Comparison of Scripted EZ fluence - Planning with Previously Manually Generated Plans for Breast in Prone Position

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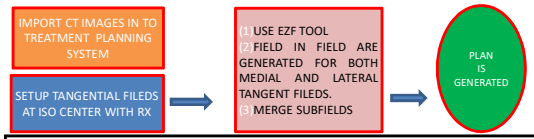
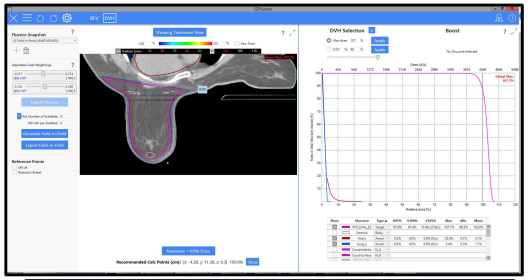
Introduction: EZFluence (EZF) is a module for Varian Eclipse treatment planning system which generates a field-in-field (FIF) plan to achieve a homogeneous dose distribution of photon treatment beams (RadFormation, New York). This study is to assess the quality and feasibility of selected prone breast treatment plans generated with the EZF module. The dose distribution and dosimetry of the EZF and manually generated plan by dosimetrist was retrospectively compared.

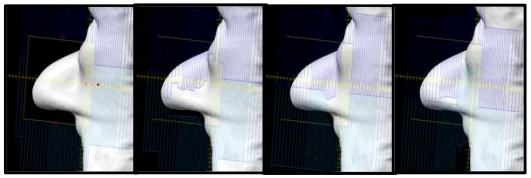
Materials and Methods:

- 10 left breast cancer patients were included
- CTs of slice spacing of 3 mm were taken in head-first-prone position with Siemens Somatom AS CT scanner.
- Eclipse v15.6 scripted EZF module was used to retrospectively generate 3D plans based on the adapted RTOG protocol dosimetric requirements for target (whole breast) coverage as well as organ at risk (OAR) sparing.
- All the plans consist of geometrical arrangement of oppose tangential fields placing iso-center in proximity to chest wall (rib).
- Alignment tattoos were given at the time of simulation.
- All plans were constructed with one dose level of 42.4Gy with 6MV or mixed 6/15 MV without use of bolus and were calculated with grid size of 2.5 mm.
- The EZF plans were performed with maximum number of field segment 4 and minimum of 4 MU per field.
- Dose volume histograms were assessed against the following criteria: 95% of whole breast (target) volume achieves greater than 95% of prescribed dose, maximum dose < 107%, mean dose to lung, V20Gy<20%, and heart mean dose<4Gy. Dosimetry was verified using secondary MU calculation software within 3%.

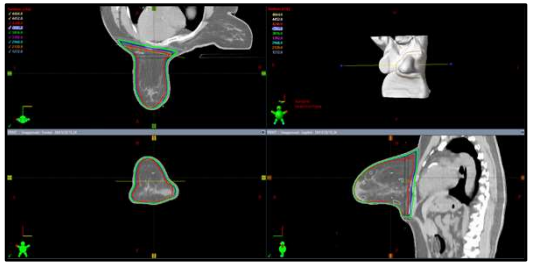




EZFluence window



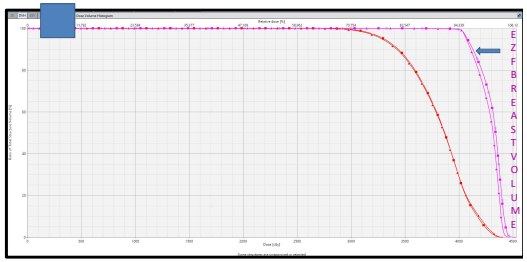
FIELD IN FIELD -EZF



ISODOSE LEVELS -EZF

Results and Discussion:

There was approximately a 10 to 15% improvement to whole breast volume coverage, 2% increase dose to skin and increase in the monitor units for EZF than plans constructed manually.



DVH FOR SKIN AND BREAST VOLUME COMPARISION FOR MANUALLY GENERATED (LINE WITH TRIANGLE) AND EZF (LINE WITH SQUARE)

DOSE TO SKIN –EZF

Conclusion:

Scripted EZF module function was demonstrated to be consistent and feasible for producing clinically acceptable plans. One benefit offered by scripted EZF is time saving in user's initial preparation of FIF. Dose to skin and breast volume was improved with EZF. EZF initial preparation achieved an equivalent outcome for beginner or skilled dosimetrists which can help an institution's standardization process. For large breast, adoption of the EZF may require more manual work to obtain optimal results. In conclusion, scripted EZF plan is a reasonable method for the initial optimization of cancers of the breast treated in the prone position