result in any significant under-dosing of the target, the observed differences showed that the rectum broke our institutional DVCS during treatment. This is important data required to evaluate the robustness of institutional procedures for the planning and delivery of patients’ treatments.

PO-0901
Investigation of a fast CBCT protocol for supine accelerated whole breast irradiation
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Purpose or Objective: Acceleration in breast cancer treatment might become the new standard. As fraction dose rises, the importance of correct positioning increases. CBCT is time consuming and uses (low dose) radiation. Increasing interval between positioning and actual treatment reduces precision. We therefore investigated a CBCT technique with lower dose and faster acquisition.

Material and Methods: Both standard and fast pre-treatment CBCT imaging (STAND and FAST) were performed on XVI Elekta® in a 5-fractions supine and whole breast irradiation scheme (5 x 5.7 Gy). The main difference between protocols was gantry speed (Table 1). Central dose was measured with PTW equipment in a CTDI32 phantom. High resolution (HR) and contrast were measured on a Catphan Phantom. Breast contour appearance was assessed on a polystyrene breast phantom. Fifteen clinical CBCT-images for three patients to which FAST or STAND was randomly assigned, were blindly scored by a skilled oncologist. A three-level answer had to be formulated regarding visibility of 1) all clips, 2) entire breast contour, 3) lung/thorax wall edge and 4) excision cavity. Answers were decoded: 0: Not at all; 1: Yes, but only with guidance of reference CT; 2: Yes clearly, without reference CT.

Results: FAST operated at only 53% and 61 % of dose and time of STAND. A low HR (3 lp/mm) was the same for FAST and STAND. Contrast was assessed for STAND through visibility of the largest (15mm) 1% contrast nodule. For FAST, no nodules could be distinguished. There was excess-tissue on cranial and caudal CBCT breast phantom slices, but to the same extent in STAND and FAST. In mid position, breast edge was sharp and coincided with reference CT. The Patient study reflected a difference in the overall low soft tissue contrast for the two protocols. The excision cavity was never scored 2, more 1 for STAND and more 0 for FAST and was less visible with higher breast density (patient 3). Breast contours showed step-wise artifacts near inframammary and axillary folds for both protocols. Lung/thorax wall edges were scored 2 and 1 but the dependency was larger for patient anatomy than for scan protocol. All clips were visible: the rather poor HR is however sufficient. Streak artifacts due to beam hardening and undersampling were apparent in both protocols (Figure 1).

Conclusion: FAST allows the oncologist to register breast CBCT. However, with high density or voluminous breasts, clips are recommended with the use of FAST.

PO-0902
Improving frameless intracranial stereotactic setup with 6DOF couch using two pre-treatment CBCTs
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Purpose or Objective: The primary goal of this study was to evaluate the residual inter-fraction positioning errors of our intra-cranial frameless stereotactic treatment following a six-degree of freedom (6DOF) correction based on automatic bone anatomy matching. A secondary goal was to evaluate the intra-fraction motion.

Material and Methods: Since the implementation of the stereotactic program at our centre, 13 patients were treated with frameless intra-cranial fractionated radiotherapy on a Varian TrueBeam STx linear accelerator. All patients had a planning CT scan with an immobilization system comprised of a CIVCO head cup, customizable pillow and thermoplastic shell. To guide setup, nose to forehead pitch was calculated using CT information and reproduced at treatment using a digital level. Roll was measured as the difference in height at the level of the anterior ear notch and reproduced at treatment using the in-room lasers. Two pre-treatment CBCTs were acquired; the first to correct using 6DOF bone anatomy matching the initial inter-fraction positioning error and the second to assess the residual inter-fraction error post 6DOF correction. Since our initial experience with the first 3 patients, revealed residual inter-fraction setup errors greater than 1mm, the residual inter-fraction setup error post 6DOF correction was measured and corrected prior each treatment for all remaining 10 patients. Due to the technical limitations of Varian’s 6DOF couch (i.e. maximum 3 degrees pitch and roll), the correction of the residual inter-fraction error was carried out using 4DOF automatic bony anatomy matching (i.e. excluding pitch and roll due to 3degree limitation). A post-treatment CBCT was acquired to determine the intra-fraction motion using 6DOF bone anatomy matching.