose for different prone whole breast irradiation planning techniques including 3D-CRT, ECOMP and hybrid IMRT.