

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.

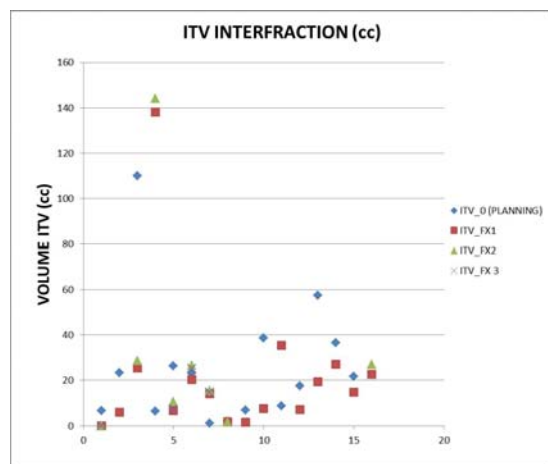


Fig 1. ITV interfraction variation (vol. cc)

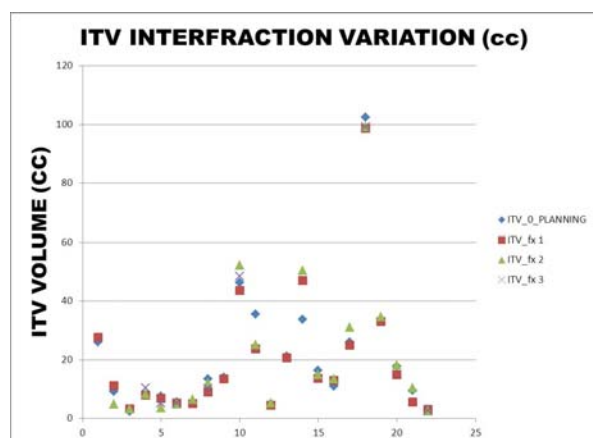


Fig 2. ITV interfraction coverage

Conclusions: There is a variation in the interfraction 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.

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

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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, Lat), Y (Longitudinal, Lng), Z (Vertical, Ver) and rotational directions Rx (Pitch, Rotation X), Ry (Roll, Rotation Y), Rz (Yaw, Rotation Z) were recorded. To compare the data by t-test using SPSS 13.0.

Results: The absolute translational setup errors (mean \pm SD) in X (Lateral,), Y (Longitudinal), Z (Vertical) axes of cervical vertebra before correction were 1.71 ± 0.10 mm, 1.81 ± 0.11 mm and 1.94 ± 0.09 mm respectively. 3.17 ± 0.19 mm, 4.26 ± 0.28 mm, 2.18 ± 0.12 mm for thoracic vertebra and 2.69 ± 0.24 mm, 3.33 ± 0.26 mm, 2.86 ± 0.21 mm 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 ($t = 2.876, P = 0.010$) 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 \pm SD) in RX (Pitch), Y (Roll), Z (Yaw) axes of cervical vertebra before correction were $0.67 \pm 0.04^\circ$, $1.06 \pm 0.06^\circ$ and $0.78 \pm 0.05^\circ$ respectively. $0.62 \pm 0.05^\circ$, $0.75 \pm 0.06^\circ$, and $0.84 \pm 0.06^\circ$ for thoracic vertebra, $0.59 \pm 0.06^\circ$, $0.80 \pm 0.07^\circ$, and $0.73 \pm 0.06^\circ$ for lumbar vertebra. T-test of paired data of set up errors before and after CBCT showed significant difference in RX ($t = -2.27, P = 0.03$), RY ($t = 4.109, P = 0.00$), Z ($t = 2.057, P = 0.04$) axes of cervical vertebra, RY ($t = 7.106, P = 0.00$) 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.

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The imaging dose and number of images taken during the CyberKnife[®] treatment for brain and prostate tumors

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