The range of variation of the ITV between each treatment fraction was 0.6 - 38.6 cc. The percentage of volume variation comparing (relative) to the ITV_0_planning volume was between 10.5% - 83%, with a mean of 36.6% and a median of 30%.

**Interfraction ITV coverage**: fig 2

The ITV interfraction variation coverage calculated to the 98% of the total prescribed dose ranged between 0 and 13.3%. The mean variation was 2.86%; median: 0%; min: 0%; max 14.7%. Only two cases showed >10% of coverage variation.

**Conclusions**: There is a variation in the interfracción ITV in SBRT treatments of infradiaphragmatic lesions. The percentage changes in this volume reached a mean of 36.6% relative to the initial ITV. Dosimetry from the initial planning (unmodified for the new ITV’s) yielded a mean variation in the ITV interfraction coverage of 2.86%. In the majority of cases, the ITV coverage variation was within 98% of the total prescribed dose. We can conclude that a new planification for every fraction according to the new ITV’s is not necessary. The PTV coverage and OARS constraints could be those which define the need for changes in the initial planning.

---

**EP-1661**

**Six degree set up errors of spine tumors assessed by image guided radiotherapy**

P. Jiang1, S. Zhou1, J.J. Wang1, R.J. Yang1, Z.Y. Liu1, S.K. Jiang1, W. Wang1
Peking University Third Hospital, Radiotherapy Department, Beijing, China

**Purpose/Objective**: To evaluate the six degree setup errors of tumors of cervical vertebra, thoracic vertebra and lumbar vertebra by image guided radiotherapy.

**Materials and Methods**: From May 2013 to June 2014, 30 patients with spinal malignant tumors (10 patients of cervical vertebra, thoracic vertebra and lumbar vertebra respectively) were treated with Elekta Synergy accelerator. Six degree set up errors were corrected using HexaPODevo RT bed and under image of on board cone beam computed tomography (CBCT) guided. All patients received kilovoltage CBCT before receiving radiotherapy and after correction. The acquired images were co-registered with planning CT with bone window. The data of 838 CT images were analyzed and the errors of translational directions X (Lateral), Y (Longitudinal), Z (Vertical) and rotational directions Rx (Pitch), Ry (Roll), Rz (Yaw) were recorded. To compare the data by t-test using SPSS 13.0.

**Results**: The absolute translational setup errors (mean ±SD) in X (Lateral), Y (Longitudinal), Z (Vertical) axes of cervical vertebra before correction were 1.71±0.10mm, 1.81±0.11mm and 1.94±0.09mm respectively. 3.17±0.19mm, 4.26±0.28mm, 2.18±0.12mm for thoracic vertebra and 2.69±0.24mm, 3.33±0.26mm±2.86±0.21mm for lumbar vertebra. T-test of paired data of set up errors before and after CBCT showed significant difference in X (t=-5.785, P=0.00), Y(t=4.717, P=0.00), Z(t=-2.876, P=0.01) axes of cervical vertebra, X(t=-1.451, P=0.05), Y(t=-2.6, P=0.01), Z(t=-5.194, P=0.00) for thoracic vertebra and Z(t=-3.518, P=0.00) for lumbar vertebra. The absolute rotational setup errors (mean ±SD) in RX (Pitch), Y(Roll), Z(Yaw) axes of cervical vertebra before correction were 0.67±0.04°, 0.75±0.06° and 0.84±0.06° for thoracic vertebra, 0.59±0.06°, 0.80±0.07° and 0.73±0.06° for lumbar vertebra. T-test of paired data of set up errors before and after CBCT showed significant difference in RX (t=-2.27, P=0.03), Y(t=4.109, P=0.00), Z(t=2.057, P=0.00) axes of cervical vertebra, RX(t=7.106, P=0.00) for thoracic vertebra and RX(t=-3.518, P=0.00), RY(t=-6.946, P=0.00), RZ(t=-2.653, P=0.01) for lumbar vertebra.

**Conclusions**: Six degree set up errors of spine tumors were corrected effectively with HexaPODevo RT bed under CBCT Image guided and its feasibility in day-to-day clinical practice has been demonstrated.

---

**EP-1662**

The imaging dose and number of images taken during the CyberKnifeÆ treatment for brain and prostate tumors

E. Czajka1, W. Jackowiak1, J. Dura1, A. Skrobala1, M. Adamczyk2, S. Adamczyk2, P. Milecki1

1Greater Poland Cancer Centre, Radiotherapy Department I, Poznan, Poland
2Greater Poland Cancer Centre, Medical Physics Department, Poznan, Poland
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-1664
Radiotherapy treatment verification in a cohort of limb sarcoma patients: an audit of departmental practice
S. Petkar1, S. Moinuddin2, H. Grimes2, S. Nash1, F. Le Grange1, B. Seddon1
1University College London Hospital, Radiotherapy, London, United Kingdom
2University College London Hospital, Radiotherapy Physics, London, United Kingdom
3University College London, CR UK and UCL Cancer Trials Centre, London, United Kingdom

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 after on-line CBCT-based corrections.

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.