Conclusions: Dose delivery in breast cancer patients irradiated during vmDIBH, as verified in vivo with 2D EPID dosimetry, is as accurate as in patients irradiated during FB.

EP-1056
Early cardiac changes due to chemotherapy and radiotherapy in carcinoma breast patients: A descriptive study
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Purpose/Objective: The aim of this study was to find out early cardiac changes from doxorubicin based chemotherapy and radiotherapy in patients with early and locally advanced carcinoma breast and to assess cardiac changes in relation to radiation dose received by heart.

Materials and Methods: Investigations like ECG, ECHO and ERV (Equilibrium radionuclide ventriculography) were done at baseline, after chemotherapy, after radiotherapy and after 6 months of followup. Changes in ECG, ECHO and ERV were recorded at different time periods during the study. Left ventricular ejection fraction (LVEF) was recorded using both ECHO and ERV. In ECHO other parameters like Fractional shortening (FS), Mitralvalve E point septal separation (MVEPSS) and PEP/LVET ratio (Pre ejection period/Left ventricular ejection time) were recorded. Patients were divided into 4 groups according to the sequence of chemotherapy and radiotherapy.

Results: The most common ECG change was T wave inversion in the pre-cordial leads. One patient had ST depression in V4 & V5 leads and 2 patients had physiological T wave inversion in Lead III. In Group 1 mean LVEF (ECHO) at baseline was 66.79 ± 3.73. It decreased to 63.45 ± 3.54 after chemotherapy. It further decreased to 61.64 ± 4.26 after RT. On follow up there was a further decline to 61.42 ± 3.27. In Group 2 baseline mean LVEF was 66.67 ± 4.33. Post RT it slightly decreased to 66 ± 4.975, while post chemotherapy it further declined to 62.7 ± 2.92. During follow up mean LVEF further decreased to 61.89 ± 2.934. In Group 4 baseline mean LVEF was 67.25 ± 4.33, which decreased after chemotherapy to 64.75 ± 2.06. During follow up it further decreased to 63.25 ± 2.363. LVEF was also measured by MUGA/ ERV. In Group 1 mean LVEF at baseline was 58.14 ± 2.997. After chemotherapy it decreased to 56.15 ± 3.144. After RT it increased to 56.21 ± 3.81 and during follow up mean LVEF decreased to 55.21 ± 2.913. In Group 2 mean LVEF at baseline was 59.11 ± 1.41. Post RT decreased to 58.67 ± 2.872 and post chemotherapy it decreased to 54.44 ± 1.81. During follow up it increased to 55.22 ± 1.787. In Group 4 mean LVEF at baseline was 60 ± 1.63, which decreased to 58.75 ± 1.89 after chemotherapy. During follow up it further decreased to 56.25 ± 2.63.

Conclusions: Our prospective study shows that a significant number of patients can develop a transient depression in ventricular function after chemotherapy and radiotherapy. ECG changes in our study were not specific. T wave inversion was the most common abnormality, suggestive of ventricular repolarisation abnormality. Decrease in LVEF was seen in our patients both by conventional ECHO and MUGA/ ERV scan during different phases of treatment. These changes indicate that doxorubicin based chemotherapy and radiotherapy produces acute abnormality in left ventricular function. Whether these results are predictive of the development of chronic cardiac toxicity can only be answered by serially investigating these patients for a longer duration.

EP-1057
Use of a 3 dimensional bioabsorbable tissue marker for image guided breast radiotherapy
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Purpose/Objective: Linear accelerator delivered partial breast radiotherapy has a number of advantages over other technologies. These include: No new clinical skills, improved efficiency and economics, non invasive (vs. brachy), performed with known histology (vs. IORT), and ability to deliver accurate and uniform dosimetry. On the other hand, uncertainties in target localisation with external beam RT has resulted in large PTV expansion margins and increased dose to the surrounding normal tissue. This work determines the utility of a novel device that allows for accurate localisation and patient positioning, facilitating reduced treatment volumes for either APBI or breast boost following whole breast RT.

Materials and Methods: A novel implantable device (BioZorb™ Tissue Marker) constructed of standard surgical materials (bio-absorbable polymer and Ti clips) has been developed. The polymer is formed into a semi-rigid spiral and shaped into a sphere or ellipsoid, with six clips strategically placed for visualisation and orientation. A range of sizes is available to match the lumpectomy cavity. The implant is placed into the cavity at the time of surgery. Several weeks post surgery, treatment planning CT (including respiratory gating) is performed. The envelope of the implant abutting the margin of the tissue cavity plus 1cm defines the CTV with an additional 0.5cm expansion for the PTV. The treatment is delivered using either 3D conformal or VMAT. Patient setup is facilitated with CBCT and a post treatment scan to reveal residual error.

Results: To date 3 patients have been treated using APBI with the implant. The average PTV was 84cc compared to 378cc worst case using all hyperdense tissue surrounding the cavity, and 788cc for the whole breast. The extent of respiratory motion ranged from 0.7 to 2mm and mean residual error for all measured treatment fractions was 1mm (SD 2.3mm). Using a VMAT technique provided further enhancement to APBI reducing the non imaging component of treatment to 112sec with no floor rotations required and a 36% reduction in MU over a non coplanar 3D conformal method.

Conclusions: This novel implantable device provides for greater certainty of target definition and assessment of respiratory motion when defining the PTV, facilitating the use of IGRT for partial breast treatment. Efficient image guided setup further allows for a reduction in margin. Post treatment imaging validates the use of a 0.5cm PTV expansion. Using this device in the breast parallels the use of other fiducially guided treatment sites such as the prostate. When positioning the patient, use of the implant serves as a significant improvement compared to highly uncertain target surrogates such as skin markers or random clouds. The device is also able to provide certainty of target location in breast boost treatment where there is usually limited evidence of the location of the primary site at the time of boost.

EP-1058
Failure Mode and Effects Analysis (FMEA) in Intraoperative Radiation Therapy (IORT) with mobile linear accelerator
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