Effect of daily variation in rectal and bladder filling: an EP-1782 study shows clearly the need for adding margin to the target to (range: -18% to 0%) among the 80 shifted plans generated in iii) The average loss of TCP was estimated to be about -5% ii) Target dose coverage (D99%) was degraded from 100% to a (inferior-superior) directions, respectively.

linac isocenter were (mean ± SD, all in mm): 0.5 ± 0.3; -0.3 ± 0.1; 0.1 ± 0.2; -0.6 ± 0.3 for (X, lateral), (Y, anterior-posterior) and Z (inferior-superior) directions, respectively. ii) Target dose coverage (D99%) was degraded from 100% to a mean ± 1.96 x SD of the measured CBCT isocenter misalignments were simulated for each SRS plan (i.e., 8 shifted plans) were obtained for each SRS case). Target dose coverage (D99%) and TCP (estimated according to "mean ± 1.96 x SD" of the measured CBCT isocenter. Eight X -Y-Z shifts was derived from (a) and (b).

To analyze the dosimetric impact of the CBCT isocenter misalignment, 10 cranial SRS cases were randomly selected from our database. For each case, the isocenter in the original plan ("reference plan") was shifted according the misalignments obtained for CBCT isocenter. Eight X-Y-Z shifts were calculated generated from 

mean ± 1.96 x SD of the measured CBCT isocenter misalignments. For rectum, R1-R25 volumes varied from 30.9% -205.9%, 47.5% -155.1%, 33.8%-150.2%, 44.6%- 208.1% and 43.4%- 140.2% of R0, respectively. Overall mean actual rectal volume were very similar to original rectal volume (101.6% of R0). Overall actual bladder dose (D1-D25) was lesser than original bladder (D0) dose. Statistically significant lower actual mean dose (range 13 to 30%) was observed when recorded for 25cc to 85 cc of bladder volume (p<0.05). For lower volumes less than 20 cc, difference was not significant. For rectum, difference between delivered and planned dose was statistically non significant for any volume. A comparison of volume to dose data showed a difference in planned and mean actual V15, V20 and V25 for bladder and V5 to V30 for rectum, which was statistically significant (p < 0.05).

Conclusion: Strict bladder and rectal protocols both for simulation and delivery is important in planning pelvic radiotherapy due to physiological variations in their daily volumes. Exact duplication of bladder and rectal volumes is difficult, however by using image guidance and ensuring at least 25% concordance of daily with original planning volumes of these organs, possible differences in actual delivered dose can be mitigated and accurate delivery of planned dose can be ensured.

Results: Even with strict bladder and rectal protocols, daily volumes varied in all individual cases. The range of bladder volume variation (B1-B25) recorded for 5 cases were: 30.7%-211.1%, 26.9%-119.1%, 27.8%-107.2%, 15.4%-305.8% and 27% - 92.6% of B0, respectively. Overall actual mean volumes were within 25% variation range (mean actual 76% of B0). For rectum, R1-R25 volumes varied from 30.9%-205.9%, 47.5%-155.1%, 33.8%-150.2%, 44.6%- 208.1% and 43.4%- 140.2% of R0, respectively. Overall mean actual rectal volume were very similar to original rectal volume (101.6% of R0). Overall actual bladder dose (D1-D25) was lesser than original bladder (D0) dose. Statistically significant lower actual mean dose (range 13 to 30%) was observed when recorded for 25cc to 85 cc of bladder volume (p<0.05). For lower volumes less than 20 cc, difference was not significant. For rectum, difference between delivered and planned dose was statistically non significant for any volume. A comparison of volume to dose data showed a difference in planned and mean actual V15, V20 and V25 for bladder and V5 to V30 for rectum, which was statistically significant (p < 0.05).

Conclusion: Strict bladder and rectal protocols both for simulation and delivery is important in planning pelvic radiotherapy due to physiological variations in their daily volumes. Exact duplication of bladder and rectal volumes is difficult, however by using image guidance and ensuring at least 25% concordance of daily with original planning volumes of these organs, possible differences in actual delivered dose can be mitigated and accurate delivery of planned dose can be ensured.

EP-1783 Translational and rotational set-up uncertainties in Head and Neck cancer treatments using CBCT
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Purpose or Objective: The aim of this study was to assess setup errors, both translational and rotational, for head and neck (H&N) cancer patients treated with intensity-modulated radiotherapy (IMRT) and volumetric-modulated arc therapy (VMAT) using daily pretreatment CBCT imaging guidance.

Material and Methods: A total of 57 CBCTs referred to 7 patients treated with an Elekta Agility Linear Accelerator were analyzed. Patients were treated in a supine position; as immobilization system for head and shoulder a thermoplastic fixation mask was used. Tattoos on the surface mask were placed on the laser projection. Axial CT-planning slices at 5 mm intervals were acquired and reconstructed at 2 mm. Image data set were sent to the Oncentre Masterplan Planning System. Planning CT was also sent via DICOM to XVI software for the co-registration with the CBCT scan. For the CBCT acquisition we used the “fast head and neck 520”. The 3D-3D co-registration with the CT planning scan was performed using the Grey level algorithm. Translations were measured in medio-lateral (x), supero-inferior (y) and antero-posterior (z) directions, as well as in rotation around axes. Online corrections for translational increments were applied, based on the basis of literature data, when the discrepancy exceeded 3 mm. Rotation corrections were recorded with a