Purpose/Objective: The CyberKnife® Robotic Radiosurgery System uses two x-ray sources to set up patient, to track region of interest and to correct patient's position. The aim of this study is to evaluate the number of images per one fraction and to calculate the imaging dose for the whole treatment for different localizations.

Materials and Methods: A retrospective analysis was performed on a group of 20 patients treated with CyberKnife® system. The group included 10 patients with brain tumors and 10 patients with prostate cancer. The used x-ray parameters were similar within considered localization and it was respectively 120 kV, 100 mA and 100 ms for prostate and 115 kV, 100 mA and 100 ms for brain. The interval between images taken during the fraction was specified by physician at the first fraction of the treatment and it was 60 s for all patients. Typical amount of beams ranged from 148 to 177 for prostate and from 67 to 203 for brain. The number of fractions and the fraction dose for each localization was respectively: 5 fractions and 7.25 Gy for prostate and 3 fractions and 6 Gy for brain. To calculate the mean number of images per one fraction the whole information about the imaging (such as: number of images taken during the positioning, final number of images per fraction, image interval and x-ray parameters) for each fraction was saved. Based on our results and publications data, the surface dose from imaging system, which received patients with brain tumors and prostate cancer, was calculated.

Results: The study found that the mean number of acquired images per one fraction for each localization was: 77 for prostate and 105 for brain. The calculated surface dose was 18.48 mGy per fraction for prostate case and 10.87 mGy per fraction for brain. Total dose from images taken during the whole treatment course was 92.4 mGy for prostate cancer and 32.61 mGy for brain tumors.

Conclusions: The number of images and the dose on the surface is different for each localization. We suspect, that the higher number of images and higher dose from imaging system for prostate cancer results from the number of fractions and from movements of prostate gland (which forced us to make some additional images during the positioning and during the time of irradiation) as well.

EP-1663
Breast cancer patient interfraction displacement assessment before and after on-line CBCT corrections in IMRT
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Purpose/Objective: To model interfraction motion variation in breast cancer patients with intensity modulated radiotherapy (IMRT) based on cone beam CT (CBCT), and to quantify interfraction motion in patients with breast cancer.

Materials and Methods: Eighteen breast cancer patients after breast conserving surgery underwent whole breast IMRT were included in this study. A total of 452 CBCT scans were acquired. Three dimensional interfraction motion and setup error before and after on-line CBCT-based corrections were quantified. Trends in magnitudes of interfraction motion were assessed during treatment.

Results: Magnitude the interfraction displacements varied widely among the 18 patients, and for the same patient, the displacement among three dimensional directions were also different. The largest interfraction variability in the lateral (LR)/anteroposterior (AP) and superoinferior (SI) direction were 0.22cm±0.49cm±0.48cm prior to CBCT-based corrections, and 0.16cm±0.21cm±0.17cm after on-line CBCT-based corrections. On-line CBCT-based corrections decreased the displacement in SI direction (-0.08 cm vs 0.03 cm, t=-2.373, P=0.034) and random error (σ), but there were no significant differences for systematic error (Σ). No trends in interfraction motion were observed before and after on-line CBCT-based corrections.

Conclusions: For breast cancer patients underwent IMRT, both interfraction displacement in SI direction and mean population random error were reduced after on-line CBCT-based corrections using automated greyscale match. As a result of individual differences, although slight progressive changes occur in all directions with the increasing of treatment times, no significant trend was identified before and after on-line CBCT-based corrections.

EP-1664
Radiotherapy treatment verification in a cohort of limb sarcoma patients: an audit of departmental practice
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Purpose/Objective: Regular set up audits facilitate the calculation of departmental margins and inform the action level and frequency of the IGRT required. They should be carried out whenever changes in the patient pathway are proposed and become even more important when changing from conformal delivery to IMRT with potential reduction in margins (1). We present the set up data acquired by using an in-house bespoke immobilisation system for our limb sarcoma patients.

Materials and Methods: A retrospective audit was undertaken using limb sarcoma patients treated in the period 2012-2014. Patients who had sarcomas in the thigh region were selected as these were the majority of limb cases, using the same customised immobilisation. Patients were further categorised by gender, laterality, pre- or post-operative radiotherapy, and to which joint (knee or hip) was used for verification. Aria 11.0 (Varian Medical Systems) was reviewed to extract orthogonal kilovoltage (kV) (and megavoltage) imaging data taken for each patient for each imaging session. Patients were imaged in the first three days of treatment and the systematic error was then calculated in longitudinal, vertical and lateral directions. The set-up was then adjusted for all of the following sessions. An image was additionally acquired on session 4 and then weekly to ensure random set up error was within tolerance. Population mean, systematic and random errors were calculated for measurements in each direction. Margins were suggested based on these data (2).