The aim was to review existing bladder-filling protocols to establish if they provide effective consistent filling throughout treatment and to see if this impacts toxicity.

**Materials and Methods:** All patients receiving radical radiotherapy for prostate, rectal and gynaecological cancers over a 6 month period were included. Bladder scan measurements were conducted at radiotherapy planning and US was performed 3 times weekly throughout treatment. The RTOG toxicity score was reviewed retrospectively.

**Results:** 12 patients with prostate cancer, 3 with rectal cancer and 2 with cervical cancer were identified. Bladder filling protocols were adhered to in that the number of preparatory cups of water drunk was consistent. US filling protocols were adhered to in that the number of preparatory cups of water drunk was consistent. US was performed 3 times weekly throughout treatment. The RTOG toxicity score was reviewed retrospectively. US was performed 3 times weekly throughout treatment.

**Conclusions:** It is important to reliably achieve bladder filling throughout treatment that is consistent with the bladder volume on which the radiotherapy plan is based otherwise it may impact both treatment outcomes and toxicity. Despite having standardised preparation protocols, consistent filling is challenging. Variation may be due to patient compliance, time lag between US to planning CT, or time on treatment couch, during which there is continued bladder filling, introducing significant changes in bladder volume. Standardising bladder-filling protocols, patient education, and minimizing time between bladder US and treatment time all play important roles in improving consistent bladder filling.

**EP-1618**

**Study of the capacity to keep the treatment position during radiotherapy in palliative patients**

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**Purpose/Objective:** To assess if the patient position for palliative patients with well controlled pain is guaranteed in each treatment session during the whole treatment.

**Materials and Methods:** 16 palliative patients with well controlled pain were selected. The simulation was performed without any particular immobilization system. The patients are usually in supine position with a pillow under the head and another under the legs, to help keep a stable and comfortable position during the treatment.

**Conclusions:** To frameless stereotactic radiotherapy cranial field mean set-up error was <0.2 cm in all X Y Z coordinates. Caution is warranted against adopting generic margin as different margin generating recipes lead to a different probability of target volume coverage.

**EP-1617**

**Assessment of set-up errors in frameless fractionated SRT of cranial lesions with CBCT and immobilization cast**

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**Purpose/Objective:** Setup errors are inherent part of any radiation treatment. It is introduced by virtue of manual as well as machine related attribute which to a certain extent can be controlled by daily meticulous procedural checks. They are defined as the difference between the actual and intended position with respect to radiation delivery. The Aim of our study is to assess setup error and its frequency in cases of frameless stereotactic radiotherapy given in case of brain tumors without frame with the help of orfit ray cast with open mouth and All in One base plate.

**Materials and Methods:** A total of 11 patients undergoing treatments in between 3 to 6 fraction on linear accelerator with HD MLC at our hospital by frameless stereotactic radiotherapy for lesions metastatic to brain. Each patient was planned without rigid frame, though immobilization was achieved by orfit cast. Daily verification of setup was done with the help of CBCT. Analysis of daily setup error and shift thus applied was calculated for each patient at the end of his/her treatment.

**Conclusions:** The differences obtained in the aforementioned comparison, of frameless stereotactic radiotherapy cranial field mean set-up error was <0.2 cm in all X Y Z coordinates. Caution is warranted against adopting generic margin as different margin generating recipes lead to a different probability of target volume coverage.
Results: 81% of the patients were within tolerance in each fraction of the radiotherapy treatment, and only 19% exceeded the tolerance level for some of the treatment fractions (figure 1). Quantifying the differences found in any axis and for any fraction, it can be seen that 90% are within the tolerance level, and 8% are between 0.5cm and 0.6cm. Only 2% exceeds the limit of 0.7cm (figure 2).

Conclusions: We found a good reproducibility in the daily position for patients with well controlled pain. We can conclude that the positioning method and other technique-related parameters that we use for palliative treatments are adequate to guarantee a good reproducibility of patient position during the radiotherapy treatment. These results show the importance of keeping a well controlled pain to ensure a good treatment.

EP-1619
Comparison between two different commercial thermoplastic mask systems in image-guided radiation therapy
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Purpose/Objective: Aim of this work was to evaluate the accuracy in the positioning of two different set of commercial thermoplastic mask systems: Easy Frame (Candor) (group A) and Double Shell Positioning System (MacroMedics) (DSPS) (group B). A group of patients undergoing SNC and H&N treatments, both stereotactic or with conventional fractionation was chosen. The translational shifts applied after each CBCT and prior to irradiation with Varian TrueBeamSTx were registered. Rotations around the three axes were calculated using the MIM software. A comparison in terms of absolute displacement and rotations was performed in order to evaluate if a significant difference could exist between the two systems.

Materials and Methods: 10 patients were chosen for a total of 26 CBCT analyzed in each arm of the study. For every patient, the change in the position applied by the physician after the CBCT was registered and a mean shift was calculated. Since our set-up does not allow to apply rotations to the couch, the MIM software was used to evaluate rotations: the CBCTs and the plan CT were imported and a box based rigid fusion was performed and checked by a trained physician. Shifts in the three directions and rotations were acquired. The mean value of the displacement (along x, y and z) and of the rotations was calculated and a 3D displacement (3Dd) value was obtained, together with the 5 and σ values of the distributions respectively representing the distribution of systematic errors and of population random errors.

1 Van Herk M. Sem. Rad. Onc. 2004;14

Results: In table 1 the group mean 3Dd of the clinical applied translations (APP) for the two groups of patient is reported, together with the 3D displacement and rotations obtained with the MIM fusions, with SDs. The applied 3Dd varied between 0.4 and 6.2 mm (group A) and 0.6 and 8.1 mm (group B). Maximum Σ and σ were 2.3 (scored along the vertical direction, y) and 1.0 mm (registered along the cranial-caudal direction, z), respectively for group A and 2.7 and 1.8 mm for group B. Mean differences in translational shifts between MIM and applied shifts were of 0.19 mm (A) 0.20 mm (B) along x, of -0.14 (A) and -0.10 mm (B) along y and of -0.23 (A) and 0.19 mm (B) along z, with a maximum deviation of 3.9 mm (a) and 3.5 mm (B) respectively along y and z.

Conclusions: Our analysis showed that no significant difference between the two positioning systems exist. The results obtained with MIM demonstrate that both systems are able to keep patient head rotations minimal and that the possibility of applying roto translations instead of simple translations do not give a substantial reduction of shifts. A widest set of patient is needed in order to improve the statistic and to make the evaluation more robust. It has also to be noticed that the set B was adopted recently in our